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ABSTRACTS

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Gynecology And Obstetrics

A case report of a false positive NIPT result due to vanished twin

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We report a case of a 30 year-old primipara who conceived after IVF due to primary infertility.

At 10th week of pregnancy during an ultrasound scan (US) DC/DA twins were confirmed. Also during the US vanished twin syndrome was diagnosed, fetus A was alive, meanwhile fetus B stopped developing. The patient decided to perform a non-invasive prenatal test (NIPT). NIPT results showed an increased risk of 21st chromosome trisomy and showed male sex. Test was performed when twin B stopped developing.

After the NIPT results, the patient was consulted in the perinatology centre in the Hospital of Lithuanian University of Health Sciences Kaunas clinics. At the 15th week of pregnancy during an US DC/DA twins were confirmed: fetus A was alive, there were no abnormalities of the fetal anatomy, meanwhile fetus B stopped developing at the 10th week of pregnancy. The decision was made to perform an invasive prenatal diagnostic procedure amniocentesis. However, after discussion with the patient about the possible false positive NIPT results caused by vanished twin syndrome, also in the NIPT result there was confirmed the male sex meanwhile during an ultrasound scan the female sex organs were confirmed.

Amniocentesis was performed in a typical way, without complications. Amniocentesis was done only for twin A because the patient did not want to increase the risk of miscarriage. The sample of fetus A's amniotic fluids were tested, the genetic molecular testing was performed - there were no chromosome number abnormalities, also the test confirmed female sex (XX chromosomes).

After evaluation of the genetics test and US results, the decision was made that NIPT showed the vanished twin increased risk of 21st chromosome trisomy.

At 38th week of pregnancy an elective caesarean section was made because of the fetal breech presentation.

Antenatal diagnosis of fetal cardiac rhabdomyomas and tuberous sclerosis by ultrasound and NIPT: case report

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Fetal cardiac rhabdomyoma is a rare condition, but the most common fetal cardiac tumor, which constitutes more than 60% of all cardiac tumors diagnosed during the intrauterine life and post-natal age. Technical advances in fetal echocardiography have facilitated their prenatal diagnosis. Although rhabdomyomas may form in any part of the heart, they are usually detected in the ventricles and interventricular septal areas. The median diagnostic age is 28 weeks. The incidence of cardiac rhabdomyomas being associated with tuberous sclerosis (TS) is around 50–80%. TS is an autosomal dominant neurocutaneous disorder that most commonly affects central nervous system, heart, skin, retina, kidneys and lungs. Cardiac rhabdomyomas may be the earliest manifestation of TS, therefore the objective of this case report is to highlight the possible approach and tactics once rhabdomyomas are detected.

This case report focuses on extremely rare finding of multiple cardiac rhabdomyomas of the fetus of 38-year-old female, gravida and parity one, at 26 weeks of gestation. Echocardiographic findings demonstrated an intracardiac bulky mass, 18 × 11 mm, on the apical right ventricular wall and a similar mass, 7,9 × 5,2 mm, on the interventricular septum of the left ventricle. Both masses presented a hyperechogenic, homogeneous aspect and were diagnosed as cardiac rhabdomyomas. Fetal cranial sonographic examination caused the suspicion of tubers, therefore MRI was performed. Noninvasive prenatal testing (NIPT) was used in order to indicate the presence of tuberous sclerosis and adapt adequate multidisciplinary approach. Genetic analysis confirmed the diagnosis of TS. A male neonate was delivered at the 37th gestational week, with stable cardiac and respiratory functions. No prompt surgical treatment was required, however, antiepileptic drugs were prescribed.

Prognostic counseling for pregnant women should include not only the prognosis of the tumor itself but also information regarding TS, emphasizing the importance of genetic analysis.

Clinical characterization and collagenopathic phenotyping in preterm birth due to cervical insufficiency

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Objectives

Preterm birth (PTB) occurs in ~5-18% of births worldwide, and in ~5–6% in Latvia. PTB in 1-2% of the cases are associated with cervical insufficiency (CI). Our previous systematic literature analysis identified 12 genes linked to CI, with the majority causing collagenopathies. Our **aim** for this study was to evaluate the proposed idea of CI being a subtle form of collagenopathy.

Materials and Methods

Forty patients were recruited for a longitudinal cohort study at Rīga Maternity Hospital. Inclusion criteria were singleton pregnancy and cervical length ≤ 25 mm at 14-28th weeks of gestation (mean cervical length 15.8mm). Deep phenotyping of 40 patients using an extended Brighton questionnaire was performed. Clinical-exome sequencing was carried out before in 21 patients.

Results

A clinical description of 40 patients: progesterone supplementation was recommended in all cases. Seven received antibacterial therapy due to suspicion of intraamniotic infection. Cervical cerclage was placed in five cases, pessary – in 12, two patients received both. Eight pregnancies resulted in PTB at 32-37 weeks, three at 28-32, and 11 at 22-28 weeks. Eleven patients delivered at term. There was one case of perinatal death. Four patients were born preterm themselves, 19 had a positive personal history of late pregnancy loss or PTB in previous pregnancies, 11 had a positive family history of PTB. Nine patients demonstrated collagenopathic features – arthritis, joint dislocations, myalgia, and ruptures. One of these patients had variants of unknown significance/likely pathogenic variants in *COL12A1* and *COL1A1*, one – variant in *FKBP14*, and one – variants in *COL1A1* and *LAMA4*. Eight patients having possible genetic susceptibility variants did not show collagenopathic symptoms, but only CI.

Conclusions

Outcomes for CI patients can be improved with up-to-date management of the condition. The idea of CI being a subtle form of collagenopathy is strengthened by the genetic and deep phenotyping findings, further investigations are warranted.

Clinical chorioamnionitis during labour and delivery course, outcome for the mother and newborn

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Objectives

Chorioamnionitis (CA) is an inflammation of the amniochorionic membrane, and is a significant cause of maternal and neonatal morbidity. The aim of this study is to investigate the risk factors of CA and its association with adverse maternal, neonatal outcomes and mode of delivery.

Materials and Methods

We performed retrospective case control observational study that enrolled 210 singleton deliveries in Riga Maternity Hospital at ≥ 37 weeks of gestation (2018-2019). 105 cases with clinically diagnosed CA were compared to control group of 105 labours. Clinical CA was defined as elevated temperature and one or more of the following: fetal tachycardia > 160 x/min, maternal tachycardia > 100 x/min, maternal leucocytosis $> 15\ 000/\text{mm}^3$, purulent/smelly discharge. The data were analysed using SPSS- Pearson Chi-Square, Independent Samples T and Mann-Whitney U Test with the cut of point of $p < 0.05$.

Results

The average maternal body temperature in CA group was 38°C . Commonly the temperature rising point was during 1st (59%) and 2nd (24%) stage of labour. There were statistically significant differences in length of ruptured membranes ($805,2 \pm 450,6$ min; $761,7 \pm 406$ min, $p < 0,001$), the rate of labour induction (59/105; 35/105, $p = 0,001$), uterine dysfunction (84/105; 50/105, $p < 0,001$), use of epidural analgesia (90/105; 61/105, $p < 0,001$), the length of 1st period ($627,86 \pm 202,8$ min; $434,44 \pm 206,1$ min, $p < 0,001$) and the 2nd stage of labour ($84,86 \pm 52,84$ min; $57,78 \pm 51,24$ min, $p < 0,001$), presence of meconium stained amniotic fluid (42/105; 25/105, $p = 0,012$), the rate of Caesarean sections (38/105; 14/105, $p < 0,001$), cervical tears after vaginal delivery (25/67; 12/91, $p < 0,001$) and blood loss ($467,71 \pm 245,43$ ml; $360,76 \pm 178,88$ ml $p < 0,001$). The need of antibacterial therapy postpartum in neonates was higher in CA group (50/105; 15/105, $p < 0,001$).

Conclusions

CA complications as increased Caesarean section rate and high blood loss are the risk factors for mother's morbidity and mortality. It should be taken in to account managing delivery, prescribing adequate antibacterial therapy and postpartum haemorrhage prophylaxis.

Comparison of vaginal delivery outcomes in midwife-led versus physician-led labour ward setting. A propensity scores matched analysis

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Objectives

The aim of this study was to compare midwife-led and obstetrician gynecologist-led care related vaginal delivery outcomes

Materials and Methods

A propensity score matched case-control study of midwife-led versus physician-led low risk delivery outcomes. Patient characteristics and outcomes were compared between the groups. Continuous variables are presented as mean \pm SD (standard deviation) and analysed using Mann-Whitney U test. Categorical and binary variables are presented as frequency (percentage) and differences were analysed using chi-square test. Analyses were conducted separately for the unmatched (before PSM) and matched (after PSM) groups.

Results

Postpartum haemorrhage differences between physician-led and midwife-led labour were significant in both unmatched and matched populations ($p=0.007$ and $p=0.026$), same for hospital stay duration ($p=0.001$ and $p=0.042$), perineal tears ($p<0.001$ and 0.034), newborn APGAR 1 ($p=0.018$ and $p=0.002$), newborn APGAR 5 ($p=0.010$ breast and $p=0.004$) and pain relief ($p<0.001$ and $p=0.002$). Significant differences were seen in unmatched but not confirmed in matched population for obstetrical procedures used during labour, breastfeeding, delivery induction and successful vaginal delivery as overall spontaneous vaginal delivery success measure.

Conclusions

Midwifery-led care significantly reduced rates of unnecessary medical interventions, decreased hospital stay duration and postpartum haemorrhage, increased newborn APGAR 1 and 5 minute scores. Midwifery-led care is same safe as physician-led care and does not influenced rate of successful spontaneous vaginal deliveries.

Do such factors as parity or BMI affect the placental volume and placental quotient in the first trimester?

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Objectives

It is well known that parity and high BMI are associated with increased birthweight and placental weight. The aim of our study was to evaluate whether parity and BMI affects placental volume and placental quotient in the first trimester.

Materials and Methods

During the first trimester screening Placental volume was obtained in 64 pregnant woman with VOCAL software (Voluson E8, GE). The off-line analysis was performed using VOCAL option (30°). All cases of fetal anomalies were excluded. Informed consent was signed before enrolment.

Placental quotient (PQ) was calculated by dividing PV by the foetal crown–rump length (CRL). Body mass index (BMI) was calculated (kg/m²) and recorded. To assess parity influence on the placental volume, patients were divided in two subgroups - there were 25 patients in nullipara and 39 in multipara subgroup. Spearman's correlation coefficient (ρ) was used to study the relationships between all the studied variables. $P < 0.05$ was considered statistically significant.

Results

The median PV in nullipara group was 56,93mm and 66,51mm³ in multipara group, a non statistically significant difference ($P=0.36$). The median PQ in both groups were not significant different with 0,223 in nulliparous vs. 0.195 for the multipara group ($P=0.36$). On the average BMI was 22.54 (range 17.08–35.75) kg/m². BMI did not correlate with PV ($\rho = 0.096$, $P = 0.45$) or PQ ($\rho = 0.053$, $P = 0.67$)

Conclusions

The results of our study suggest that placental volume does not correlate with parity or BMI. The limitation of current study was the small number of patients. Further studies are needed to evaluate the influence of parity and obesity on placental volume.

Experience of implementation of Robson classification at Riga Maternity Hospital

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Objectives

Substantial increase of Caesarean section (CS) in developed countries increase health care costs without significant improvement of perinatal and maternal morbidity.

The aim of the study was to analyse the dynamics of delivery patient profile and CS in specific patient groups in order to develop a strategy for reducing CS rate.

Materials and Methods

Since 2011 all deliveries in Riga Maternity hospital were classified according to the Robson classification using the electronic medical data basis. The most important factors influencing the number of CS were searched for and a strategy for changing the labour management was developed.

Results

CS section rate in Riga Maternity hospital 2011-2019 was $20.3 \pm 1.5\%$. According to the Robson classification, Group 1 (nulliparous women with a single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour) and Group 3 (multiparous women without a previous CS, with a single cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labour) were the most represented groups. From 2011 to 2014 Group 1 was the biggest - $34.2 \pm 0.7\%$ from all deliveries. The leading position changed - starting from 2015 Group 3 had a dominant role - $33.7 \pm 1.6\%$.

Despite the increasing rate of successful vaginal delivery in the group with previous uterine scar from 2.3% in 2011 to 18.6% in 2019, during the whole period the CS of Group 5 had the largest contribution to all deliveries ($8.1 \pm 0.7\%$). The second biggest contribution had Group 1 ($4.5 \pm 0.7\%$).

Conclusions

The profile of patients in the Riga Maternity hospital during last 9 years has changed. The Robson classification is helpful tool for healthcare facilities to identify and analyse delivery patient profile and CS rate within the groups. Although, rate of vaginal delivery after previous CS has increased, the CS rate in the Group 1 stays constant. To develop strategy for decrease of CS rate deeper understanding of reasons of CS in the Group 1 is needed.

First-time delivering women's fear of childbirth and its relation to childbirth outcomes

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Objectives

The objective of this study was to evaluate first-time delivering women's fear of childbirth (FOC), ascertain its origins and links between tocophobia and childbirth duration, maternal and neonatal outcomes.

Materials and Methods

A prospective study was conducted at the tertiary care teaching hospital (Kaunas, Lithuania) in 2020. 110 patients were included. FOC was evaluated via questionnaire, medical data were collected from hospital's database and analyzed using MO Excel and IBM Statistics SPSS for frequencies, T-test and χ^2 test. Results with values of $p < 0.05$ were considered as statistically significant.

Results

Almost half of respondents felt FOC (44,5%; n=49). Most indicated FOC by 3/10 points (25,5%; n=28). 9 women (8,2%) felt complete absence of fear (0 points). Life altering tocophobia (10 points) affected 5 respondents (4,5%). Age didn't have statistic link with FOC ($p=0,261$). Majority was worried about newborn's health (89,1%; n=98) and labor pain (79,1%; n=87). Poor maternal and neonatal outcomes didn't have links with FOC ($p>0,05$). 23 participants previously suffered pregnancy loss, it was related to FOC ($p=0,036$), their fear was more intense than those with no previous pregnancies ($p=0,012$). Most women delivered naturally (85,5%; n=94), more than half felt FOC (55,32%; n=52). Women with FOC had longer deliveries ($p=0,047$). Delivery time increased as fear intensified ($p=0,002$). Delivery method didn't correlate with FOC ($p=0,443$). Majority used pain relief methods (drugs, inhalation, epidural anesthesia) (78,2%; n=86). Women with FOC were more likely to be administered with pain relief method ($p=0,011$).

Conclusions

Almost half respondents experienced FOC. Main reason for FOC was newborn's health. There were no significant links between FOC and poor childbirth outcomes. FOC was more intense for women with failed pregnancy history. Longer delivery time was observed in women with FOC, they were more likely to use labor pain relief methods.

Is energy based physiotherapy use reasonable for those who do not have female sexual dysfunction?

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Objectives

HIFEM technology – innovative physiotherapeutic method for diminishing weakness of pelvic floor muscles (PFM). Its effect is based on intense focused electromagnetic fields, causing contractions of higher tension than Maximal Voluntary contractions of PFM. As strong PFM is associated with high sexual function and satisfaction, HIFEMt is believed to have great prospectives in treatment of Female Sexual dysfunction (FSD). But could it be used to improve sexual life in case of normal sexual function?

Materials and Methods

40 women, aged 25 to 45, selected according to specific criteria, underwent ten HIFEM technology procedures according to local regimen. Data was obtained from questionnaires, filled before the 1st and the 10th procedures, using validated FSFI – suggesting FSFI < 26.55 for the diagnosis of FSD – and supplementary questions. Data was processed with Microsoft Excel and IBM SPSS Statistics 22.0.

Results

60% (n=21) of patients were nullipara. 50% (n=7) of those, who had ≥ 1 child had episiotomy/ruptures during labor. 48.6% (n=17) named anorgasmia as the reason of participation in the research, 42% (n=15) – libido problems, 20% (n=7) – pain during intercourse. Before the start of procedure cycles 60% (n=24) of all patients had FSD, with the mean (IQR) value 22.50 (4.85) with the lowest numbers in Desire domain (3.10 (1.00)).

87.5% (n=35) of patients have underwent full procedure cycle. 12.5% (n=5) were excluded because of developing contraindications for the procedures (pregnancy, acute infections, hemorrhoid disease). 5.7% (n=2) developed complications after 7th and 10th procedure (PFM hypertonus (n=2)), both non-FSD group.

After the 10th procedure 42.9% had FSD (n=15) with FSFI 27.17 (3.58). The biggest changes were in Orgasm domain (0.84 (1.37)) after the 5th; 0.93 (1.6) after the 10th. Medians (Q1-Q3) of FSFI changes from 1st till 10th procedure between FSD group and non-FSD group were statistically significant: 6.1 (3.1-11.1) and 1.9 (-3.1-5.0).

Conclusions

HIFEMt shows better results in symptomatic therapy of FSD than as method of improvement of previously normal sexual function – its use for non-FSD patients is possible, however each case should be considered individually. Further evaluation needed.

Knowledge and beliefs about human papillomavirus and vaccination against it among adolescents and parents

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Objectives

Immunization against human papillomavirus (HPV) in Latvia started in 2010; the average coverage is under 60%. It is important to understand what knowledge adolescents and parents have about HPV, as a lack of knowledge can seriously threaten the vaccination coverage, which affects the spread of HPV-related diseases. The aim of this study was to evaluate adolescents and parents' knowledge and their beliefs about HPV and vaccination.

Materials and Methods

A cross-sectional survey was carried out. Structured questionnaires were used for surveys in the Internet and in schools. 1576 questionnaires were analyzed. Respondents were parents and 8th grade pupils from Riga. Knowledge was assessed using 17 questions, and overall knowledge was scored according to the correctly answered questions. This research was approved by RSU Ethics Committee. The results were statistically analyzed using IBM SPSS 26.

Results

The study included 1266 adolescents (58.1% girls, 41.9% boys) and 310 parents (96.8% mothers, 3.2% fathers). Using a scale from 1 to 5 correspondingly to how informed they felt about HPV vaccine benefits and possible risks, the analysis indicated the mean 2.1 for adolescents, 3.5 for parents. 6.6% adolescents and 56.8% parents knew HPV may cause cervical cancer. 54.5% adolescents believed that most sexually active people do not develop HPV in their lifetime. 32.9% adolescents and 21.3% parents considered that the vaccine contains cancer cells. 34.4% adolescents and 25.2% parents assumed that after the vaccination there is a risk of infertility. The knowledge score of the parents of vaccinated adolescents was statistically significantly higher than of the parents of non-vaccinated adolescents, the same was observed between vaccinated and non-vaccinated adolescents ($p < 0.001$).

Conclusions

The study implies that parents who vaccinate their children, and adolescents who are vaccinated have better knowledge about HPV and vaccination. To increase the vaccination coverage, it is important to improve adolescents and their parents' knowledge.

Knowledge of sexual and reproductive health among young adults

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Objectives

To investigate the sources of sexual and reproductive health (SRH) information among young adults aged 16, 17 and 18 years and compare their dominance in 3 countries – Latvia, Portugal and Cape-Verde. To compare the knowledge of SRH topics in three countries with different social backgrounds – Latvia, Portugal and Cape-Verde.

Materials and Methods

A quantitative study performed by means of a 3-part questionnaire: Identification; Sources of information; Knowledge of sexual and reproductive health. Two countries–Portugal and Cape-Verde are the target populations. Data was analysed within the country itself and compared to the other country under study. Theoretical data from literature about Latvia was analysed and used for further conclusions.

Results

A total of 611 individual students, 246 (40.3%) Portuguese and 365 (59.7%) Cape-Verdeans, predominantly feminine (51.7%), aged 16 years (43.7%). Most students acquired information about puberty and the reproductive systems of men and women through 'professors' (60.7% and 75.6% respectively). Young adults are more comfortable and prefer to speak to friends about sex related topics (36,8%) and personal issues (44.2%). Students report an acceptable level of knowledge: 76.6% know women can get pregnant on their very first sexual intercourse, 83,1% know that STIs can occur from the first sexual intercourse. The most familiar contraceptive method is 'condoms' (96.6%) and 'HIV' (95.9%) is the most recognized STI.

Conclusions

Young adults need a deeper, more specialized SRH education, which is essential for responsible sexual behaviours. They gravitate more towards their peers for information, even though their primary source of information is their professors. Specializing teachers in SRH education is of utmost interest when it comes to improving it worldwide. Superficially, we conclude that problems in SRH education are present in both developed and developing countries. This study represents a small step in the understanding of adolescents SRH needs in Latvia, Portugal and Cabo-Verde.

Lithuanian students' knowledge about HPV and HPV vaccine

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Objectives

The aim of this study was to evaluate Lithuanian senior school students' knowledge about human papillomavirus (HPV) and HPV vaccination.

Materials and Methods

A survey-based cross-sectional study was performed during the period from February to June 2017. Study population consisted of the last two secondary school grades students from 5 biggest Lithuania districts. An original self-administered anonymous validated questionnaire was used.

Results

The final sample consisted of 8325 students, with 77.0% response rate. Median age of the responders was 18 (range 16-20) years. Half (50.1%, n= 4169) of the responders have heard of HPV but only 28.3% (n=2359) thought they knew what HPV was exactly. Females (compared to males) and students from urban regions (compared to rural regions) have heard of HPV more often, OR 2.5 (95% CI 2.3-2.7) and 1.3 (95% CI 1.2-1.4) respectively. Less than half (46.6%, n=3881) of students knew that HPV can be transmitted through sexual intercourse and only 2.1% (n=178) of them answered the questions about ways of transmission without a mistake. Just 0.4% (n=32) of the responders knew all possible diseases caused by HPV and only 19.6% (n=1633) of them knew at least about cervical cancer. Possibility of HPV vaccination was known by 22.7% (n=1891) of students. The majority (75.7%, n=6301) of students would like to get more information about HPV and HPV vaccine and 14.7% (n=1225) of students were not sure. The most preferable sources of information about HPV were public health specialists, doctors and teachers chosen by 57.9% (n=4820), 53.2% (n=4429) and 34.2% (n=2847) of students respectively.

Conclusions

We found a significant lack of awareness about HPV, diseases related to HPV and HPV vaccination among the students. However, students' wish to learn and preference for trustful sources obliges to make changes in education.

Lithuania's experience in reducing caesarean section rate

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Objectives

To evaluate the change in the number of caesarean sections (CS) in Lithuania following a multifaceted intervention.

Materials and Methods

The information system was used for CS and perinatal mortality rate data collection.

The multifaceted intervention took place in 2012 – 2019 and consisted of 1) implementation of the Robson's classification (2012); 2) implementation of a CS audit system as the quality of care indicator (2012); 3) national professional training courses (2012-2014), and 4) regular audit of recommended CS rates at different levels of maternities (according to WHO) by National Committee of Integrated Perinatal Care was performed (2012).

Results

In the period covered by the study, 217 523 women gave birth in Lithuania. The national CS rate edged down from 26.01 % to 20.43 % in 2012-2019 ($p < 0.001$). The reduction was gradual: from 26.01 % to 25.21 % in 2012-2013, from 25.21 % to 21.64 % in 2013-2014, from 21.64 % to 22.17 % in 2014-2015, from 22.17 % to 20.9 % in 2015-2016, from 20.9 % to 20.2 % in 2016-2017, from 20.2 % to 20.56 % in 2017-2018, from 20.56 % to 20.43 % in 2018-2019. The perinatal mortality was 5.3‰ in 2012, 6.26 ‰ in 2013, 6.2 ‰ in 2014, 5.66 ‰ in 2015, 5.85 ‰ in 2016, 4.9 ‰ in 2017, 5.41 ‰ in 2018, 5.42 ‰ in 2019.

Conclusions

- The CS rate decreased with statistical significance from 26% (2012) to 20,4% (2019).
- The change in CS did not have a negative impact on perinatal mortality.

Maternal and perinatal outcomes among obese parturients in the Riga Maternity Hospital

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Objectives

The increasing number of obese women of reproductive age leads to the global epidemic of obesity. In 2018 in Latvia 16.4% of women between age 15 and 49 were obese. Adipose tissue has dysregulatory effects on metabolic, vascular, and inflammatory pathways in many organ systems during pregnancy. Obese pregnant women are at increased risk for an array of maternal and perinatal complications.

Materials and Methods

All pregnant women with obesity (maternal pre-pregnancy BMI ≥ 30 kg/m²) who delivered in the Riga Maternity Hospital in Riga, Latvia from January 2018 to December 2019 were included in a retrospective case-control study. We used individual participant data from 684 mother-offspring pairs and assessed the associations of obesity and maternal and perinatal outcomes. As control group 242 mothers with normal BMI were selected.

Results

In 2018 and 2019, there were 11776 deliveries in the Riga Maternity Hospital. Obesity was identified in 684 (5.8%) of women. Total rate of Cesarean sections was 223 (32.6%) in the case group and 39 (16.2%) in the control group.

The diagnosis of preeclampsia, gestational hypertension and gestational diabetes mellitus was made in 25 (3.7%), 118 (17.3%) and 175 (25.6%) in cases and in 4 (1.6%), 9 (3.7%) and 12 (5.0%) in controls, respectively. Preterm birth was in 69 (10.1%) in the case group and in 20 (8.3%) in the control group.

Macrosomia (birth weight >4000 g) was identified in 182 (26.0%) neonates and 46 (19.0%) neonates in obese mothers and normal BMI mothers, respectively. Admission in neonatal ICU was needed for 80 (11.4%) newborns in cases and 15 (6.2%) in controls.

Conclusions

Obesity during pregnancy enhances maternal and fetal vulnerability to different adverse short-term and long-term obstetric outcomes. There is a need for a great focus and comprehensive approach on preventing, screening, diagnosing, and managing obesity-related problems in pre-pregnancy period and pregnancy.

Methods for cervical volume measurements and interobserver agreement analysis

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Objectives

Prior to starting research on cervical regeneration after Loop electrosurgical excision procedure (LEEP), the authors conducted a pilot study to assess reproducibility between their measurements and compared three different methods for cervical volume (CV) evaluation.

Materials and Methods

Women of reproductive age undergoing gynecological ultrasound examination were recruited and gave their informed consent. Cervical 3D measurements were obtained, stored in an archive, and assessed by two examiners in a blinded manner.

Measurements included cervical length (CL), cervical anteroposterior (AP), and longitudinal (LL) diameters. Cervical volume was measured three times by 3D VOCAL (Virtual Organ Computer-Aided Analysis) software (V_{vocal}), by cylinder formula ($V_{\text{formula}} = 3.14 \times [AP + LL] / 4 \times \text{Length}_{\text{cervix}}$) and USG devices inbuilt generic volume formula ($V_{\text{formula_gen}}$).

To evaluate measurement reproducibility between methods and two examiners we calculated the Intraclass Correlation Coefficient (ICC) and 95% Confidence Intervals for intraobserver, interobserver, and inter-method agreement. ICC was calculated using a two-way mixed-effects model in SPSS software.

Results

We analyzed 35 images. Mean women's age- 34.7 ± 5.5 mm, CL 30.8 ± 4.5 mm, AP 30.4 ± 3.6 mm, LL 34.7 ± 4.9 mm. Average $V_{\text{formula_gen}}$ $17.46 \text{ cm}^3 \pm 7.60$, average $V_{\text{vocal}} = 25.73 \text{ cm}^3 \pm 5.40$ and average $V_{\text{formula}} = 26.53 \text{ cm}^3 \pm 8.65$. CV measured with Generic formula estimated volume inadequately small, due to the fact that only depth, length, and height measurements were used.

All ICC showed excellent reliability. CL interobserver ICC 0.85, $P < 0.000$, CI 95% 0.702-0.924. V_{vocal} interobserver ICC= 0.927, $p < 0.000$, CI 0.855-0.965. V_{vocal} interobserver ICC= 0.85, $p < 0.000$, CI 0.808-0.947. All intraobserver ICC were within 0.85-0.99 interval range ($p < 0.000$).

Intermethod agreement between V_{vocal} and V_{vocal} ICC=0.86, $p < 0.000$, CI 0.741-0.927.

Conclusions

All measurements showed adequate reliability within interobserver, intraobserver, and inter method measurements. Generic formulas should not be used for the evaluation of CV. The cylinder formula for the assessment of CV is comparable to 3D VOCAL measurements.

Methotrexate treatment of tubal ectopic pregnancy: experience of Hospital of Lithuanian University of Health Sciences Kaunas Clinics

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Objectives

To identify tubal ectopic pregnancies treatment with methotrexate outcomes in Hospital of Lithuanian University of Health Sciences (LUHS) Kaunas Clinics Obstetrics Gynaecology department.

Materials and Methods

A retrospective analysis was conducted for LUHS Kauno Klinikos Obstetrics and Gynaecology department registry data. All 2018-2019 years tubal ectopic pregnancy cases (n=40), where methotrexate was administered, were analyzed. The following criteria were evaluated: female demographics, risk factors and symptoms of tubal ectopic pregnancy, ultrasound findings, human chorionic gonadotropin (hCG) levels, number of methotrexate doses, treatment efficacy, and whether methotrexate was administered according to recently recommended criteria. The data was analyzed using "SPSS 23.0 for Windows", the Fischer and Chi-squared tests were used. The results were statistically significant then $p < 0,05$.

Results

Most patients were pregnant for the first time and on average 6 weeks of gestation, complained of abdominal pain and vaginal bleeding, which ultrasound usually showed a heterogeneous structure of varying size in the field of uterine adnexa. The most common risk factors among women were pelvic or abdominal surgery in the past (22.5 %), tubal ectopic pregnancy in the past (10.0 %) and intrauterine device (7.5 %). In most cases (92.5 %) methotrexate was administered according to recommended criteria. The outcome of methotrexate treatment is unknown in 35.0 % cases. Treatment of tubal ectopic pregnancy with methotrexate was effective in 76.9 % cases. Three out of four women (75 %) received a single dose, rest required the second dose of methotrexate. Urgent surgery was performed in 23.1 % of women, but when methotrexate was prescribed according to the recommended criteria - 17.4 %. All operations were performed after the first drug dose.

Conclusions

At LUHS Kaunas Clinics treatment of tubal ectopic pregnancy with methotrexate was successful in 76.9 % of women. Although the results are very similar to the scientific literature, further prospective studies are needed.

Nulliparous women with term pregnancy and cephalic presentation as a focus group to reduce Caesarean section rate in future

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Objectives

The rate of Caesarean section (CS) is increasing for complex reasons. In previous studies it was found that CS rate of nulliparous women with term pregnancy with spontaneous labor and fetus in cephalic position (Group 1 according to Robson classification) makes great effect on the number of CS at Riga Maternity hospital.

Materials and Methods

A descriptive retrospective study was conducted in Riga Maternity hospital for the year 2019. Data about the Group 1 were collected from the electronic medical data basis, medical histories. Data were further analysed with Microsoft Excel and SPSS 26.0.

Results

In 2019 there were 5835 deliveries in Riga Maternity hospital, CS rate – 21.5%. Group 1 was 26.0% (1520 deliveries) of all deliveries with CS rate – 13.6% (207) which makes 3.5% of all deliveries. 204 CS were analysed, 3 - excluded because lack of data. The mean age of women – 29±5.1 years with mean BMI 23.5±3.7 kg/m². Mean gestation age at the time of delivery was 40 weeks 3 days.

85/204 (41.7%) SC were performed due to dystocia and suspected fetal compromise. 26/85 (30.6%) patients reached full dilatation; oxytocin was used in 21/26 cases (80.8%). Cardiotocography subacute 15/26 (57.7%) or chronic 8/26 (30.8%) fetal distress were seen in this group more often. 59/85 (69.4%) patients did not reach a full dilatation, of which 10/59 (16.9%) did not receive oxytocin. The most common indications for a CS were uterine dystocia 42/59 (71.2%), fetal distress 10/59 (16.9%) and a cephalopelvic disproportion 4/59 (6.8%).

43/204 (21.1%) SC was performed due suspected fetal compromise. 14/204 (6.9%) previous planned CS performed urgently due to spontaneous labour, placental abruption, or umbilical cord prolapses.

Conclusions

The strategy to reduce SC rate should be based on more active management of labour for nulliparous women, including the use of oxytocin in childbirth.

Omega-3 index in pregnant women in Latvia

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Objectives

Studies show that omega 3 fatty acids are vitally important for both: the infant for development of the nervous system and retina and for the mother - reduces risks of adverse pregnancy outcomes and prevents perinatal depression. The aim of this study is to analyse omega-3 fatty acid status in Latvian women during pregnancy.

Materials and Methods

The study has been implemented within the frame of the project LZP Nr. lzp-2019/1-0335 funded by Latvian Council of Science. A cross-sectional survey of 144 pregnant women in 3rd trimester and women with single-ton birth until 7th day post-partum. Data was obtained using questionnaire and medical documentation. Body mass index (BMI) was classified according to WHO recommendations. Blood samples were taken for measuring omega-3 index: relative eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) concentration in erythrocyte fatty acid. Data were analyzed using IBM SPSS 26.0.

Results

The mean age: 31.4 (SD 5.1) years; 33.3% were at age under 30; 57.5% were in age group 30-39; and 6.2% older than 40. The mean BMI 23.9 (SD 3.6) kg/m².

The omega-3 index was from 2.3% to 9.4%, median was 5.7 (IQR 4.9-6.5)%. Omega-3 index <8% was detected in 96.5% (n=139), 8-11% in 3,5% (n=5) women. In summer omega-3 index in all participants was <8%, median was 5.2 (IQR 4.6-6.2)%, in fall omega-3 index was >8% in only 6.8% of the participants, median was 5.9 (IQR 5.4-6.6)%. Statistically significant difference (p<0.001) between omega-3 levels in summer and fall.

There is no statistically significant correlation between omega-3 index and age or BMI.

Conclusions

Omega-3 fatty index was low in this study population. In fall omega-3 index was higher than in summer. To evaluate omega intake from food and supplements as well as evaluating impact of other factors to omega-3 status further studies are needed.

Oxidative and antioxidative status in pregnant women with diabetes mellitus

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Objectives

Pregnancy, especially due to increased oxygen demand is a condition that has increased sensitivity to oxidative stress.

The aim of the study was to assess oxidant and antioxidant status in the third trimester of pregnancy in pregnant women with diabetes.

Materials and Methods

Cohort study : 112 pregnant with DM (basic lot-L_b) and 112 without DM (control lot-L_c), delivered in Institute of Mother and Child, Chișinău, Moldova. L_b was divided into 3 sublots: 35 (31,3%) with DM type 1 (L_{b1}), 20 (17,8%) with DM type 2 (L_{b2}) and 57 (50,9%) with GDM (L_{b3}).

Results

We found a significant increase in the blood serum of the pregnant with DM compared to those in the L_c of : malondialdehyde (MDA) $8.96 \pm 0.21 \mu\text{M} / \text{L}$ vs. $7.24 \pm 0.15 \mu\text{M} / \text{L}$; advanced oxidation protein products (AOPPs) $88.99 \pm 2.64 \mu\text{M} / \text{L}$ vs. $76.25 \pm 1.51 \mu\text{M} / \text{L}$ and ischemia-modified albumin (IMA) $0.54 \pm 0.01\text{mM} / \text{L}$ vs. $0.45 \pm 0.01\text{mM} / \text{L}$. L_{b2} and L_{b3} vs. L_{b1} : MDA $9.50 \pm 0.76 \mu\text{M} / \text{L}$ and $9.15 \pm 0.27 \mu\text{M} / \text{L}$ vs $8.33 \pm 0.24 \mu\text{M} / \text{L}$; AOPPs $113.43 \pm 9.62 \mu\text{M} / \text{L}$ and $85.10 \pm 2.42 \mu\text{M} / \text{L}$ vs. $81.38 \pm 3.93 \mu\text{M} / \text{L}$. The antioxidant status showed a significant increase in pregnant with DM vs. L_cof : superoxide dismutase (SOD) $938.94 \pm 17.11 \text{ u} / \text{c}$ vs $763.24 \pm 11.74 \text{ u} / \text{c}$; total antioxidant capacity of various liquids (Cuprac) $1.43 \pm 0.15 \text{ mM} / \text{L}$ vs. $0.77 \pm 0.33 \text{ mM} / \text{L}$; GST $37.94 \pm 1.51\text{nM} / \text{sL}$ vs $28.97 \pm 0.01 \text{ nM} / \text{sL}$.

Conclusions

Pregnancies with DM have been exposed to a more pronounced degree of oxidative stress compared to euglycemic ones.

Perioperative intravenous dexamethasone efficiency in reducing postoperative pain after cesarean section

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Objectives

Pain after cesarean section remains an important problem that reduces the well-being of the mother and child. In this prospective randomised trial, the aim was to determine if 8 mg of intravenous dexamethasone given before caesarean section reduces postoperative pain and reduces the need for narcotic painkillers.

Materials and Methods

In our study we included 60 patients, that were scheduled for elective caesarean section. The operation was performed using spinal anaesthesia with bupivacaine, fentanyl, morphine. Patients were randomly divided into two groups, group GD (group dexamethasone) and GK (control group), thirty patients each. In GD patients received 8 mg of intravenous dexamethasone before caesarean section. In the GK – no dexamethasone was given. We obtained pain scores, severity of nausea, vomiting, pruritus, somnolence, urinary retention and painkillers used in 6–8, 12–16 and 24 hours' post-surgery. Data was compiled with Microsoft Excel and SPSS programs.

Results

In both groups of the study, patient's demographic profiles were similar. We found that there was a reduction in pain, measured changing position (patient moving), by one point in GD in time frame 6-8 h after surgery ($p < 0.022$). There also was a reduction in pain scale in GD 12 – 16 h after surgery, but this was not statistically significant with $P < 0.067$. There were no differences in both groups regarding intrathecally administered narcotic painkiller side effects. The same amount of acetaminophen, diclofenac and trimeperidine hydrochloride were used in both groups. It is noteworthy that the amount of patients receiving ketorolac was less in GD (6) than in GK (11 patients). But if ketorolac was administered, the doses were the same.

Conclusions

Administration of dexamethasone 8 mg intravenously slightly lowers pain score, while in movement 6 – 8 hours after operation. Dexamethasone does not decrease the need for narcotic painkillers.

Polymorphic eruption of pregnancy in first trimester

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Polymorphic eruption of pregnancy, also known as pruritic urticarial papules and plaques of pregnancy, is a condition that manifests as an itchy and bumpy rash mostly on abdomen and late in pregnancy. It is seen in 1 in 160 pregnancies and is associated with male fetus, multiple births and excessive weight gain.

We report 25 years old female patient that presented to dermatology clinic with the complaints of very itchy rash on her abdomen, armpits, groin and thighs for two weeks. At the moment of her first visit she was 12 weeks pregnant with her first pregnancy, normal body mass index, no comorbidities. The only received supplement was folic acid that was discontinued. The rash seen at the visit was small papules, occasionally grouped, excoriations in armpits and groin. Initially scabies was excluded and patient received topical treatment with corticosteroids and systemic antihistamins with minimal clinical response. Further due to rapid progression of the skin lesions into widespread urticarial rash patient received systemic corticosteroid treatment with methylprednisolone. After successful systemic treatment patient currently is symptom free and her pregnancy is advancing as planned.

Dermatoses unique for pregnancy can be a challenge for any dermatologist, as they don't always follow a classic pattern, affect life quality of the pregnant mother and might pose a risk for both - the pregnant mother and the fetus.

Pregnancy and delivery outcomes in women after IVF depending on previous pregnancy experience

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Objectives

Unsuccessful experiences of previous pregnancies in the presence of infertility often raise concerns about the positive outcome of pregnancy after IVF. This study aims to compare pregnancy and delivery outcomes in women after IVF depending on their previous pregnancy experience.

Materials and Methods

The retrospective study was conducted among the women who delivered after IVF in LUHS Hospital Kaunas Clinics in the period of 2018–2019. Women were divided into 2 groups depending on the previous pregnancy: G1-had a history of previous pregnancy, G2-had no pregnancies before. The current pregnancy and delivery outcomes were compared among these two groups. For statistical analysis z test, Mann-Whitney, Student T test and correlation were used applying SPSS. Results were considered significant at $p < 0.05$.

Results

A total of 133 women have delivered after IVF and 55 (41.3%) of them had previous pregnancies. The average age of women in G1 was 34 ± 0.5 and G2- 33 ± 0.4 years. The correlation of woman's age with the number of pregnancies ($cc=0.210$, $p=0.015$) and births ($cc=0.198$, $p=0.022$) was found. The frequency of gestational diabetes, hypertension, preeclampsia did not differ in the comparison groups. Asymptomatic bacteriuria was significantly more often detected in G1 (3.8% vs 0%, $p < 0.05$). Gestational age did not differ (G1-36 weeks vs G2-37 weeks) and the rate of premature delivery was similar (G1-30.9% vs G2-21.8%). Vaginal delivery was significantly more successful in G2 (64.1% vs 45.5%; $p < 0.05$). Both groups were statistically similar regarding neonatal birth weight (G1-2631g vs G2-2716g). Apgar score at 1 and 5 minutes did not differ between these groups.

Conclusions

The course of current pregnancy after IVF was not affected by previous pregnancies. Women who had no pregnancies in the past were significantly more successful to give birth naturally. Neonatal outcomes did not differ depending on women's previous pregnancy experience.

Pros and cons of the presence of a partner in childbirth during COVID-19 restrictions

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Objectives

One of the public health concerns is how to combine prevention of the further COVID-19 spread and the presence of a partner during labour and childbirth. The aim of the study was to analyze the impact of COVID-19 and related restrictions on the presence of a partner during childbirth.

Materials and Methods

The online quantitative survey and qualitative research (using in-depth interviews and focus group discussions) were conducted from July to October 2020 as a part of international multi-country study I-SHARE (International Sexual and Reproductive Health Survey in the time of COVID-19). The study was carried out as a part of the state research project "Impact of COVID-19 on health care system and public health in Latvia; ways in preparing health sector for future epidemic" (VPP-COVID-2020/1-0011). Data were summarized and analyzed using MS Excel and IBM SPSS 26.0. Data from the birth register from CDC Latvia for the study period was analyzed.

Results

From all 1173 responders 70 women were pregnant during the COVID-19 pandemic, 63 women gave birth. One third (34%) of the pregnant women did not receive information on acquiring COVID-19 during pregnancy. Almost all pregnant women (97.1%) received a substantial emotional support from their partners before pandemic and 27.1% noticed a higher degree of support during the pandemic. However, 61.4% of pregnant women felt anxiety and depression, and 37.8% were frustrated due to COVID-19 restrictions. Qualitative research confirmed that worries regarding the presence of a partner during childbirth was the main cause of anxiety for women and influenced the choice of the maternity hospital.

Conclusions

To ensure emotional and practical support during childbirth, decisions to restrict the presence of a partner in maternity wards should be consulted with involved health care providers and legal experts. Reasoning of these decisions should reach every pregnant woman and her partner.

Provision of pregnancy care during the COVID-19 restrictions

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Objectives

The COVID-19 pandemic has resulted in decreasing the provision of medical care in cases without emergency. However, some health care services during pregnancy have time constraints, and one of them is antenatal care. The aim of the study was to evaluate the impact of COVID-19 and social restriction measures on health care during pregnancy.

Materials and Methods

Online quantitative survey and qualitative research (using in-depth interviews and focus group discussions) were conducted from July to October 2020 as a part of the international multi-country study I-SHARE (International Sexual and Reproductive Health Survey in the time of COVID-19) and the state research project "Impact of COVID-19 on health care system and public health in Latvia; ways in preparing health sector for future epidemics" (VPP-COVID-2020/1-0011). Data were summarized and analyzed using MS Excel and IBM SPSS 26.0.

Results

1173 Latvian inhabitants participated in the online survey – from 966 women 70 were pregnant during the COVID-19 pandemic.

Almost a half (41.4%) of the pregnant women identified that their antenatal appointments were cancelled or postponed, mostly by the care provider (58.6%). More than one fourth of women (27.6%) did not attend the antenatal care appointment due to the fear of becoming infected. Care providers noted the delay in prenatal genetic screening due to the woman's self-isolation. The attitude of care providers toward pregnancy termination services differed – some claimed to understand that pregnancy termination is time-limited and included surgical termination in the list of essential services. The access to medical termination of pregnancy as the best choice during COVID-19 pandemic was not discussed in details.

Conclusions

It is essential to define essential sexual and reproductive health services which should be available during all crises. The understanding of time-limited services provision should be discussed with health professionals, managers of the health care institutions and policy makers.

Psychosexual development and gynecological morbidity in adolescence

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Objectives

The influence of psychosexual development on gynecological morbidity in adolescence is explained by changes in menstrual function and fertility, being a consequence of hypothalamic and pituitary structures immaturity at this stage of life.

The aim of the study was to appreciate the interrelation between psychosexual development and gynecological pathologies.

Materials and Methods

A number of 115 adolescent girls were included in the study. They came to the Neovita Youth Friendly Center for health services. Adolescent's development was determined based on Tanner's staging and HEADS tool. The study included a comprehensive analysis of historical data, clinical and laboratory observations. The study included services such as: information, advice, and referral.

Results

Adolescent age ranged from 15 to 18 years. In 28 cases (41.2%) psychosexual development was disharmonical: in 13 cases (19.1%) was repressed, in 5 cases (7.3%) it was registered as slowed, in 7 cases (10.3%) – suppressed, and in 15 patients (22.1%) – accelerated. The risk factors that have led to the aspects of pathology (sexually transmitted infection, unwanted pregnancy, health problems as a result of psycho-emotional disorders and personality disorders and behavioral nutrition, etc.) were specified. This study pointed out the following gynecological nosologies: genital tract infection (21.7%), pelvic inflammatory disease (29.6%), juvenile dysfunctional bleeding (45.2%). Dysmenorrhea was diagnosed in 91 cases (79.1%) and in 31 cases (27.0%) – urogenital infection was registered. Teenage girls suffered from a headache, abdominal pain, depression, difficulty sleeping, etc. The morbidity rate was determined to be 35.5%.

Conclusions

Adolescent girls need more information in sexual and reproductive health, the morbidity level at 15-18 years old being not very promising. Adolescent-friendly health services could contribute significantly to solve the major problem of psychosexual development disorders during adolescence and their correlation with gynecological pathologies as well as a number of additional important problems.

Relation between aerobic vaginitis and histologically proven cervical intraepithelial neoplasia

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Objectives

Persistent human papillomavirus (HPV) infection is a prerequisite for the development of cervical intraepithelial neoplasia (CIN) and cervical cancer. Still factors promoting this progression are not fully explored. The association between different vaginal microflora changes and CIN has been debated in the literature in the recent years. Although, not much is known about a possible role of aerobic vaginitis in the development of cervical dysplasia.

The aim of this study was to analyse the relation between aerobic vaginitis and histological finding of CIN.

Materials and Methods

In the time from July 2016 until December 2019 110 consecutive patients with abnormal cervical cytology referred for colposcopy to Riga East Clinical University Hospital (RECUH) Outpatient department were included in the study group. 118 women who came for a gynaecological check-up were chosen as controls. Material from upper vaginal fornix was taken for wet-mount microscopy. Colposcopy was performed in all participants; cervical biopsies were taken from all study group subjects and in case of visual suspicion for CIN in the control group. Histological analysis was performed in RECUH Pathology Center. Statistical analysis was done with Microsoft Excel 2010 and IBM SPSS 20.0.

Results

In the study group there were 31 (28.2%) cases of CIN1, 57 (51.8%) cases of CIN2, 21 (19.1%) cases of CIN3 and 1 (0.9%) cervical cancer case. Any AV associated microflora changes (35/110 (31.8%) vs. 20/118 (16.9%), $p=0.009$) and the proportion of moderate to severe AV (15/118 (13.6%) vs. 7/110 (5.9%), $p=0.049$) were significantly more frequent in the CIN group compared to healthy controls.

Conclusions

We have found a significant association between aerobic vaginitis and cervical intraepithelial neoplasia. Further studies are needed to fully understand the relation between abnormal vaginal microbiota and the development of cervical cancer.

Role of the medication treatment for the low risk cervical preinvasive lesions

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Objectives

The most common cervical precancerous disease is low-risk intraepithelial neoplasia or CIN 1. These lesions spontaneously regress in 57%, persists in 32%, progresses in 12%. Pharmacological treatment with glycyrrhizinic acid could reduce persistent HPV infection, the incidence of CIN 1, and the use of more aggressive therapies. The aim of the study is to investigate efficiency of medication treatment for CIN 1 lesions.

Materials and Methods

A prospective study is ongoing in Riga East Clinical University Hospital. Women with histologically confirmed CIN 1 in cervical biopsies are included in the study. Participants of the study group members use glycyrrhizinic acid spray (Epigen spray) topically for 6 months. Women of the control group have no any treatment. During two follow-up visits 6 months apart cytological, colposcopic and histological examination is done. All patients are screened for human papillomavirus before enrollment and during the 1st follow-up visit.

Results

There are currently 45 patients of the Epigen and 44 patients of the control group involved in the study, 64 of them have completed the study. No statistically significant different incidence of improvement or deterioration in cytological and colposcopic findings at either the first or second control visit is found. Though participants of the Epigen's group progression to CIN 2/3 in histological findings at first control visit is less common (in Epigen's group lesions progress in 4.8 % vs 35.3 % in control group $p=0.01$). No such relationship is found during the second control visit. Most commonly detected HPV types among the enrolled women are 16, 31, 33, 44 and 56. There is no statistically significant difference in distribution and changes of virus concentration over the time between groups.

Conclusions

Currently data on medication treatment efficiency for low risk cervical preinvasive lesions are inconclusive. The study needs to be continued.

Symptoms of depressive disorders in perinatal period in Latvian women

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Objectives

Evaluating prevalence of symptoms of depressive disorders in Latvian women in their 3rd trimester of pregnancy and postpartum period with Patient Health Questionnaire (PHQ-2) screening tool.

Materials and Methods

The study has been implemented within the framework of the Latvian Council of Sciences project Nr.lzp-2019/1-0335. It is a cross-sectional study of Latvian pregnant women and women until 7th day post-partum, who consented to participating in a personal interview survey. In 2020, 287 women were interviewed. Data were analysed by IBM SPSS program.

Results

In total, 283 women answered the PHO-2 screening test, 10% of those had scored three or more points, thus indicating for possible depressive disorder, and would require further assessment. Only 11% of these women said their symptoms did not affect their daily functions and interaction with other people. In women who screened positive, the mean age was 31 (SD 6); the median income per household was EUR 1500 (IQR 1200 to 1500); nationality: Latvian - 75 %, Russian - 18%, other - 7%; marital status: married - 68%, partnership - 28 %, and divorced - 4%; mode of delivery: vaginal birth - 61%, instrumental vaginal delivery - 4%, and Caesarean section - 35%; gestation week at time of delivery: <37 GW - 4%, 37-40 GW - 69%, and >41 GW - 27%. No statistically significant correlation with age, income, marital status, and time or mode of delivery was found.

Conclusions

The prevalence of symptoms of depressive mood disorders in perinatal period is noteworthy. PHQ-2 is a simple and fast screening tool that can be used routinely by medical professionals involved in perinatal care. The limitation of study is the small sample of respondents with depressive disorder symptoms.

Term pregnancy labour induction of nulliparous women with gestational hypertension, diabetes

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Objectives

Labour induction (LI) is associated with better maternal, perinatal outcome and should be offered to patients with gestational hypertension (GH) from 37+0, gestational diabetes (GD) after a full 38 weeks of gestation.

Materials and Methods

Data were collected retrospectively in year 2019. 163 Riga Maternity hospital inducted labour medical histories of singleton, cephalic, nulliparous women $\geq 37+0$ weeks of gestation with GD, GH were reviewed. Data were analyzed with SPSS 26.0.

Results

Women's mean age was 29 years ± 5.0 with mean BMI 24.4 ± 4.9 kg/m². Data were divided into two groups – first included 67 (41.1%) patients from $\geq 37+0$ to 40+0 weeks of gestation, second – 96 (58.9%) from 40+1 weeks of gestation. As a maternal comorbidity, GD and preeclampsia were more common in group 1 – 18 (26.9%), 29 (43.3%); GD and GH were more common in group 2 – 34 (35.4%), 33 (34.4%), $p=0.045$. Mean duration from LI to 1st stage in groups were 14h59min ± 11 h24min and 16h6min ± 12 h6min, $p=0.213$; of the 1st stage – 6h47min ± 3 h14min and 8h12min ± 3 h20min, $p=0.238$; 2nd stage – 56min ± 39 min and 1h8min ± 49 min, $p=0.405$, accordingly. In groups 29 (43.3%) and 49 (51.0%) were vaginal births, 29 (43.3%) and 35 (36.5%) labours were completed by caesarean section, $p=0.713$. Apgar scores for groups were 7.58 ± 0.59 and 7.53 ± 0.72 at 1 minute, $p=0.402$, 8.72 ± 0.50 and 8.72 ± 0.51 at 5 minute, $p=0.609$, respectively. 10 (14.9%) newborns of group 1 and 13 (13.5%) of group 2 entered the neonatal intensive care unit, $p=0.803$; 4 (6.0%) and 13 (13.5%) were injured during labour, $p=0.120$. 20 (29.9%) group 1 and 33 (34.4%) group 2 mothers did not have vaginal births within 24h after LI, $p=0.544$.

Conclusions

LI did not affect perinatal or maternal outcome in this study. To determine statistically significant differences between the groups, they should be extended.

The chances of successful delivery in women after pre-pregnancy bariatric surgery compared to normal body weight women

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Objectives

Bariatric surgery (BS) is highly effective treatment for obesity. The rates of adverse maternal and neonatal outcomes were found to be lower in women after previous BS compared to obese women. There is a lack of data on the comparison of outcomes with women of normal pre-pregnancy body weight.

The aim of this study was to compare delivery outcomes in women after pre-pregnancy bariatric surgery and normal body weight women.

Materials and Methods

A retrospective matched cohort study covering the women with previous bariatric surgery in Lithuania was performed. There were 130 postoperative singleton deliveries during 2005-2015 period and 37 birth were in tertiary level hospitals. For each post-surgery delivery up to 1 control delivery was matched by maternal age and parity. The delivery outcomes were compared in the group of bariatric surgery (BS) and normal control (NC). Statistical analysis performed using the SPSS version 23.0, $p < 0.05$ was considered statistically significant.

Results

Gestational age did not differ (BS-39 (33-41) weeks vs NC-38 (27-41) weeks) and the rate of premature delivery was similar (BS-8.1% vs NC-13.5%). No difference was found in the rate of spontaneous delivery, induction of labor, episiotomy, the duration of delivery in groups. Compared to matched control, post-surgery women were delivering significantly more frequently without any analgesia (BS-60.0% vs NC-29.6%; $p=0,037$), but they were less likely to have successful natural delivery (BS-81.1% vs NC-54.1%; $p=0.013$). Both groups were statistically similar regarding neonatal birth weight (BS-3560 (2385-4410)g vs NC-3179 (708-4260)g) and Apgar scores.

Conclusions

Women after pre-pregnancy bariatric surgery were less likely to require labor analgesia, but the increased risk observed for cesarean delivery compared to normal body weight women. A larger group of subjects is needed to confirm other maternal and neonatal trends.

The feasibility of sentinel lymph-node biopsy in the management of the patients with endometrial cancer: pilot study

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Objectives

To explore the impact and the feasibility of sentinel lymph-node biopsy (SLB) in the group of patients with endometrial cancer undergoing systemic pelvic lymphadenectomy (PLN).

Materials and Methods

Prospective interventional study was conducted in Lithuanian University of Health Sciences Hospital, Centre of Oncogynaecology, in the period of 2018 – 2019. Patients with histologically confirmed endometrial cancer were included. Indocyanine green dye was used for sentinel lymph-node (SL) mapping in patients undergoing SLB with PLN. Data regarding patients' characteristics, number of lymph-nodes removed, time of surgery and hospital stay, and complications were collected.

Results

54 patients were included into the study: 24 underwent SLB and PLN while 30 had PLN only. There were no significant differences between the groups concerning patients' age (65.9 vs. 66.6, $p=0.78$), weight (79.7 vs 81.0, $p=0.71$) nor BMI (29.9 vs. 30.5, $p=0.72$).

SLB group patients had longer surgery time (186.3 min vs. 157.2, $p=0.008$) and greater blood loss (100 ml vs. 90, $p=0.004$), but number of removed lymph-nodes was higher (9.9 vs. 7.5, $p=0.027$) in this group. The overall SL detection rate was 83.3% (20/24), with bilateral detection rate of 62.5% (15/24). 5 (9.3%) patients had lymph-node metastasis: 3 in SLB and 2 in PLN groups. In all three cases positive lymph-nodes were detected in mapped SL's. The median time of hospital stay was similar in both groups (7 and 6, $p=0.06$). 3 patients (5.6%) developed complications: 1 patient in SLB and 2 in PLN group.

Conclusions

SLB is a feasible procedure for surgical lymph-node staging in endometrial cancer patients. Patients undergoing SLB had longer surgery time and slightly greater blood loss, but the number of lymph-nodes removed was bigger compared to PLN only. All metastatic lymph-nodes were discovered by SLB in interventional group. There were no differences concerning hospital stay nor the complications between the groups.

The impact of gender-based violence on female sexual function

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Objectives

1 in 3 women experience physical or sexual violence during their lifetime, many of them suffer from mental harms, which significantly influence women's physical and psychological health. The research was aimed to evaluate the impact of gender-based violence experience on female sexual function.

Materials and Methods

Descriptive cross-sectional study, using questionnaires, was conducted from November 2020 to January 2021. The study included 315 out of 507 respondents, who experienced any type of violence. Data was analyzed using SPSS26.

Results

267(84.7%) of women experienced emotional violence, 110(41.2%) first faced it being a teenager.

113(52.1%) out of 217(68.8%) had injuries after physical violence and 54(47.8%) hid those were caused by violence.

Forced touching was experienced by 175(55.5%), 112(35.5%) had intercourse without consent, for 76(67.9%) it was unprotected, 21(18.8%) had perineal bleeding and 19(17.0%) injuries of perineal area after the intercourse. 18(5.7%) were abused during pregnancy, 2(11.1%) of these pregnancies were the result of sexual abuse, 10(55.6%) mentioned sexual life worsening: decreased frequency (n=12;66.6%), decreased libido (n=14;77.8%), decline in reaching orgasm (n=6;33.3%).

Violence in postpartum period was registered among 26(8.2%) of women, 9(34.6%) continued their sexual life <6 weeks after delivery, 13(50.0%) noted worsening of sexual life and 19(76.0%) experienced decreased sex frequency, 9(34.6%) complained about reduction of orgasming and 19(73.1%) about lowered libido.

Violence became the reason of abortion in 2(4.2%) cases.

150(47.6%) of women noted the impact of abuse on further sexual relations: 45(30.0%) were afraid of new relationships and sexual life, 61(40.7%) had difficulties with orgasming and 56(37.3%) with libido.

239(75.9%) are sexually active now, 126(52.7%) complain about occasional dyspareunia, 24(10.0%) never orgasm.

Conclusions

Gender-based violence against women is a crucial issue for modern society. Abusive experience influences female sexual function, including difficulties in feeling satisfaction, decreased libido and frequent dyspareunia. Nevertheless, noticeable part of respondents remains hiding violence and staying with abuser.

The management of post-partum hemorrhage in Republic of Moldova

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Objectives

Postpartum hemorrhage (PPH) represents the direct cause of maternal mortality and morbidity in developing countries, remaining a current problem, with repercussions on the patient's life.

The aim of the study was to evaluate the management of clinical cases diagnosed with severe PPH.

Materials and Methods

A descriptive retrospective study on a sample of 57 patients with PPH ≥ 1500 ml, was performed. Patients were admitted at the 2nd and 3rd Level Perinatal Centers – Institute of Mother and Child and *Gheorghe Paladi* Municipal Clinical Hospital, during the last 3 years.

Results

The mean age of the patients was 27 ± 3 years. In 30 cases (52,6%) was determined a complicated obstetrical history. Uterine scars were identified at 20 patients (35,1%). The course of pregnancy was complicated by severe preeclampsia in 8 cases (14,0%). In 42 cases (73,7%) the pregnancy ended by caesarean section (CS). The causes related to placental pathology were attested in: 14 cases (24,6%) by placenta accreta, in 10 cases (17,5%) by placenta praevia, in 7 cases (12,3%) by placental abruption, uterine atony being assessed in one case (1,8%). Another 9 patients (15,8%) underwent deep lacerations of the vagina and perineum, and in one case (1,8%) there was a uterine rupture. Disseminated intravascular coagulation syndrome was established at 35 patients (61,4%), in which: retroperitoneal hematoma was determined in 7 cases (15,6%); hemorrhages from the small vessels of the wide ligament – at 2 (3,5%) women; vaginal hematoma – in one case (1,8%).

Conclusions

PPH practically in half of the cases was determined by the placental pathology, the last one being determined by the increase of the birth rate by CS. Maternal mortality and morbidity rate may be reduced if the birth is monitored by a competent multidisciplinary team that acts according to specialized clinical protocols.

The pandemic quarantine-affected changes for delivery outcomes in the tertiary level hospital in Lithuania

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Objectives

To assess the possible effects of pandemic quarantine changes in delivery outcomes.

Materials and Methods

A retrospective study was conducted among women who had delivered in the Hospital of Lithuanian University of Health Science Kaunas Clinics in the period of quarantine 2020.03.16 – 04.16 and the ordinary period 2018.03.16 – 04.16. Data was collected from the Delivery department register database and analyzed with IBM Statistics SPSS for frequencies, χ^2 , and Mann-Whitney U test. Results with values of $p < 0.05$ were considered as statistically significant.

The way of delivery, gestational age at delivery, preterm birth, birth weight, Apgar score at 1 and 5 minutes were compared among these two groups of different periods.

Results

There was an equal number of deliveries ($n = 237$ vs $n = 239$) and newborns ($n = 251$ vs $n = 252$) in the 2020 quarantine and 2018 assessed period. During the quarantine period the average gestation at delivery was significantly shorter ($M 37 \pm 4w$; vs $M 38 \pm 3w$; $p = 0.004$) and the incidence of preterm births was significantly higher (11.3% vs 18.1%; $p = 0.035$). Spontaneous deliveries were significantly more common in the 2018 period, $p = 0.029$. The number of cesarean operations was higher in the quarantine period, but without a statistical difference (21.1% vs 14.6%; $p > 0.05$). Comparing the 2020 quarantine and 2018 assessed period neonatal Apgar score of 1st and 5th min. did not differ and birth weight was similar ($3382g \pm 805.5 g$; vs $3290g \pm 860.0 g$).

Conclusions

COVID - 19 pandemic and quarantine may be associated with a higher incidence of preterm deliveries and a lower frequency of spontaneous deliveries. No differences in neonatal conditions were observed. However, a further detailed and larger sample study is required to assess clinically relevant changes.

Three-dimensional ultrasound measurement of the placental volume and vascularization in the first trimester: correlation with crown–rump length, biochemical placenta parameters and uterine artery doppler

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Objectives

The aim of our study was to evaluate the correlation between placental volume (PV), placental vascularisation and such placental functional indices as PAPP-A, free BHCG and uterine artery (UtA) Doppler velocimetry in the first trimester of pregnancy and therefore to assess whether placental volume PV can be used as independent or additional measurement for PE and IUGR prediction.

Materials and Methods

74 women undergoing first trimester screening were prospectively assessed using three-dimensional ultrasound in order to measure PV and three-dimensional power Doppler indices: vascularity index (VI), flow index (FI) and vascularity flow index (VFI) using the VOCAL software (Voluson E8, GE). The offline analysis was performed by 4D View software and PV was calculated using VOCAL option (30°). Placental quotient (PQ) was calculated by dividing PV by the fetal crown–rump length (CRL).

Spearman's correlation coefficient (ρ) between PV and PAPP-A, free BHCG, UtA mPI were calculated. In addition, PQ correlation with PAPP-A, free BHCG, UtA mPI was assessed. $P < 0.05$ was considered statistically significant.

Results

The mean placental volume was $68.31 (\pm 31) \text{ mm}^3$. There was no correlation between placental volume and PAPP-A ($\rho = 0.183$, $P = 0.182$), free BHCG ($\rho = 0.109$, $P = 0.427$) UtA mPI ($\rho = 0.016$, $P = 0.901$) nor with other maternal characteristics. No correlation between PQ and PAPP-A ($\rho = 0.208$, $P = 0.127$), free BHCG ($\rho = 0.138$, $P = 0.316$), or UtA mPI ($\rho = 0.116$, $P = 0.901$), were found.

Conclusions

Our results suggest that there is no correlation between placental volume, first trimester biochemical markers and uterine artery velocimetry. The limitation of study was a small number of enrolled patients and therefore results were statistically insignificant.

Urodynamics referral pathways: are we over-investigating? An audit of the appropriateness of urodynamic investigation in NHS Tayside

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Objectives

Urodynamic studies (UDS) are an investigation used in the assessment of people with urinary incontinence (UI). UDS is an invasive test with documented complications and NICE* specify criteria for when it should be performed. UDS has become standard clinical care without solid evidence for its routine use. It is a relatively expensive, embarrassing investigation, which can cause complications such as urinary tract infections. UDS should be judiciously used in patients with failed conservative therapy where there is diagnostic uncertainty before embarking on invasive treatment.

*The National Institute for Health and Care Excellence (NICE) provides national guidance and advice to improve health and social care.

The aim is to audit the use of UDS in NHS Tayside against the NICE guidelines over the period of one year.

Materials and Methods

Audit of females undergoing UDS in the gynaecology department of NHS Tayside between 11/2017 and 11/2018. A pro forma was used to collect the patients' data retrospectively using the Clinical Portal, an electronic database.

Results

The majority of patients were referred for UDS without a full appropriate conservative treatment. 72.9% (n=78) of the females presenting for UDS (n=107) had urge or mixed UI symptoms, but only 10% of them were suitable to undergo invasive treatment post UDS. 18% were not suitable for UDS. It is recommended that UDS should not be performed in females with pure stress UI, but we found that 22% of patients presenting for UDS had symptoms of pure stress UI. There was great variability in conservative treatment started by different healthcare professionals before UDS referral.

Conclusions

This audit identified that the NICE guidelines were not adhered to in NHS Tayside. Performing UDS only after failed conservative treatment, and before surgery is more cost effective and spares patients an invasive test that does not influence further management of their condition.

Use of effective contraception among sexually active HIV positive women in Latvia

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Objectives

The fertility of women living with HIV (WLHIV) is not significantly different from healthy women in childbearing age, and most WLHIV are sexually active. The choice of contraception among WLHIV has not been sufficiently studied in Latvia. The study aims to assess the prevalence of contraceptive use and method preference among sexually active WLHIV in Latvia.

Materials and Methods

This study was conducted in cooperation with the European Society of Contraception and Reproductive Health. A cross-sectional survey of sexually active WLHIV aged 18 to 49 years, took place in nongovernmental organization's (AGIHAS, DIA+LOGS) from March 2019 until October 2020. Research tool: anonymous questionnaire. Data was processed with IBM SPSS statistics.

Results

From 102 responders, 79 were sexually active WLHIV, 86.1% of them used contraception. Most used contraception was condoms (89.7%). Only 59% reported using condoms during each sexual intercourse. Among condom users, 62.3% reported condoms as their only method of contraception. However, one third of these women were not using condoms during each sexual intercourse. The second most used method was pills (17.6%). 23.5% recognized the use of natural contraceptive methods (calendar method, douching, coitus interruptus). In 56.9% of all cases, women were responsible for contraception. 51% of women reported financial difficulties in purchasing contraceptives. No significant association was noted between contraceptive use and other sociodemographic factors (age, education, marital status, partners HIV status, parity).

Conclusions

There is a high level of contraceptive use among sexually active WLHIV in Latvia. However, every fifth WLHIV use contraception with low effectiveness and there is a high rate of condom users who do not use this method permanently. Many WLHIV in Latvia face financial difficulties in obtaining contraception. There is a need for health education and financial support to make effective contraception available and affordable and decrease the risk of unintended pregnancies for WLHIV.

Pediatrics

A 5-year review of adenoid, palatine tonsil and tympanic cavity drainage operations

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Objectives

Adenoid enlargement with or without palatine tonsil enlargement is a common childhood disease that results in tuba auditiva dysfunction and fluid accumulation in the middle ear.

First goal is to gather information on adenoid removal operations in association with middle ear drainage, caused by adenoid enlargement and chronic secretory otitis media.

Second goal is to evaluate the amount of repeated middle ear drainages, after adenoid removal.

Third goal is to evaluate whether enlargement of palatine tonsils promotes fluid accumulation in the middle ear.

Fourth goal is to evaluate whether the frequency of visits to an otorhinlaryngologist by the patients is reduced following adenoid removal.

Materials and Methods

A retrospective analysis of archived medical histories of patients who underwent surgical treatment in "AIWA Clinic" from years 2015 to 2019 was used. Statistical analysis was conducted using IBM SPSS Statistics v23.

Results

In the chosen time frame 559 adenotomies were performed, with or without palatine tonsil reductions or middle ear drainage procedures. Repeated tympanostomy insertion was required in 17 cases out of 214 middle ear drainage cases (7% of cases). The mean number consultations by otorhinlaryngologist in a year prior to operation was 3.4 visits, after the operation was 2.5 visits a year. Fluid accumulation in the middle ear was observed in 116 patients with palatine tonsil enlargement and in 98 patients without enlargement. No statistical difference between the amount of patients in both groups was found using the Wilcoxon test ($p < 0.0001$).

Conclusions

The mean age of patients was within the timeframe of maximum adenoid size in children. After the removal of adenoid tissue and middle ear drainage, an insignificant number of patients required repeated drainage and tympanostomy. Adenoid removal operations reduce the number of visits to an otorhinlaryngologist. Coexisting palatine tonsil enlargement has no statistically significant impact on accumulation of fluid in the middle ear.

Acute dacryocystitis in pediatric patients – five year review from Children's Clinical University Hospital of Latvia

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Objectives

Purpose is to study acute dacryocystitis in a pediatric age group, focusing on ambulatory, day hospital and inpatient management and outcome.

Materials and Methods

A retrospective case series of all acute dacryocystitis in pediatric patients from Children's Clinical University Hospital of Latvia ophthalmology clinic from year 2014-2019 were conducted. Patient intrahospital, day hospital and ambulatory presentation were analysed. Nasolacrimal duct obstruction surgeries were accessed regarding dacryocystitis treatment. Data were accessed using IBM-SPSS (version 26).

Results

During given time period 48 patients were treated for acute dacryocystitis. The number of acute dacryocystitis diagnosis intrahospital, day clinic and ambulatory clinic patients were n=1 (2%) in 2014, n=8 (16.7%) in 2015, n=4 (8.2%) in 2016, n=4 (8.2%) in 2017, n=6 (12.5%) in 2018, n= 6 (12.5%) in 2019. Otorinolaringology clinic treated n=1 (2%) patient, and n=2 (4.1%) were treated in pediatric clinic, and n=15 (31.3%) in neonatology clinic. Acute dacryocystitis was also partly resolved during nasolacrimal duct stenosis surgery, although the precise case analysis for dacryocystitis was not clear since the surgery diagnosis was written under nasolacrimal duct stenosis.

Conclusions

Number of treated patient for acute dacryocystitis in ophthalmology inpatient clinic is decreasing. Less complicated cases are treated under ophthalmology ambulatory care and more severe cases are medically managed by pediatric or in neonatology clinic in collaboration with ophthalmologist performing nasolacrimal duct stenosis surgery, that helps in resolving severe acute dacryocystitis. Performing surgery for dacryocystitis diagnosis it is important to differentiate it between nasolacrimal duct stenosis diagnoses, since further medical management differs.

Antibacterial therapy for non-complicated appendicitis in children: problem of choice

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Objectives

Recent decade showed increased use of non-operative antibacterial treatment (NOT) for pediatric acute non-complicated appendicitis (NAA). Multiple randomized controlled trials(RCT) comparing operative treatment (OT) and NOT approach show possible feasibility of non-surgical approach in NAA. Preliminary literature review showed numerous different antibiotic drug combinations used for NAA treatment. Thus a problem of choice was raised - which antibiotic drug combination to choose?

Materials and Methods

A concise literature review was performed. A list of antibiotic drugs and their combinations used for treatment of NAA in children was formed.

Results

Lack of RCTs regarding NOT of pediatric NAA was discovered. Two meta-analysis by Xu et al. and Georgiou et al. allowed to form a list of 18 different antibiotic drugs used for NOT of pediatric NAA. Initial treatment success varied from 58% to 100% with subsequent appendectomy varying from 4.2% to 27% of cases.

Children Clinical University Hospital in Riga uses i/v ampicillin/metronidazole combination for NOT and reports 13.5% recurrence rate of acute appendicitis.

Conclusions

RCTs comparing different choice of antibacterial therapy for pediatric NAA are lacking. Several systematic analysis and meta-analysis studies showed necessity for further prospective randomized studies regarding NOT treatment of AA.

Authors have the proposition to perform an RCT to compare clinical safety, efficacy and cost-efficiency of 72h i/v ampicillin and metronidazole combination following 7 days of p/o amoxiclav - the existent standart of care method for treating non-complicated appendicitis with a prospected 72h i/v ceftazidime and metronidazole following 7 days of p/o amoxiclav. Study is expected to show additiona insight in feasibility of NOT of NAA for pediatric population

Association of two prothrombotic conditions in a 16-year-old boy with cerebral venous sinus thrombosis and newly diagnosed type 1 diabetes: case report

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Cerebral venous sinus thrombosis is a disease that mainly affects young people, with a peak age of 39 years. It is rare in children and most often occurs in the neonatal period.

The patient, a 16-year-old boy, without any chronic diseases, went to family doctor with complaints of headaches that have been around for 1 year, but have lately worsened after drinking alcohol 2 weeks ago. The pain tending to be both bilateral and unilateral, starting in the temples and moving to one eye. Blood tests were performed, which showed an elevated glucose level of 27.32 mmol/l. The patient was urgently hospitalized. In hospital diabetic therapy and rehydration was started. CT scan of the head is performed, where no pathological changes are detected. Against the background of the received therapy, the headache persists. The patient was consulted by a pediatric neurologist and was prescribed an MR head with angiography. MR conclusion - sinus sagitalis superior, right sinus transversus, sinus sigmoideus thrombosis. No data are available on venous ischaemia. Low molecular weight heparin therapy has been initiated. Genetic analyzes were performed, which found a mutation in factor V (Leiden factor), resistance to activated protein C, and elevated homocysteine levels. The patient's headache decreased after treatment. Due to the risk of thrombosis, long-term treatment with warfarin for INR 2-3 has been initiated.

Although cerebral venous thrombosis is a rare cause of headache in adolescence, it should be considered as one of the options for differential diagnosis, also taking into account the associated conditions.

Biological therapy in paediatric inflammatory bowel disease – right patient to prescribe it

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Objectives

25% of inflammatory bowel disease (IBD) patients are from paediatric population. During the last decade, the role and indications for the use of anti-tumor necrosis factor (TNF) therapy in paediatric IBD have changed and becomes more challenging. From 2011. Anti-TNF therapy with Infliximab (IFX) and Adalimumab (ADA) has been started in Latvia.

Materials and Methods

This is retrospective study reviewing the data of all the IBD patients from Children's Clinical University Hospital of Latvia medical records with the diagnosis of Crohn's disease (CD) and ulcerative colitis (UC) from 1st January 2011 to 31st July 2020 and who had biological therapy. We collected the data of age at diagnosis, sex, used biological therapy, disease activity index (AI) (CD -PCDAI and UC-PUCAI), fistulas, abscesses, operations, steroid resistances.

Results

30 children had biological therapy. 80% (n=24) had CD, 20% (n=6) had UC. The mean age at diagnosis was 13 years 8 months. 47% (n=14) received IFX, 30% (n=9) ADA, 23% (n= 7) required both agents. First biologic agent for CD was 58.3% IFX (n=14), 41.7% ADA (n=10). For UC: 83.3% (n=5) IFX, 16.7% (n=1) ADA. 44% (n= 11) CD patients had fistulas and 36.3% (n=4) of them had abscesses. Small intestine involvement in CD is associated with higher risk for surgery (p-0.044). Disease AI before and after the start of treatment was calculated in 80.6% (n=25): 37.9 points and 15.4 points. The sooner the therapy is started, the better therapeutic effect for CD patients (p-0.007).

Conclusions

Biological therapy indications in paediatric IBD are not only related to CD or UC activity index, but also to previous therapies effectiveness or resistance and disease localisation.

Birth season and difference in 25(OH)D level in Latvian infants – evidence of major progress

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Objectives

Lower 25(OH)D level in children born in winter-spring is a known phenomenon in countries with pronounced climate seasonality, it may strongly influence physical development and morbidity.

Materials and Methods

We present retrospective analysis of pediatric (till 17 years) serum 25(OH)D tests performed in Children's Clinical University Hospital Laboratory in 2012-2019 on Cobas e601 (Roche). 16042 tests were assessed, including 2645 infant samples, together with age, month of birth and testing year. Data was analyzed by IBM SPSS v25 (Kolmogorov-Smirnov test for differences).

Results

Significant differences of 25(OH)D in children born in winter/spring (WS) and summer/autumn (SA) were found, most prominent in the first year of life, but disappearing only by 2 years.

Median 25(OH)D level in infants (0-11 months) was 34.46 ng/mL in WS-born and 37.51 in SA-born ($p=2E-5$). In 2012-2015 it was, respectively, 28.85 and 38.61 ng/mL ($p=1E-8$) and in 2016-2019 - 36.81 and 37.59 ng/mL (p NS). Median rate of 25(OH)D <20 ng/mL was 27.1% in WS-born infants and 18.7% in SA-born ($p=1E-4$). In 2012-2015 it was, respectively, 36.8% and 20.4% ($p=6E-7$) and in 2016-2019 - 19.6% and 17.4% (p NS).

Rate of 25(OH)D <12 ng/mL was 13.2% in WS-born and 6.8% in SA-born, $p=0.009$. In 2012-2015 it was, respectively, 22.0% and 8.1% ($p=4E-5$) and in 2016-2019 - 6.4% and 6.0% (p NS).

Increase of 25(OH)D in WS-born and drop of rates of 25(OH)D <20 ng/mL and <12 ng/mL are highly significant ($p < E-500$, $p=2E-8$ and $p=6E-7$, respectively).

Conclusions

The study demonstrated that WS-born Latvian children have low 25(OH)D during the first year of life with slight decrease visible for at least another year, similar to other seasonal countries.

Dramatic progress in dealing with the problem has been achieved in recent years. The results show that overall 25(OH)D level in infants has risen considerably and the effect was most prominent in WS-born.

Blood lactate level prediction of mortality in critically ill children in Latvia

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Objectives

Paediatric Index of Mortality 2 (PIM2) is widely used for risk prediction of patients admitted to Paediatric Intensive Care Unit (PICU) based on clinical variables collected during the first hour of admission. Studies have shown that lactate is a useful biomarker for estimation of disease severity and mortality. The goal of this study was to investigate association between blood lactate level at the time of admission and mortality in Children's Clinical University Hospital (VSIA BKUS PICU patient population).

Materials and Methods

This retrospective observational study (RSU Ethics Committee 51/22.02.2018.) involved all patients who were admitted to VSIA BKUS PICU from 1 January, 2004 to 31 December, 2020 and had blood lactate level measured during the first hour of admission. The primary outcome of this study was considered mortality in PICU; the secondary outcome was length of stay in PICU. Binomial logistic and multiple linear regressions were performed using IBM SPSS Software. P value less than 0.05 was considered significant.

Results

A total of 669 admissions were eligible for this study. 32 (4.8%) died during PICU admission. Blood lactate level was significantly increased in non-survivors (OR 3.7 (95% CI: 1.87-8.69)) compared to survivors (OR 1.81 (95% CI: 1.32-2.57)). Variables that statistically correlated with mortality (non-postoperative status, source of admission, no cardiopulmonary bypass, fixed areactive pupils, length of mechanical ventilation, systolic blood pressure, base excess, lactate, PIM2 score) were entered into the binomial logic regression model. PIM2 score (OR 4.0 (95% CI: 1.71-1920.48)) and length of mechanical ventilation (days) (OR 0.09 (95% CI: 1.03-1.15)) were independently associated with mortality. Blood lactate level was not predictive for length of stay. However, lactate level correlated well with PIM2 score (Pearson, $r = 0.60$, $p = 0.01$).

Conclusions

PIM2 is a good risk stratification tool in VSIA BKUS PICU population. Blood lactate does not significantly improve its performance.

Chromosomal aberration diagnostic yield diagnosed with chromosomal microarray analysis in Latvia in 2019 and 2020

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Objectives

Chromosomal microarray analysis (CMA) is a molecular cytogenetic diagnostic method which can be used to detect constitutional chromosomal aberrations such as microdeletion and microduplication. Microdeletion or microduplication is defined when chromosomal deletion or duplication is smaller than 5 million base pairs (5Mb). CMA offers a diagnostic yield of 15%-20%. Indications for CMA testing are dysmorphic features, unexplained psychomotor developmental delay, autism spectrum disorders and multiple congenital anomalies. The aim of this study was to assemble CMA results, gather data about what type of chromosomal aberrations were found in Latvia and compare if our diagnostic yield corresponds to data given in scientific literature.

Materials and Methods

The study was conducted in Children's Clinical University Hospital. All data from April 2019 till September 2020 about CMA results were gathered and analysed with IBM SPSS software.

Results

During this period CMA was performed in 156 cases. 83.3% were patients and 16.7% were their relatives. The mean age was 9 years and 6 months. From all respondents 55.8% were male and 44.2% were female.

Our diagnostic yield was 33.3%. From all chromosomal aberrations 7.1% were variants of uncertain significance, 8.3% were complex variants, 1.9% were benign variants and pathogenic or likely pathogenic microdeletions and microduplications were found in 16%. From all microdeletions and microduplications 16p11.2 microdeletion was the most frequent in 32%, and 22q11.2 was the second most frequent in 24%.

From all tested patient relatives 42.3% were positive for chromosomal aberrations and 72.7% from these aberrations were a match with patient results.

Conclusions

Our diagnostic yield in Latvia was much higher (33.3%) than in scientific literature. One can speculate that it is higher because of narrowly selected indications for CMA testing.

The most frequent chromosomal aberration during this period was 16p11.2 microdeletion.

Comparison of assessment tools content and psychometric properties in children with obstructive sleep apnea: systematic review of the literature

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Objectives

Due to the increasing health problems in pediatric obstructive sleep apnea (OSA) patients, including hypertension, cardiovascular diseases, metabolic disorders, obesity, neuropsychiatric and developmental issues, it is essential to investigate the presence of childhood OSA by using specific and validated assessment tool to diagnose OSA and to assess children's needs. The purpose of this study was to determine most commonly used tools for assessing OSA in children, to compare their content using the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY), and to compare their psychometric characteristics.

Materials and Methods

Most commonly used assessment tools for pediatric OSA were identified, including Polysomnography, Pediatric Sleep Questionnaire, Epworth Sleepiness Scale for Children and Adolescents, Obstructive Sleep Apnea 18 and the Pediatric Quality of Life Inventory, and linked to the ICF-CY according to the ICF linking rules. The analysis of the psychometric properties of these instruments were observed.

Results

A total of 77 studies were identified, showing 26 tools for assessing OSA in the pediatric population. In order to identify meaningful concepts, the most frequently used assessment tools were linked to 65 ICF-CY categories. The predominance of linked concepts was observed in the PSQ. The predominance in categories of the component *body functions* in PSQ and OSA-18 was equal. Linking to one *body structure* was performed with PSG and OSA-18. Linking to categories of *activities and participation* was done for all instruments. Categories of *environmental factors* were not linked only with PSG. All commonly used assessment tools have been shown to be reliable and valid, while responsiveness to change has only been demonstrated in OSA-18.

Conclusions

PSQ is reliable and valid tool for assessing sleep-disordered breathing, snoring, drowsiness and behavioral disorders in children aged 2 to 18 years to identify sleep-disordered breathing, including OSA, when polysomnography isn't possible.

Comparison of clinical features of COVID-19 vs febrile non-SARS-CoV-2 infections in hospitalized children

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Objectives

To define and compare the demographic data and clinical features of hospitalized children with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) disease (COVID-19) and non-SARS-CoV-2 etiology infections.

Materials and Methods

This was an ambidirectional cohort study. Hospitalized children, aged ≤ 18 years, with COVID-19 (n=23) were enrolled retrospectively and febrile children with non-SARS-CoV-2 infections (n=32) were enrolled prospectively from March 2020 to December 2020. The clinical features and epidemiologic data were collected, assessed, and compared using descriptive statistics.

Results

The average age of children in COVID-19 group was 6,9 years, median age 7 years. In the non-SARS-CoV-2 (control) group the average age was 3,8 years, median – 2,7. Female patients were predominant in both groups – 65% and 53%, respectively. Participants were divided into 5 age groups (< 1 year; 1 – 4; 5 – 9; 10 – 14; 15 – 18 years). In COVID-19 group the age distribution was equal (about 20% each), in the control group mostly children aged 1 to 4 years were represented (72%, n=23). The mean time between symptom onset and hospitalization was 3,8 days in the COVID-19 group and 5,5 days in the control group. The average hospital length of stay was 4 days in both groups, ranging from 1 to 22 days in COVID-19 group and 1 to 19 in the non-COVID-19 group. The clinical symptoms were quite similar between both groups. The most common symptoms were fever (96% and 100%, respectively), congestion or runny nose (87%; 56%), fatigue (48%; 75%) and sore throat (43%; 53%).

Conclusions

Although differences in clinical features were found between the groups, significant overlap in presentation was noted. Clinical symptoms alone should not be used to identify COVID-19 patients. During the pandemic, every child with fever or signs of infection should be perceived as potentially SARS-CoV-2 positive and PPE should be used accordingly.

Congenital systemic abnormalities and other inborn ocular pathologies in children with congenital cataracts

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Objectives

A congenital cataract is a major cause of childhood blindness. Although, most congenital cataracts remain idiopathic, in some cases a child can have more than one inborn pathology, neither ocular nor systemic. A congenital cataract is associated with ocular abnormalities in 27% of cases and with systemic abnormalities in 22% of cases (*Khokhar SK et al, 2017*). Observing and understanding the whole child's health condition is not only essential for the ophthalmologist, but also for whole care providers as a general practitioner, pediatrician, etc.

Materials and Methods

The retrospective study was held at Children's Clinical University Hospital I (Riga, Latvia). A total of 110 medical records from patients with congenital cataracts were observed. IBM SPSS Statistics version 25.0 was used to process data.

Results

Out of the 110 patients included in this study 54,5% (n=60) had bilateral cataracts, 45,5% (n=50) had unilateral cataracts. The majority of patients 49,1% (n=54) had developed an early congenital cataract. Out of all patients, 32,7% (n=36) also had systemic congenital abnormalities. The main part (n=8) of inborn pathologies was preterm birth. Almost one third – 27,3 % (n=30) of all patients had other congenital ocular diseases. 43,3% (n=13) had anterior segment abnormalities as aniridia or microcornea, followed by 23,3% (n=7) retinal pathologies and 13,3% (n=4) ocular nerve defects. Out of all patients with bilateral cataracts, 41,6% (n=25) had been born with other inborn pathologies. There is a very weak correlation between the development of bilateral cataract and other ocular or systemic abnormalities ($p>0.005$).

Conclusions

A great part of children with congenital cataracts also was born with other congenital systemic or ocular abnormalities. Of other congenital ocular pathologies majority was linked with anterior segment development defects. Although there is a correlation between the development of bilateral congenital cataracts and other systemic or ocular inborn abnormalities, this correlation is not statistically significant

Consumption of nonnutritive sweeteners and sweetened beverages in children's population

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Objectives

As one of the habits of a healthy lifestyle is to reduce the fast sugars in our meals, the supply of nonnutritive sweeteners in the food supply has increased by offering sweeter meals without extra calorie intake.

The aim of study was to assess whether children consume nonnutritive sweeteners and what is the consumption of sweetened beverages.

Materials and Methods

A cross-sectional population study was carried out in 3 schools including 694 students aged 8-17. A voluntary anonymous questionnaire about their anthropometric data, lifestyle, eating and physical activities habits was administrated. Data was statistically analyzed by Microsoft Excel 2010 and SPSS program version 19.0 software for Windows and RStudio IDE 1.3.

Results

15 % of the respondents had overweight or obesity (BMI>85th perc.). The prevalence of overweight and obesity in boys was significantly higher than in girls (M BMI 85-95perc. = 11%, >>95perc. = 6 %, F BMI 85-95perc. = 8%, >>95perc. = 4%, $p=0.07$). In the pubertal age (14-17) prevalence of obesity (BMI >>95perc. = 1.9%) was lower in age group 8-13(BMI >>95perc. = 6.5%) ($p<0.001<0.001$).

In all age groups respondents consume less fruits and vegetables than WHO recommended 5 portions of fruits and vegetables per day (Normal weight =54.01%, Overweight= 64.44%, $p=0.025$)

77.5 % of respondents drink at least 250ml of sweetened beverages per day. At pubertal age students use more sweetened beverages than younger age group 8-13 (30.5% /26.8% one glass per day) Boys drink more sweetened beverages than girls ($p<0.001$) Most popular sweetened beverages are fruit juice (68.63% drink more than once a month), but the least is Coca-Cola Zero (60% never use).

Conclusions

Students choose more sugar sweetened meals than nonnutritive sweetened. There is a correlation between overweight and nonnutritive sweetener consumption that needs to be explored more.

Determining acute complicated and uncomplicated appendicitis using serum and urine biomarkers leucine rich alpha-2 glycoprotein 1, neutrophil gelatinase-associated lipocal and interleukin-6

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Objectives

Severe complications of acute appendicitis (AA) arise with delays in treatment; to avoid this an early and accurate diagnosis is crucial. Our primary objective was to demonstrate the potential of *leucine-rich alpha-2 glycoprotein 1 (LRG1)*, *Neutrophil gelatinase-associated lipocal (NGAL)* and *Interleukin-6 (IL-6)* in differentiating acute complicated (AcA) from uncomplicated appendicitis (AnA).

Materials and Methods

In this prospective single centered cohort study, LRG1, NGAL, IL-6 in serum and urine levels were assayed preoperatively and on the second and fifth days postoperatively. Patients were divided into three groups: AcA, AnA and a control group without infectious or inflammation-mediated pathology.

Results

A total of 153 patients participated, of which 97 had AA and 56 were control. The s-LRG1 levels of AA versus the control with a cut-off value of 51.69 µg/mL generated an AUC of 0.95 [95% CI 0.91-0.99, p<0.001]. The cut-off value of s-LRG1 was 84.06 µg/mL for diagnosis of AcA when compared to AnA and therefore, significant [AUC 0.69 95% CI 0.59-0.80, p=0.001]. Median serum IL-6 and serum NGAL levels Day 0 were higher in appendicitis versus non-appendicitis. The average serum NGAL on Day 0 were 199.55 ng/mL for AcA, 135.20 ng/mL for AnA and 90.60 ng/mL for the control group (p = 0.020). The basal average serum IL-6 levels were 79.45 ng/mL for AcA, 23.14 for AnA and 10.93 ng/mL for the control group (p < 0.001). On the second postoperative day, serum NGAL levels were higher in AcA vs. AnA (p<0.001).

Conclusions

Serum LRG1, NGAL and IL-6 are elevated in pediatric appendicitis cases compared to the control group upon disease presentation. Serum LRG1 and NGAL exhibited excellent diagnostic performance as an inexpensive, non-invasive, rapid, accurate biomarkers in comparison to IL-6. The data shows promising results for the usage of these biomarkers in determining whether a patient has a high risk of appendicitis that requires surgical treatment.

Evaluation of motor development of preterm infants from the point of view of physiotherapists and parents, using standardized assessment tools

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Objectives

To comparatively analyze the coherence of parents' and physiotherapists' assessments of motor development in the population of preterm infants.

Materials and Methods

The study included 91 premature infants (up to 37 weeks of gestation) with an adjusted age of 1 to 12 months and their parents. The study was performed at the Children's Clinical University Hospital in Latvia. Parents were asked to complete the gross motor domain of the Ages and Stages Questionnaires (ASQ-GM). The physiotherapist then assessed the level of motor development of the premature baby using the Alberta Infant Motor Scale (AIMS). All data were collected, processed, and the results were analyzed using descriptive and analytical statistical methods.

Results

According to the results of the ASQ-GM, for most of the study participants (61.5%) the level of motor development was described as "above the threshold level", 13.2% was at "threshold level" and 25.3% was "below the threshold level". According to the AIMS, most study participants (79.1%) had motor development levels above the 10th percentile and was described as "normal", while 20.9% were below normal. Children with higher results at the ASQ-GM, also had higher AIMS centile rank ($r=0.781$, $p<0.001$). The result of the ASQ-GM, which was below "threshold level" had a sensitivity of 84%, a specificity of 90% and a positive predictive value of 70% that the child's score would be below the normal (below the 10th percentile) on the AIMS.

Conclusions

In general, the level of motor development of most premature infants corresponds to the adjusted age. There is a statistically significant, highly close relationship between parental (ASQ-GM) and physiotherapist (AIMS) assessment. The result ASQ-GM is valid to identify gross motor function delays in the population of prematurely born infants.

Immediate antibiotic prescribing habits for acutely ill children in primary care

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Objectives

Acute illness in pediatric patients is a common reason for visiting family physicians, meanwhile mostly children suffer from self-limiting viral infections which don't require antibacterial treatment. Antibiotics are the most common administered prescription drugs for children, around 90% prescribed in primary care. C reactive protein (CRP) testing could reduce diagnostic uncertainty and antibiotic prescribing rates. The aim of this study is to explore whether CRP measurement could rationalize antibiotic prescribing for children with acute illnesses.

Materials and Methods

The prospective observational study was conducted between November 2019 and May 2020. 80 family physicians from various Latvian regions were asked to record data (demographics, diagnosis, CRP level measurement, decision about antibiotic prescription) on pediatric patients aged 1 month - 18 years who were consulted with acute infections.

Results

During 6 months period 2388 patients, with the mean age 6,07 years, were assessed. The most common infections were acute respiratory viral infection (ARVI) - 40,8%, otitis - 32.6%, acute bronchitis - 15.8%. The major groups of infections treated with antibiotics were otitis - 44.8%, acute bronchitis -25.2% and ARVI -14,6%. For 47.2% (n=1126) CRP testing was performed before antibiotic prescribing. CRP level < 20 mg/l was detected in 77,8% (n=876) patients, only in 6,1% (n=68) CRP level > 50 mg/l (n=68). In patient population tested for CRP, antibiotics were prescribed immediately in 31.2% cases. In children group treated with antibiotics, CRP level was < 20 mg/l for 48,1% (n=169) and >50 mg/l for 16,5% (n=58).

Conclusions

Antibiotics in primary care are overused and often prescribed for self-limiting infections when CRP measurements are below the level indicating bacterial infection. Reliable cut-off levels of CRP to distinguish children with self-limiting viral infections from those who benefit from antibacterial treatment and guidelines could make this method more useful to reduce antibiotic prescribing.

Indirect impact of COVID-19 pandemics on health-related quality of life and specialized health care in children with chronic diseases in Children's Clinical University Hospital of Latvia

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Objectives

COVID-19 can have a direct and indirect impact on the course of a chronically ill child's disease and health-related quality of life (HRQoL). The aim of this study was to analyze the factors that could affect the HRQoL of the patient and the patient's caregiver during the COVID-19 pandemic.

Materials and Methods

University hospital (CCUH) from IX till XII 2020 in 4 diagnostic cohorts – type 1 diabetes (T1D), bronchial asthma (BA), inflammatory bowel disease (IBD) and cystic fibrosis (CF). Data were collected through a validated questionnaire PedsQL consisting of 4 main dimensions: physical health and activities, emotional health, social activities and school activities.

Results

The following number of children were enrolled in the study: 108 patients with DM1, 101 patients with BA, 12 IBD patients and 15 patients with CF. Analyzing the patients' HRQoL score in 4 dimensions: the physical health and activities - the highest HRQoL score among 4 chronic disease groups was achieved by patients with DM1 85.04, the lowest - patients with CF and IBD 75.00; emotional health - the highest HRQoL score was achieved by patients with BA, DM1 and IBD 70.00, the lowest - CF 67.50; social activities - the highest score - IBD 90.00, the lowest - CF 77.50, school activities – the highest HRQoL score - BA 75.00, the lowest - CF and IBD 65.00. Assessed by their treating physician 27.5% of all patient's clinical condition have worsened during the pandemic and 12.3% of the patients did not receive the necessary specialized care during the pandemic.

Conclusions

HRQoL is affected in all disease groups included in the study and analyzing the patients' HRQoL score in 4 dimensions the lowest numbers of HRQoL in all dimensions was observed between CF patients. 27.5% of all patient's clinical condition have worsened during the COVID-19 pandemic.

Low carbohydrate diet for children with attention-deficit/hyperactivity disorder

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Objectives

Objective of the study is to investigate the potential of low carbohydrate diet (Gut and Psychology Syndrome diet, GAPS) and Prebiotics in reducing some symptoms of attention deficit and hyperactivity in children.

According to Centers for Disease Control and Prevention, 9.4 % of children in the USA have been diagnosed with attention deficit and hyperactivity disorder (ADHD) (CDC, 2016). Symptoms of ADHD may include trouble paying attention, controlling impulsive behaviors, or being overly active.

Children with ADHD often have underlying digestive problems and altered gut microbiome. The growing research body is looking at nutritional and dietary interventions as treatment for ADHD symptoms.

Materials and Methods

The ongoing study involves a quantitative, case-control 3-month treatment of a nutritional and dietary intervention involving a low carbohydrate diet (GAPS) and the use of a prebiotic (Hufulac).

The participants are 56 children from Latvia, Norway, and Sweden (ages 5-13 years) with diagnoses of attention deficit disorder (ADD) or ADHD or undiagnosed ADHD symptoms.

Out of 56 children, 43 are in the Intervention group and 13 are in the Control group. Additionally, the intervention group is divided into GAPS (21 children) and GAPS+Prebiotic (22 children) subgroups.

Results

Symptoms of ADHD and digestive symptoms of children will be evaluated by parents using several adapted or validated questionnaires several times during the study. Fecal analysis will be evaluated at the beginning and end of the study. Cognitive tests will be performed several times during the study to evaluate reaction time, processing speed, continuous performance and working memory of the children.

Preliminary results of the study will be presented.

Conclusions

Research suggests that elimination of certain food additives, refined sugars, allergens, and the consumption of nutrient-rich foods, plays a role in ADHD. Reduction of some ADHD symptoms for children is expected in this study.

Low eosinophil percentage is related to higher CRP level in pediatric patients

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Objectives

Recent studies indicate that decreased eosinophil (EO) count may be a marker of severe infection. These studies were performed on relatively small adult cohorts, there is virtually no data on possible clinical relevance of eosinopenia in pediatric practice.

Materials and Methods

We present a retrospective study of 166379 parallel CRP and clinical blood tests (CBT) in pediatric patients (new-born - 17 years); samples with $EO > 1.5 \times 10^9/L$ (high risk of end organ damage) were excluded. The tests were performed in Children's Clinical University Hospital Laboratory in 2013-2019 (WBC and EO on Sysmex XN 2000; CRP on Cobas 6000). Anonymized results were retrieved from Hospital LIS, split by age groups, gender, WBC status and clinical profile; CRP cutoff points of 5mg/dL and 50mg/dL were applied. Data were analyzed by IBM SPSS v25 (Pearson, regression with weight estimation, Kruskal-Wallis).

Results

EO percentage highly significantly correlated with CRP level, CRP > 5mg/dL rate and CRP > 50mg/dL rate ($p < E-500$ for all), regression analysis demonstrated that this relation is independent from age, WBC count and absolute EO count. Samples with $EO < 0.2\%$ (21.7% tests) had median CRP 9.11mg/dL, CRP > 5mg/dL rate 61.1% and CRP > 50mg/dL rate 16.0%; samples with $EO 0.2-1\%$ (24.1% tests), respectively, 5.78mg/dL, 52.4% and 12.2%; $EO > 1\%$ (54.2% tests) - 1.91mg/dL, 37.0% and 7.2%; all differences highly significant in Kruskal-Wallis test ($p < E-500$ in all instances).

Similar distribution was seen in all age groups, both genders, patients with low, normal or elevated WBC and in most clinical profiles (emergency, neonatology, surgery, therapy, hematology), except ICU (no relation) and infectology (reverse, CRP higher in samples with $EO > 1\%$).

Conclusions

Relative eosinopenia is a readily available additional parameter for evaluation of inflammation in pediatric patients, it discriminates samples with elevated CRP at EO values $< 0.2\%$. Further study of clinical correlations, intermediate interval of 0.2-1% and of clinical profiles where 0.2% rule is not applicable would be of interest.

Ovarian and fallopian tube pathologies in children and adolescents

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Objectives

The aim of this study was to review ovarian and fallopian tube pathologies in Children's Clinical University Hospital (CCHU) in order to characterize their histological types and underlying genetic pathologies.

Materials and Methods

The hospital records of phenotypically female patients operated for ovarian and fallopian tube pathologies between 2016-2020 in CCHU were analyzed retrospectively. Clinical data and pathological diagnosis were obtained from medical records.

Results

156 phenotypically female patients aged from 18 days to 22 years, were operated due to ovarian or fallopian tube pathologies. 43 cases (27,56%) were paratubal/paraovarian cysts, 36(23, 8%)- mature cystic teratomas, 17 (10,90%) -follicular cysts 10,90%, 16 (10,26%)- serous cystadenomas, 5(3,21%)- corpus luteum cysts, 7 (4,49%)- mucinous cystadenomas, 3 (1,92%)- fibromas, including bilateral giant calcified and ossified ovarian fibroma, 2(1,28%)- ectopic tubal pregnancy, 1 (0,64%)- serous borderline tumour, 2 (1,28%)-gonadoblastomas, 1 (0,64%)- dysgerminoma, 1(0,64%) -juvenile granulosa cell tumour In 1 case (0,64%) combined pathology of streak gonads, gonadoblastoma and dysgerminoma was found. In 6 cases (3,85%) streak gonads without signs of neoplasia were found. In 4 cases of streak gonads patients had Swyer syndrome (karyotype 46XY), in two cases karyotype was 46XX (1 case of Mayer-Rokitansky-Küster-Hauser syndrome and 1 case of primary gonadal dysgenesis). Both gonadoblastoma cases and combined pathology case also were associated with Swyer syndrome. In total there were 7 (4,49%) Swyer syndrome cases. In 1 case (0,64%) histology revealed testicular tissue (case of androgen insensitivity syndrome). In 1 case normal ovarian tissue was found (biopsy was taken because of clinical signs of disorder of sex development). Other pathologies found included hydrosalpinx, non-specific inflammation and complete necrosis.

Conclusions

The most common fallopian tube and ovarian pathologies in childhood are paraovarian cysts, malignant ovarian neoplasms are rare in this age group. Underlying genetic pathologies, especially Swyer syndrome, are important in pathogenesis of ovarian pathology in childhood.

Pediatric quality of life after critical illness

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Objectives

The goal of this study was to evaluate the postdischarge quality of life in children after critical illness treated in a pediatric intensive care unit (PICU).

Materials and Methods

This study was conducted in Children's Clinical University Hospital in Riga, Latvia from January to July 2019 and was designed as an observational study. Inclusion criteria were admission to PICU from January 1st to December 31 2018, children who spent at least 48 hours in PICU, received mechanical ventilation and were discharged from PICU alive. Non-residents and patients that were transferred from neonatal ICU were excluded. Presence of a life limiting condition was assessed. Individual phone interviews with patients' parents were conducted to assess Pediatric Quality of Life Inventory (PedsQL) after PICU discharge. Patients were included in age groups specified in the score as follows, one to 12 months, two to four, five to seven, eight to twelve, 13 to 18 years. Participants were offered the option to withdraw from the study at any point.

Results

One-hundred twenty-five patients met inclusion criteria, male: female (n=55:70). Thirty patients were excluded (not reachable [14], death after PICU discharge [5], declined to participate [1], other reasons [10]) and 85 patient's parents were interviewed. Interviews were conducted after a median of 301 (IQR 227-377) days after PICU discharge. Median length of stay was 6 days (IQR 4-8). Forty percent had a life limiting condition. Mean Paediatric Index of Mortality was 0.03 SD 0.05. PedsQL shows data variety in four functioning categories in the study group. IQRtotal (62.3-87.0), IQRphysical (53.6-96.9), IQRemotional (57.3-82.3), IQRsocial (59.2-95.0), IQRschool (50.0-88.8).

Conclusions

Impairment of physical, emotional, social or school functioning often persists after PICU discharge. The most variability in collected data is seen in physical functioning. Further studies are required to assess the post-intensive care syndrome and increase quality of life after discharge from the PICU.

Pediatric renal replacement therapy: 20 years' experience in Pediatric Intensive Care Unit at Children's Clinical University Hospital in Riga, Latvia

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Objectives

To introduce with retrospective data and experience that Children's Clinical University hospital in Riga, Latvia have gained during last 20 years in cases where acute pediatric dialysis have been performed.

Materials and Methods

A retrospective study with comparative analysis of all patients hospitalised from 1998 to 2018 (excluding year 2002) with renal replacement therapy in Children's Clinical University hospital in pediatric intensive care unit. From overall 15 956 patients, that were hospitalised in pediatric intensive care unit, 167 received pediatric renal replacement therapy (peritoneal dialysis, continuous renal replacement therapy or both) and could be included in the study.

Data were collected and analysed with *Microsoft Excel*.

Results

From 167 patients that underwent renal replacement therapy, 51% (n=86) was female gender, 49% (n=81) – male.

All patients, that were included in the study, was divided into three age groups – younger than 1 year old (21%, n=36), 1 to 12 years old (56%, n=95), older than 12 years (21%, n=36).

In the biggest part of cases 85,63% (n= 143) continuous renal replacement therapy were the method of choice, while in 13,77% (n=23) - peritoneal dialysis was used. Only in one case combination of peritoneal dialysis and continuous renal replacement therapy was used.

Overall mortality data showed that 13% (n=21) of cases ended with *exitus letalis*.

Looking closer to mortality rate in each age group, children < 1 y.o. 19% (n=7) cases ended with *exitus letalis*, while in children aged 1 – 12 y.o. – 11% (n=10), > 12 y.o. – 11% (n=4).

Mortality rate was higher in continuous renal replacement therapy group 14% (n=20), while in peritoneal dialysis group mortality rate was lower – 4% (n=1).

Conclusions

This study describes current overall renal replacement therapy use in pediatric population in Latvia. For more detailed data (common causes, length of RRT) study should be continued.

Predictive model for serious bacterial infections in children with fever presenting to emergency department

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Objectives

Creation and validation of clinical prediction model (CPM) for serious bacterial infections (SBI) in children presenting to emergency department (ED) with febrile illness, based on clinical variables, clinician's "gut feeling", and "sense of reassurance".

Materials and Methods

Febrile children presenting to the ED of Children's Clinical University Hospital (CCUH) between 1st of April 2017 and 31st of December 2018 were enrolled in a prospective observational study. Data on clinical signs and symptoms were recorded in a standardized case report form. Clinician's "gut feeling" of something wrong and "sense of reassurance" were assessed via questionnaire completed after examination. Variable selection for the CPM was performed using stepwise logistic regression (forward, backward, and bidirectional), AIC criteria was used to penalize for too many parameters. Bootstrapping was used for assessment of the model's internal validity and correction for overoptimism. For external validation, the model was tested for prediction of SBI in a separate dataset of patients presenting to six regional hospitals between 1st of January and 31st of March 2019.

Results

517 children were included in CCUH, 54% (n=279) were boys, the median age was 58 months. 26.7% (n=138) developed SBI. 188 patients were enrolled in validation cohort, the median age was 28 months, 26.6% (n=50) developed SBI. Two CPMs were created, CPM1 consisting of eight clinical variables, and CPM2 with four clinical variables: "Refusal to drink", "Tachypnoea", "Reduced breath sounds", "Poor peripheral circulation"; plus "gut feeling" and "sense of reassurance". The area under curve (AUC) for ROC curve of CPM1 was 0.738 in CCUH cohort and 0.677 in validation cohort. The AUC for CPM2 was 0.783 in CCUH cohort and 0.752 in validation cohort.

Conclusions

Both CPMs had moderate ability to predict SBI and had acceptable performance in validation cohort. Adding variables "gut feeling" and "sense of reassurance" in the CPM improved its ability to predict SBI.

Prognostic factors predisposing to conservative treatment failure in children (aged 7 to 18) with uncomplicated acute appendicitis

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Objectives

Although appendectomy is the "gold standard" in the treatment of acute appendicitis, a conservative approach is gaining popularity. The aim of this study is to evaluate symptoms, objective signs, laboratory and ultrasound (US) findings that can lead to failure of antibacterial therapy in children with uncomplicated acute appendicitis (UCAP at Children's Clinical University Hospital (CCUH)).

Materials and Methods

A retrospective study was made to evaluate objective signs and symptoms, laboratory and US findings in medical records among patients aged 7 to 18 years old admitted to CCUH from January 2018 to December 2018 with diagnosis of uncomplicated acute appendicitis.

The patients were divided into two groups according to outcome of conservative therapy – A and B. In group A were 103 (72.02%) patients whose condition improved during antibacterial therapy and they were discharged on oral antibiotics. In group B were 40 (27.98%) patients whose condition did not improve after 48 hours of initiation of therapy and they underwent appendectomy.

Data were analyzed by IBM SPSS Statistics 22 program (Fisher's Exact test, Pearson Chi-Square test, Mann-Whitney U test, Shapiro-Wilk test).

Results

A total of 143 patient were included (78 boys (54.5%) and 65 girls (45.5%)). Median age was 12.0 (IQR 10.0-14.0 years). Fisher's Exact test gave statistically significant association between ALVARADO score severity groups and treatment groups ($p=0.001$).

Pearson Chi-Square test gave statistically significant association between nausea, vomiting, leucocytosis and shift to the left in treatment groups ($\chi^2=8.14$, $p=0.017$ and $\chi^2=12.22$, $p=0.002$ and $\chi^2=18.68$, $p<0.001$ and $\chi^2=7.82$, $p=0.02$).

There was no statistically significant difference in distribution of diameter across categories in groups (Mann-Whitney U test, $U=844.0$, $p=0.206$).

Conclusions

Presence of nausea, vomiting, leucocytosis and shift to the left suggests probability of increased risk of conservative treatment failure. Therefore, clinical signs and laboratory findings may indicate lack of efficacy in conservative therapy in children diagnosed with uncomplicated acute appendicitis.

Response to SARS-CoV-2 infection using an approach independent of symptom-based serological testing in children cohorts with selected chronic diseases

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Objectives

Since SARS-CoV-2 was first identified in December 2019, it has become a global pandemic at an incredible rate. The aim of this study was to perform SARS-CoV-2 serological testing in children with chronic diseases with no COVID-19 evidence.

Materials and Methods

The quantitative longitudinal study using convenience selection of the patients included children (aged 0-18 years) with type 1 diabetes, bronchial asthma, cystic fibrosis and inflammatory bowel disease in Children's Clinical University hospital (CCUH) from September till December 2020, who has no epidemiological, clinical or laboratory evidence of possible COVID-19. All the patients were tested for seroprevalence of SARS-CoV-2 by *Elecsys Anti-SARS-CoV-2* (Roche Diagnostics) and randomized patients - *Anti-SARS-CoV-2 ELISA (IgA) and (IgG)* (Euroimmune).

Results

A total of 238 patients were enrolled in the study and serological testing was performed to 232. Patients have been distributed by disease groups: 103 patients with bronchial asthma, 108 patients with diabetes, 12 patients with inflammatory bowel disease and 15 patients with cystic fibrosis. From all the 232 patients, who were serologically tested, only 3 had positive total SARS-CoV-2 antibodies, that is only 1.3%. Anti-SARS-CoV-2 positive patients were 2 patient in group of bronchial asthma and 1 with inflammatory bowel disease. Additional Anti-SARS-CoV-2 IgA and IgG were tested to randomized 83 patients enrolled in the study. 3 out of 83 (3.6%) were borderline positive for Anti-SARS-CoV-2 IgA, 2.4% had borderline positive Anti-SARS-CoV-2 IgG, 3.6% had positive Anti-SARS-CoV-2 IgA and 4.8% had positive Anti-SARS-CoV-2 IgG.

Conclusions

- SARS-CoV-2 seroprevalence is only 1.3% among children with chronic diseases enrolled in the study in CCUH, it should be noted that the number of cases with COVID-19 increased rapidly during study period in Latvia.
- We recommend serological testing with more than one method for patients who may benefit from it.

Risk management in hospital "Blood Transfusion Chain"

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Objectives

The understanding of the risks within the "Blood Transfusion Chain" is the best way to improve the Blood safety and Patient safety overall. The minimal number of transfusion reactions and adverse events does not indicate total safety. The aim of this research was to reduce or maintain the risk at an acceptable level by analyzing processes, critical points and data.

Materials and Methods

A retrospective case series study was conducted by analyzing Haemovigilance data, patient safety reports and transfusion reactions, performed in Children's Clinical University Hospital in Latvia from 01.01.2016. to 01.10.2020. Insufficient number of Haemovigilance data hindered adequate quantitative analysis. Case studies for every adverse event and reaction were more useful than statistical analysis.

Results

Among 8552 blood transfusions, 29 patient safety events, 47 adverse events and 9 adverse reactions were reported. Two main risks were identified: 1) the risk to blood component's quality and availability: integrity; bacterial contamination; blood handling processes; pre-transfusion actions; impact of the COVID-19; 2) the risk for the patient safety: identification; correct pre-transfusion, transfusion and post-transfusion processes, as well as the correlation between both risks.

Standardization and validation for risk reduction and maintenance, risk management at all stages, reporting data and analyzing were improved to control the trends.

Conclusions

There is a positive correlation between the Hospital's culture in "Blood Transfusion Chain" and Patient safety. Six step risk management process (planning, risk identification, qualitative and quantitative analysis, determination of adequate risk response and risk control) was the effective tool to search decisions for improvement of Blood Supply in COVID-19 pandemic conditions, to optimize Blood Stock management and mitigate the Patient safety risks.

Seasonal variations of main lymphocyte subsets are unexpectedly mild

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Objectives

Lymphocyte subsets is one of the basic parameters of immune status; beside clinical conditions, subset counts are influenced by regional and environmental factors. Only fragmentary data exist on seasonal variations, particularly in children, still, the issue may be important for diagnosis and for monitoring patients with immune abnormalities.

Materials and Methods

Continuous cohort of 5964 lymphocyte subset tests in 1-17 years old children was retrospectively studied, proven cases of primary immunodeficiencies and leukemias were not included. The tests were performed in Clinical Laboratory of Children's Clinical University Hospital, Riga in 2012-2019, on IVD 6-color single tube platform - 6-TBNK test, BD FACSCanto II flow cytometer, FACSCanto software (Becton Dickinson Co, BD Biosciences, San Jose, USA). Lymphocytes were defined as CD45+/FSlow/SSlow cells and further split into CD3+ T-cells, CD3+/CD4+ cells, CD3+/CD8+ cells, CD3-/CD19+ B-cells and CD3-/CD16+CD56+ NK cells.

Anonymized data were retrieved from the Hospital LIS, split by seasons and age groups and analyzed by IBM SPSS v.25 software; Kruskal-Wallis H test was used to evaluate differences.

Results

Lymphocyte count followed leukocyte trend with peak in winter and drop in summer, the same tendency was seen in all subsets, the pattern was roughly repeated in all age groups.

Variations, though consistent, were unexpectedly mild: maximal deviation of lymphocytes was 2.8%, T-cells 1.0%, T4 cells 1.7%, T8 cells 2.8%, NK cells 3.1%, B-cells 3.6% and T4/T8 ratio 1.8% and statistically nonsignificant, in contrast to significant seasonal dynamics of leukocytes (deviation 5.4%, $p=1.5E-10$).

Conclusions

Overall, lymphocytes and lymphocyte subsets demonstrated remarkable seasonal stability; that, considering numerous stimuli, would ask for a robust stabilizing mechanism.

The findings suggest that seasonal factor may be disregarded when defining normal reference ranges for subsets.

Seasonal oscillation of lymphocytes and lymphocyte subsets described in a large set of pediatric tests may be important for understanding populational dynamics of immune response.

The case study of chronic nonbacterial osteomyelitis with lung involvement and development of cerebral abscess *Dietzia* sp. etiology

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We report a case of a 3.5-year-old girl, who had recurrent episodes of fever, migratory joint pain and swelling, disseminated papulopustular rash for the first time in December 2018. The girl was born from physiological pregnancy, had no family history of rheumatological, autoimmune diseases or consanguinity.

In February 2019 there was osteomyelitis at the junction of os pubis and os ischii in MRI, WBC $22.7 \times 10^3 / \text{uL}$; CRP 56.0 mg/L. Blood culture remained negative. With antibiotics the imaging changes, laboratory markers and symptoms normalized.

In March she had headache, rhinitis, rash and limping, but no changes in joint examination. A cranial CT scan revealed pansinusitis. During antimicrobial treatment the symptoms disappeared.

In May-June fever, rash and swelling on the left side of the face were observed. MRI showed chronic mandibular osteomyelitis, leading to suspicion of CNO. A jawbone biopsy showed fibrous dysplasia. Naproxen was initiated. In September, MRI of the mandible showed progression of changes. Repeated examination of biopsy sent to Helsinki and radiological images sent to Tartu were consistent with the CNO diagnosis. Cultures remained sterile. In October PET/CT showed hypermetabolic foci in both lungs, left mandibula, left proximal tibia and distal metaphysis of femur. A lung biopsy revealed non-necrotizing granulomatous inflammation. Tbc, immunodeficiency with granulomatosis, secondary sarcoid-like reactions and lung infections were excluded.

After vast investigations in February 2020 methotrexate, etanercept and pamidronate were initiated. Due to lung changes the patient received azithromycin. After treatment initiation, she started experiencing episodic vomiting. In May MRI revealed pansinusitis and cerebral abscess in the frontal lobe without purulent signal. Supraorbital craniotomy, intracranial abscess resection and maxillotomy were performed. Granulomatous tissue found was sent for histological, bacteriological and fungal examination. Gram-positive bacteria growth (*Dietzia* sp.) was found and long-lasting antibacterial treatment was started with clinical and radiological imaging improvement.

Visual functions in patients with congenital unilateral or bilateral cataracts after cataract extraction surgery

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Objectives

The aim of the study was to evaluate visual functions in cases of unilateral and bilateral cataracts after congenital extraction surgery.

Materials and Methods

The retrospective study was held at Children's Clinical University Hospital (Riga, Latvia). The study analyzed patient card data on children with congenital cataracts in period from 2006 to 2019 year. The cohort comprised of 98 children (143 eyes) who underwent foldable posterior chamber IOL implantation. The eyes of the children were grouped according to different characterising factors of the congenital cataract: the of time of cataract onset and laterality. 48 children with bilateral cataracts (93 eyes) and 50 children with unilateral cataracts (50 eyes).

Results

The acquired results of vision acuity for unilateral pseudophakic eyes median was 0,23 decimal [0,26 - 0,4 dec] and unilateral – 0,4 decimal [0,36 - 0,48 dec]. The median value of the spherical equivalent t unilateral pseudophakic eyes was -0.75 D [-2.69 D to -0.5 D], but for bilateral -0.63 D [-2.72 D to - 0.87 D]. The median value of myopic deviation of unilateral congenital pseudophakic eyes was -4,00 D [-7,60 D to -3,60 D] and bilateral -7,75 D [-10.10 D to -5, 50 D]. The average magnitude of astigmatism was 2.00 D and the most common type of astigmatism was direct astigmatism (83%). Binocular vision was 1.6 times more common in bilateral cataracts (70% ± 10%) than in unilateral (42% ± 14%), while stereovision was 30% ± 12% in children with unilateral cataracts and 41% ± 10% in bilateral. In cases of unilateral cataracts, exotropia developed in 67% ± 17%, bilateral 71% ± 19% of all operated children.

Conclusions

The timing of the presentation of pediatric cataracts is an important factor in the development of visual acuity, refraction, myopic abnormalities and binocular function after cataract surgery. Cataract laterality significantly affects binocular functions.

Neonatology

Growth of preterm born children after discharge from hospital and comparison of factors that influence it

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Objectives

Optimal care, minimal morbidities, optimal weight gain are important factors for healthy development of prematurely born infant and better neurocognitive outcome. The aim of this research was to estimate the dynamic weight and length of premature born children during the two first corrected years of life and the factors that can influence growth.

Materials and Methods

We analyzed the data of prematurely born infant of 2017 year (till 33+6gw), who were treated in Children's Clinical University Hospital of Latvia and were included into Follow-up programme after discharge. There were 2 groups: 1st-birth weight <1500g, 2nd -birth weight ≥1500g. Weight and length gain was compared to population growth charts. Birth weight (BW) mean percentile (%) was compared to weight mean % at the corrected age of 12 and 24 months. Influence of comorbidities on growth was analyzed. Statistical analyses: T-tests.

Results

In total, Study included 189 children (54.0% boys); 1st group: 89 children (47%), 2nd – 100 (51%). The weight mean % at 12mo and weight mean % at 24mo: 1stgroup: 52.36% and 56.02% (p=0.01); 2nd 62.37% and 67.10% (p=0.01). The height mean % at 12mo and height mean % at 24mo: 1stgroup: 67.78% and 48.18% (p<0.0001); 2nd 73.50% and 54.58% (p<0.0001). The BW mean % was higher, than weight mean % at 12mo in the 1st group, who had RDS, BPD, severe IVH and PDA. Psychomotor development appropriate for 24mo was: 1st group: 79.5%, 2nd-83.9%.

Conclusions

The weight gain of prematurely born children is adequate during the first two years of life. The height dynamic is lower, but still in normal ranges. Neonatal diseases negatively influence the growth, especially whom were born with weight <1500g during 1st year of life. Most of children have normal psychomotor development.

Necrotizing enterocolitis in neonates that carried out in Neonatal Intensive Care Unit in Children's Clinical University Hospital from 2017 to 2019

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Objectives

Compare tactics and outcome with previous research data (2000-2009).

Materials and Methods

In retrospective study, carried out in NICU from 1 of January 2017 to 31 of December 2019, medical records of necrotizing enterocolitis (NEC) patients were analysed.

Results

58 newborns with NEC were treated, more infants diagnosed with extremely low birth weight (27), very low birth weight (22), more common boys (57%). 35 out of newborns were breastfed before the diagnosis of NEC. In most common additional diagnosis: anemia (50), intraventricular haemorrhage (46), respiratory distress (45). The flora of NEC-associated sepsis is diverse. The clinical finding in 52 cases: bile retention (39), increased abdominal volume (19). X-rays show the diagnosis of NEC in 41% cases: the intestinal wall thickening (14), wall pneumatosis (6), free air in the abdominal cavity (5). Using the Ultrasonographic examination method, NEC is diagnosed in 30(52%) cases: the intestinal wall pneumatosis in 29 cases, wall thickening in 5 cases. 98.4% of children had changes in blood tests. 81% of infants were treated only conservatively, the most often used antibacterial agents such as Ampicillin, Gentamicin, Vancomycin. 11 had surgeries: laparocentesis with abdominal drainage in 2 cases, intestinal stoma formation in 8, multi-stage surgery in 1 (laparocentesis, followed by intestinal stoma). Newborns were treated 59% of the total hospitalization time in Neonatal Intensive Care Unit. 7 infants with NEC died, 2 treated conservatively, 2 underwent surgically (laparocentesis with abdominal drainage).

Conclusions

Typically, NEC is often diagnosed among newborns with extremely low birth weight- 47%. Additional diagnoses are associated with prematurity: anemia in 86%, IVH in 79%, RD in 78%. Radiological methods of examination possibility of the NEC diagnostics is the same. Emergency surgery is needed in fewer cases- 19% (2000-2009 years in 38%), postoperative mortality has also decreased- 29% (2000-2009 years 53%). The mortality of patients with NEC is still high (12%).

Neonatal outcomes and mortality rate of preterm infants (born at $\leq 30 + 6$ weeks) admitted to Kaunas Center of Perinatology in 2019

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Objectives

Aim of this study was to evaluate neonatal outcomes and mortality rate of newborns whose gestational age (g.a.) was 22-30+ 6 weeks.

Materials and Methods

A retrospective study was conducted at Kaunas Center of Perinatology. Preterm newborns born and/or treated in 2019 were included. Information inquired via medical data from the hospital's database and archive. Data analyzed using IBM Statistics SPSS for frequencies, T and χ^2 tests. Results with values of $p < 0.05$ considered statistically significant.

Results

105 newborns born between 22-30+ 6 weeks were included, majority ($n=89$; 84,8%) survived, 16 (15,2%) died. Mortality rate was 152 per 1000 live births in selected gestation group. 13 twin couples ($n=26$; 24,8%) and 1 triplet ($n=3$; 2,9%) were admitted. Almost a tenth of newborns ($n=10$; 9,5%) were conceived after IVF procedure. 71,7% of newborns in 22-27+6 g.a. group and 98,1% in 28-30+6 g.a. group survived. Average weight was 803,6+260,9 g in 22-27+6 g.a. group and 1360,4+-211,2 g in 28-30+6 g.a. group. Respiratory distress syndrome (RDS) was diagnosed in 81 cases (91%), hyperbilirubinemia in 59 (66,3%), intraventricular hemorrhages in 26 (29,2%), anaemia in 22 (24,7%), congenital heart defects (CHD) in 37 (41,6%), bronchopulmonary dysplasia (BPD) in 19 (21,3%), congenital infection in 15 (16,9%), sepsis in 15 (16,9%), necrotizing enterocolitis (NEC) in 15 (16,9%), cystic periventricular leukomalacia in 14 (15,7%), retinopathy in 10 (11,2%), Statistically significant correlations were found between g.a. and BPD ($p=0,007$), NEC ($p=0,021$), anaemia ($p=0,01$), CHD ($p=0,004$), congenital infection ($p=0,009$) and sepsis ($p=0,011$).

Conclusions

Most preterm newborns survived, mortality rate was 152 per 1000 live births in selected g.a. group. Most newborns in 28-30+6 g.a. group survived. All surviving newborns suffered complications, most commonly - RDS and hyperbilirubinemia. There were significant links between g.a. and these complications: BPD, NEC, anaemia, CHD, congenital infection and sepsis.

Outcomes of neonates born at Riga Maternity Hospital following in vitro fertilization procedures

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Objectives

The objective of this study was to obtain statistical data regarding neonates born out of IVF by analysing demographic, anthropometric and neonatal morbidity data retrieved from the largest national maternity hospital.

Materials and Methods

In this retrospective, descriptive cohort study we analysed medical documentation on 509 pregnant women and 558 neonates who were in-patient at the Riga Maternity Hospital from 2017 until 2019. In the data analysis we included maternal medical history as well as neonatal birth data and morbidity.

Results

Average maternal age was 34±4 years. 51.9% of the neonates were male, average gestational age was 38 weeks, average weight – 3307 grams. Incidence of multiple births were 17,5 %, prematurely born were 55.1% of twins. There were 460 singleton and 49 twin deliveries. A moderate correlation between twin pregnancy and prematurity were found ($r=0.48$). A high incidence of very premature birth rates (gestational weeks 28–33) was found in twin pregnancies. Adaptation disorders were observed in 5.9% of the cases, and 8.9% of the neonates required admission to the intensive care unit. Congenital abnormalities were observed in 1.6% of the neonates, but 5.3% of the neonates were small for gestational age.

Conclusions

Use of IVF is associated with a higher incidence of multiple deliveries which is associated with a higher risk of prematurity. Adaptation disorders and need of intensive care are observed more frequently in neonates born out of IVF than in the general population.

Incidence of genetic disorders did not exceed those observed in the general population, but this may be due to insufficient data.

Integration of information regarding manipulations and outcomes in the newborn registry is required in order to evaluate the economic and clinical efficiency and outcomes of IVF.

Perinatal infection as a cause for stillbirth

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Objectives

According to statistics, 10-25% of perinatal death in high-income countries are caused by congenital infections, being dominated by ascending infections.

The aim of this study was to review how many of examined perinatal death cases in last year in Children Clinical University Hospital (CCHU) were caused by congenital infections and to identify incidence specific causes such as TORCH infections.

Materials and Methods

Hospital records of all perinatal autopsies in CCHU between January 1st and December 31st, 2020 were analyzed retrospectively. Clinical and histological data were obtained from medical records and analyzed using MS Excel.

Results

In total 114 autopsies on perinatal death patients were performed in CCHU during year 2020. Out of these, 22% (n=25) were excluded for miscellaneous reasons, leaving 89 (78%) cases to include in this report. Out of these 89 cases 17% (n=15) were deemed to be caused by congenital infections. 13 cases were common pneumonias, caused by ascending infection and infected amniotic water aspiration. 7% (n=1) was a case of congenital listeriosis and 7% (n=1) was caused by congenital CMV infection.

Conclusions

Most common cause of congenital infections was identified as ascending infection causing aspiration pneumonia. Overall occurrence of Perinatal death caused by congenital infections falls within common statistical category.

Pharmacotherapeutic analysis in the Neonatology Clinic of the University Clinical Hospital Service of Kosovo

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Objectives

Treatment in Neonatology, today, despite major advances in the medical field, has moved slower. This disadvantage is thought to be related to organogenesis, as well as to the storage, effective distribution of the drugs in this population. Despite challenges, advances in neonatal pharmacotherapy have been made and attracted many medical professionals. This paperwork is to obtain a clear overview of the application of drugs to hospitalized patients at UCCK, through results from patient data in December 2018, January-February 2019.

Materials and Methods

The research is of retrospective and descriptive type. Used patient data at NC- UCCK for the time periods December 2018, January- February 2019. 100 patients were included. Literature cited through the software Zotero. Patients diagnoses are coded according to ICD-10-CM. Therapeutic data are coded according to ATC-DDD.

Results

During December 2018, January-February 2019, 100 patients were diagnosed and treated at NC-UCCK: Males 50%, while females 50%. The most common age-groups were 28-32 weeks. The most common diagnosis: SIRS 63 cases, Hyperbilirubinemia 31 cases, Sepsis 13 cases. According to the results: Antimicrobics are the most frequently prescribed group 308 prescriptions, followed by the respiratory system drugs-20 prescriptions, the cardiovascular system drugs 13 prescriptions. 89% of patients were prescribed Ampicillin the first drug, followed by Amikacin 89% as second drug. The third is Meropenem 46%; the fourth stands Vancomycin in 46% of patients; Microbiological analysis was performed on only 53 patients: 39 samples were sterile and 14 patients were positive, whom 3 samples were resistant to all antibiotics.

Conclusions

Very carefully analyzed parameters during paperwork, conducted in the NC-UCCK, results of general and clinical nature were obtained, also important information from pharmacological aspect, which has been the purpose of our research, with particular emphasis on the overview of antibiotic use. Based on the results of the paperwork, We conclude that the therapy described in NC is individual for each patient based in clinical features and microbiological samples.

Review of patients with necrotising enterocolitis treated in Children's Clinical University Hospital Riga from 2015 to 2020

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Objectives

Necrotising enterocolitis (NEC) is a devastating bowel disease affecting 3-10% of very preterm infants. It is associated with increased mortality, serious neonatal morbidity and decreased quality of life in survivors. Aim was to compare and analyze patient data with NEC regarding demographics, therapeutics, time of diagnosis and proportion of surgical treatment from 2015 to 2020 and compare data with literature.

Materials and Methods

2455 patient history charts with diagnosis of SSK 10 classifier P77 and P07 was overlooked from 2015 to 2020 to find patient with NEC diagnosis using data storage system Andromeda in Children's Clinical University Hospital (CCUH). Statistical analysis were performed in MS Excel and IBM SPSS.

Results

From 2015-2020 110 patients with NEC where treated in CCUH. Incidence 4,5%. 52 (47,3%) female and 58 (52,7%) male. According to gestational age: extremely preterm 55(50%), very preterm 44 (40%), late preterm 9 (8,2%), term 2(1,8%). According to birth weight: < 1000g 54(49,1%), 1000-1499g 37(33,6%), 1500-2499g 16 (14,5%), 2500-3999g 3(2,7%). In 57 (52%) NEC presented in a first week of life, in 48 (44%) patient >7 days, mean 16 days.

From 110 patient with NEC 20 (18,2%) required surgery. From those 1(5%) received breast milk, 12 (60%) formula, 5(25%) combined, in conservative group 33(36,7%) breast milk, 28 (31%) formula and 21 (23%) combined. 5(25%) of surgically treated presented at first 7 days of life. 19 (85%) patient in surgical group was less than 1499g and <32 weeks of gestation.

The most commonly used antibacterial combination is ampicillin/gentamicin (n=32; 29,1%), in surgical group piperacillin/tazobactam/vancomycin (n=5; 25%).

Conclusions

1. To improve statistics more careful marking of diagnosis in Andromeda is required.
2. The lower the weight and gestational age, the greater the chance of developing advanced NEC and requirement for surgical treatment.
3. In statistical analyses demographics, therapeutics and time of diagnosis corresponds to data found in literature.

Successful pulmonary hypoplasia clinical case after a long latency period

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Pulmonary hypoplasia is a rare condition characterized by incomplete development of lung tissue with a reduction of the bronchial segment, the alveoli and the lungs themselves. Respiratory movements of the fetus and sufficient amount of amniotic fluid are essential for the normal development of lung tissue. As a result long latency period with severe oligohydramnios after premature rupture of membranes impairs fetal development and increases the risk of pulmonary hypoplasia.

We report a successful pulmonary hypoplasia clinical case after a latency period of 44 days.

A 24-year-old woman attended the emergency room of our hospital at 22 weeks of gestation complaining of watery vaginal discharge. There were no clinical signs of intrauterine infection. During ultrasound examination severe oligohydramnios was observed with AFI of 35 mm.

After a prolongation of pregnancy was chosen the antibiotic therapy and corticosteroids were prescribed. During further hospitalization, the condition of the patient and the fetus remained stable.

At 28 weeks of gestation the vaginal delivery was induced and a live male newborn weighing 1398 g with Apgar Scores of 2/4/6 was born. Duration of latency period before birth – 1037 h 41 min or 44 days.

Instantly after birth the newborn underwent initial resuscitation. He was intubated and mechanical ventilation was initiated. Anyway, hypoxemia persisted. The HFOV was initiated. The surfactant was instilled. Left pleural drainage was performed. Impairment of blood circulation persisted. Persistent pulmonary hypertension was diagnosed. Inhaled nitric oxide therapy was initiated. Antibacterial treatment, infusion therapy, sedation were prescribed. At 4th day of life (DOL) the condition of the newborn was aggravated by a spontaneous intestinal perforation. The abdominal cavity was drained. With an improvement of general condition the kangaroos method was initiated.

At 44th DOL the newborn was transferred to the neonatal department. At 56th DOL he was discharged.

Value of different radiological examination methods in diagnosis of necrotic enterocolitis in Children's Clinical University Hospital from 2015 to 2020

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Objectives

Necrotic enterocolitis (NEC) is affecting approximately 7% of very preterm infants. Imaging is essential in making NEC diagnosis. Plain abdominal radiography (AR) is the preferred modality and abdominal ultrasonography (AUS) is increasingly helpful in diagnosis of NEC. The blood tests like white blood cell count (WBC) and C-reactive protein (CRP) are not specific but may be used as supportive evidence for diagnosis.

Aim was to analyze the count of cases where diagnosis was established based on radiological examinations (RE) and blood inflammatory markers (BIM) like WBC, CRP, IL-6. To evaluate the criteria of diagnosis in CCUH and the treatment (conservative or surgical) that was used.

Materials and Methods

2455 patient history charts with diagnosis of SSK 10 classifier P77 and P07 was reviewed from 2015 to 2020 to find patients with NEC diagnosis using data storage system Andromeda in CCUH, Riga. Statistical analysis were performed in MS Excel and IBM SPSS.

Results

In the time period 2015-2020 110 NEC patients were selected. In 38 (34,6%) cases NEC was confirmed or suspected in AR and in 64 (58,1%) cases – in AUS. In 25 (22,7%) NEC was confirmed in both examinations. In 26 (23,6%) no NEC signs in any RE. In reviewed data NEC stage was mentioned extremely rarely.

63 (54,5%) cases had NEC signs in one or both RE and one/both BIM were elevated. 41 (37,4%) had positive RE finding or elevated one/both BIM. In 3 (2,7%) cases RE and BIM were negative.

20 (18%) patients were treated surgically. In 15 (75%) patients, who were operated on, had positive one/both RE and 4 (20%) had negative RE but positive BIM.

Conclusions

1. Frequently the criteria and staging of NEC diagnosis weren't clear.
2. According to our data higher diagnostic value showed AUS.
3. A common NEC diagnostic algorithm would be a useful tool in CCUH.

Oncology

A case report of aggressive adenocarcinoma of cervix with ovarian metastasis

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Objectives

Cervical cancer is the fourth most common cancer in women worldwide. Cervical adenocarcinoma, as it was in this particular case, accounts approximately for 25 % of all invasive cervical cancers. Ovarian metastasis from cervical cancer is a rare phenomenon.

Case report: A 28-year-old nulliparous woman was referred to LOC presenting with progressing lower abdomen discomfort and rapid abdominal enlargement. On her blood sample raised Carcinoembryonal marker (CEA) was >2000 U/mL, CA125 - 233 U/mL were detected. Her abdominal CT scan revealed worrisome ovarian lesions and peritoneal dissemination suggesting of primary ovarian cancer.

She did have a radical trachelectomy, parailiac bilateral lymphadenectomy 14 months ago due to stage IB1 (pT_{1b1}N₀cM₀pL+V-G₂R₀) usual type cervical adenocarcinoma. No adjuvant treatment was recommended according to Sedlis criteria on the multi disciplinary team meeting (MDT).

Radical cytoreductive surgery, including total hysterectomy, bilateral adnexectomy, rectum anterior resection, pelvic peritonectomy, infracolic omentectomy, right side cistoureteroneostomy and appendectomy was performed after confirming malignant lesions on frozen section histology.

On the final histopathology report *Grade 3* endocervical serous adenocarcinoma's metastasis with mucinous differentiation (10%) were confirmed in all specimens. On the MDT combined chemotherapy including cisplatin, paclitaxel and bevacizumab was recommended.

Keywords: Cervical adenocarcinoma, ovarian metastasis.

Conclusions

This case study reports a presentation of complicated and rare medical situation, as well as facilitate a discussion about young oncological patients. This case report shows importance of accurate histology conclusion, allowing to make balanced decisions taking into account fertility desires and oncological outcomes.

A case report of signet ring cell gastric carcinoma – multidisciplinary approach

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Objectives

Gastric signet-ring cell carcinoma (SRCC) is a rare, highly malignant epithelial adenocarcinoma. Its incidence is increasing constantly in the developed world. SRCC is more frequent in women, with the mean age ranging from 55 to 61 years. This case aims to provide multidisciplinary insight in diagnosing SRCC and challenging diagnostic road to the final diagnosis.

Case report: A 32-year-old male was hospitalized in a regional hospital with progressing back pain for which he used Dexketoprofen for 2 months. Accompanying symptoms were weight loss, progressive fatigue, subfebrile body temperature and night sweats. X-rays of chest and skull as well as abdominal CT scan revealed lytic process as in multiple myeloma or bone marrow lesions. Patient was transferred to Riga Eastern University Hospital for diagnosis of myeloma, although with signs of bleeding from the upper gastrointestinal tract patient underwent emergency esophagogastroduodenoscopy. Several ulcerations were found and biopsied. Patient was admitted to the department of gastroenterology. No paraproteins were found in plasma or urine.

Hematologist was consulted and a trephine biopsy was done. Repeated review of the abdominal CT scan revealed slight thickening of the antrum of the stomach. Biopsy results confirmed anaplastic gastric SRCC and similar findings in bone marrow biopsy. The patient never smoked and had no oncopathology in family history.

Keywords: Gastric cancer, Signet ring cell carcinoma, "red flags" of back pain.

Results

Gastric SRCC with diffuse lytic dissemination in bone marrow was confirmed. During the hospitalization severe back pain progressed constraining the mobility index to ECOG 3. For this reason oncological consilium indicated palliative treatment as the patient's condition was too severe for chemotherapy.

Conclusions

1. This case shows the importance of multidisciplinary approach.
2. Back pain in young adults may conceal a diagnosis of cancer.
3. "Red flags" symptoms should never be ignored.

A case report of unusual presentation of esophageal cancer

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Objectives

Esophageal cancer occurs in only 1% of all cancers in USA. There are two major histological types of esophageal cancers: in 90% it is esophageal squamous cell cancer and in 5% esophageal adenocarcinoma (EAC). EAC most often localized in the distal esophagus. Presenting symptoms are dysphagia, weight loss and chest pain. EAC is more common in men than women, with mean age 70. EAC has one of the highest mortalities.

Case report: In mid-October 2020, a 40-year-old female with a BMI of 18 kg/m² turned to a family doctor with complaints of sore throat, dry cough, hoarseness, and decreased appetite. Despite course of antibiotics, the cough continued to worsen, and shortness of breath appeared. She was hospitalized, SARS-CoV-2 test was negative. CT of the chest revealed abnormal thickening of esophagus and metastasis in lungs. She denied any medical history of gastroesophageal reflux disease or esophagitis. She smoked for 20 years and had alcohol abuse in the past. She left the hospital.

At the end of November 2020, she was hospitalized again with severe shortness of breath. In bronchoscopy the tracheal obstruction was 70% and right bronchus was completely obstructed with tumor mass. A permanent tracheostomy tube was inserted to relieve symptoms. Esophagogastroduodenoscopy revealed endoscopically impermeable formation of esophagus, localized at the border between the upper and middle third of esophagus, 15cm from the front teeth. Histopathology of biopsies concluded: low-grade (Grade III) adenocarcinoma with necrosis. The patient was discharged from the hospital at her own request. *Exitus letalis* on 10.12.20.

Results

Respiratory symptoms like dry cough and shortness of breath have wide range of differential diagnosis. It is important to keep in mind esophageal cancer as possible reason for dry cough. Never forget about atypical disease presentations and rare cases.

Accuracy of diagnosis of melanoma and benign pigmented lesions on face, head and neck

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Objectives

Aim of the current study was evaluation of the accuracy of dermoscopy diagnostics of melanoma and benign pigmented lesions of patients who visited Clinical Centre of Skin and Sexually Transmitted Diseases, Riga 1st hospital in 12 months period of 2020.

Materials and Methods

Comparison of the accuracy of dermoscopy results with histology was analyzed. In total 168 adults patients, 34-87 years of age, 107 female and 61 male who presented to the clinic with complaints about suspicious pigmented lesions for melanoma localized particularly on face, head or neck, were investigated applying method of dermoscopy with HEINE DELTA 20T dermatoscope. This in clinic routinely used dermatoscope provides clear, high-resolution images due to the high-quality achromatic optical system, allowing goggle function for switching between polarized and non-polarized illumination mode, with both glare-free and reflection-free view in LED light.

Results

From 168 patients with suspicious pigmented lesion for melanoma localized on face, head or neck, dermoscopy investigation confirmed melanoma in 9 cases – 6 with superficial melanoma, 2 with nodular melanoma and 1 lentigo maligna melanoma. Biopsies of these lesions were not performed due to risk of dissemination. From 9 patients sent from Clinical Centre of Skin and Sexually Transmitted Diseases to Out-patients' clinic, Centre of Oncology of Latvia for treatment, surgical excision was performed and diagnosis of melanoma was confirmed histologically in 8 cases, histology result of 1 patient showed dysplastic nevus.

Other 159 patients with suspicious pigmented lesions investigated with dermoscopy were - 110 seborrheic keratoses, 49 nevi, 8 solar lentigo, and 1 pyogenic granuloma.

Conclusions

Manual dermoscopy is accurate and precise method in hands of expert, Biopsy to confirm diagnosis of melanoma on the face, head and neck is not recommendable; the excision of melanoma with safe margins is to be performed by maxillofacial surgeon. Collaboration among dermatologists, surgeons and pathologists improve treatment of melanoma.

BRCA1 loss of heterozygosity in cancer cells of hereditary breast cancer patients

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Objectives

BRCA1 is a tumor suppressor and its mutations increase predisposition to breast cancer. Knudson two hit theory describes hereditary cancer development. Therefore frequency of *BRCA1* deletion and methylation, as the second hit in breast cancer samples were determined.

Materials and Methods

DNA from 20 frozen breast cancer biopsies (from RSU Institute of Oncology collection, obtained from 2010-2020) from *BRCA1* germline positive patients was isolated. Methylation specific - Multiplex Ligation dependant Probe Amplification (*MS-MLPA*, *MRC-Holland*, *Tumor suppressor mix 1*) and next generation sequencing (*Illumina*, *BRCA panel*) was performed to assess *BRCA1* mutation, deletion and methylation.

Results

The second hit was identified in 3 samples (15%) by deletion. Common benign single nucleotide polymorphisms were identified in 7 samples (35%), variants of uncertain significance or conflicting interpretation were identified in 4 samples (20%).

Conclusions

Second-hit in *BRCA1* hereditary breast cancer might not be necessary to initiate carcinogenesis.

Changes of miRNA expression levels in plasma as biomarker for response to chemotherapy in metastatic colorectal cancer

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Objectives

A promising and due to their non-invasive nature favorable concept in biomarker exploration is liquid biopsy. Micro RNAs (miRNAs) are a preferred target due to their stability. Various miRNAs are known to be dysregulated in colorectal cancers (CRC) where they take part in oncogenesis by acting as tumor suppressor or oncogene by silencing of target genes. The aim of this study is to explore a set of differentially expressed plasma cell-free miRNAs as potential biomarkers for CRC dynamic response to chemotherapy.

Materials and Methods

Plasma samples from 51 patients with histologically confirmed primary metastatic CRC were obtained before and during the FOLFOX chemotherapy with/without targeted treatment every 2 weeks. Six retrospective patients were chosen for the discovery set. Per patient a plasma sample before treatment (control), a sample at remission after the start of chemotherapy (group 1) and relapse (group 2) was selected based on clinical data including serum carcinoembryonic antigen levels if informative.

Hemolytic samples were identified via Δ CT of miRNA-23a and miRNA-451 and excluded from the sample set. Each sample was analyzed for 752 selected miRNAs using miRNome PCR Panel (Qiagen). For normalization a set of preselected miRNAs were used. The Fold changes and p-values of each miRNA between the 3 timepoints and level of differential expression were detected with the analysis tool of the GeneGlobe Data Analysis Center (Qiagen).

Results

22 miRNAs were found to have a significant ($p < 0.05$) fold change > 2.0 between control and relapse samples versus remission. In 11 miRNAs an uniform expression pattern between diagnosis, remission and relapse in 4 or more patients were found. Five miRNAs were chosen for further validation in a larger sample set as promising biomarkers.

Conclusions

Changes in miRNA expression levels in plasma are a potentially promising biomarkers for CRC response to chemotherapy.

Comparison of unexpected vs preoperatively diagnosed thyroid carcinomas

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Objectives

Aim of study is to determine main diagnostic, management and outcome differences in thyroid cancer which were unexpected findings and those diagnosed prior operations.

Materials and Methods

From 2015-2020 were performed 1475 thyroid operations. Thyroid cancer was diagnosed in 456 (30.9%) patients. From those unexpected cancers diagnosed in 110 (24.1%) patients – Group A, 346 (75.9%) were preoperatively diagnosed carcinomas – Group B. Data were analysed regarding indications for surgery, operation type, morphology, tumour size, thyroid weight.

Results

Main indications for surgery in Group A were compression symptoms –71 and thyrotoxicosis – 39 vs in Group B – suspected malignancy in 144, a proven malignancy – 196 cases. Fine needle aspiration (FNA) was performed in Group A in 57 (51.8%), B - 333 (96.2%) cases. Thyroidectomy performed in Group A: 65 (59.1%), B –297 (85.8%); unilateral procedure: Group A – 37 (33.6%), B – 46 (13.3%). Papillary cancers found in Group A – 83 (75.5%), B – 312 (90.2%); follicular cancers – Group A: 21 (19.1%), B - 20 (5.8%). Medullary cancer and anaplastic cancer found in Group A and B respectively: 2 (1.8%) and 2 (1.8%) vs 11 (3.2%) and 0 (0 %). Multiple different cancers Group A: 2 (1.8%), B - 3 (0.9%). Microcarcinomas found in Group A – 77 (70.0%), B – 162 (46.8%). Mean tumour size in Group A: 13.4mm (1–95 mm), B – 14.0mm (1–75mm). Multifocal cancers found in Group A: 21 (19.1%), B – 86 24.9%. Mean excised thyroid weight in Group A – 53.9g, B – 30.0g. Metastatic lymph nodes were diagnosed in 8 (7.2%) cases in Group A, B – 80 (23.1%).

Conclusions

1. Unexpected thyroid cancer is not rare finding in patients operated due to benign pathologies.
2. Large part of follicular cancers is still found incidentally despite commonly performed FNA.

Copy number variation and methylation status of oncogenes and tumor suppressor genes in breast cancer tissues

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Objectives

Breast cancers are very heterogeneous, that is determined by various genetic events such as gene deletion, duplication and methylation. It is important in prognosis and therapy determination. Therefore CNV (copy number variation) and methylation status association with survival was studied.

Materials and Methods

DNA was purified from 450 frozen sequential breast cancer biopsies and 22 healthy breast tissue samples (from RSU Institute of Oncology collection, obtained from 2010-2020), using spin column-based DNA purification (*Qiagen*). Copy number variation and methylation status were detected by Multiplex Ligation-dependant Probe Amplification (MLPA) with *Breast Tumor* probemix and Methylation-Specific MLPA (MS-MLPA) with *Tumor suppressor mix 1* probemix according to manufacturers instructions (*MRC-Holland*) and analysed in Coffalyser software. Heat maps were built and statistical analysis performed by R Bioconductor.

Results

CNV of 48 genes (21 oncogenes; 27 tumor suppressor genes) and methylation status of 26 tumor suppressor genes analysed in 451 consecutive breast cancer samples and 22 controls. 118 (26,2%) samples had neither CNV, nor methylation status changes. Most frequent deletions were in tumor suppressors *CDH1* (23,1%), *VHL* (8,9%) *BRCA1*(8,7%). Among oncogenes most commonly *MYC* (19,4%), *MTDH* (15,0%), *PRDM14* (10,6%) were duplicated. The *RASSF1*(41,9%), *APC* (18,0%) and the *CDH13* (11,2%) genes were methylated most frequently. Correlation between CNV, methylation status and overall survival was determined.

Conclusions

CNV is common event in breast cancer tissue samples and happens in 73,8% of cases. Inactivation of tumor suppressor genes by genetic and epigenetic mechanisms were observed. CNV and methylation status influences overall survival.

Cryotherapy in treatment of small basal cell carcinomas on face, head and neck

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Objectives

Aim of the current study is to determine correctly the outcome of cryotherapy treatment in patients of small primary superficial and nodular form of basal cell carcinoma (BCC) localized on face, head and neck.

Materials and Methods

In 2020 a total 54 adults patients, 49-91 years of age, 34 female and 20 male who presented to the Clinical Centre of Skin and Sexually Transmitted Diseases, Riga 1st hospital with complaints about suspicious non-healing lesion on the face, head and neck. As a routine for the confirmed lesion of BCC applying method of dermoscopy with HEINE DELTA 20T dermatoscope, cryotherapy was made as method of treatment of BCC. No curettage was performed due to localization of BCC in anatomical areas with extensive blood supply that are cosmetically sensitive. Each patient was asked to attend clinic on monthly basis regularly in first 3 months after treatment, then each 3 months for duration of 1 year.

Results

In 5 cases of 54 treated patients a relapse was observed on clinical inspection and evaluation with dermatoscope. All 5 patients were referred from for further treatment from Clinical Centre of Skin and Sexually Transmitted Diseases, Riga 1st hospital to the oncologist, maxillofacial surgeon in Out-patients' clinic, Centre of Oncology of Latvia, Riga East University hospital.

Conclusions

Cryotherapy is effective and fast method of treatment of primary, superficial and nodular BCC. The regular monitoring of relapse of BCC is mandatory for 2 years after completion of treatment by dermatologist or oncologist.

Cutaneous metastases in laryngeal cancer: dermoscopic findings

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Cutaneous metastases are cancerous cells found in any of the skin layers originating from a primary cancer. Skin involvement in the metastatic process is considered to herald a poor prognosis. Cutaneous metastases occur in 1-10% of all cancer patients with metastatic disease and are considered to be quite rare, but of great importance.

Anamnesis, clinical examination and medical documentation of a laryngeal cancer patient with grade 2 neuroendocrine laryngeal tumor with metastases in abdomen, thorax and hypodermis were analyzed. Dermoscopy with *DermLite DL4* dermoscope was performed and documented on camera.

Several painful, nodular and papular lesions all over his chest, abdomen and neck area varying in size from 0,3 to 5 cm in diameter were found during the examination. The lesions were movable, painful to palpation, no discharge was present. Dermoscopy revealed two types of lesions - pigmented (purple) and non-pigmented (skin-colored). The non-pigmented lesions presented with few polymorphic vascular elements, while the pigmented lesions showed lacunar vessels and fibrotic structures, some even mimicking hemangiomas. The lesions in general had asymmetrical borders and varied in shape (round, oval, irregular). Superficial hyperkeratosis and irregular distribution of blood vessels was also present in one of the pigmented lesions.

Most cutaneous metastases in dermoscopy show various forms of vascular patterns and white pigmented structures. This case presents typical findings, as well as some unusual findings. Although cutaneous metastases are quite rare and portend a poor outcome, they are still of great clinical importance and dermoscopy of newly formed cutaneous lesions should be done more frequently in practice.

Do sunscreens prevent skin cancer? A literature review

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Objectives

Efficacy studies of skin cancer prevention strategies including regular sunscreen use are lacking and there is a need for new evaluation of the latest publications. The aim of this review was to evaluate whether regular sunscreen application can prevent skin cancer development.

Materials and Methods

A PubMed search from year 2000 was performed. Search strategy included terms "melanoma", "basal cell carcinoma", "squamous cell carcinoma", "actinic keratosis" and their corresponding MeSH terms.

Results

Initial search showed 802 results, from which five prospective studies were included. Two studies assessed melanoma incidence rates in sunscreen groups. A single study by *Ghiasvand et al.* showed 33% lower melanoma incidence in a ten-year follow-up and a study by *Green et al.* assessed that melanoma incidence was by 50% lower in a 15-year follow-up. Three studies assessed squamous cell carcinoma (SCC) and actinic keratosis (AK). A statistically significant decrease by 38% in the sunscreen group was seen in an eight-year follow-up study by *Van Der Pols et al.* assessing the incidence of SCC. In addition, sunscreen use prevented AK progression to higher histological grade and SCC in aged AK patients in a study by *Kunimoto et al.* and induced significant spontaneous remission of AK as well as effectively prevented SCC development in immunocompromised patients in a study by *Ulrich et al.* Studies by *Van Der Pols et al.* and *Ulrich et al.* that assessed basal cell carcinoma (BCC) prevention with sunscreen use did not show statistically significant benefits.

Conclusions

Regular sunscreen use is cost-effective approach for significant prevention of AK, SCC, and melanoma development, but preventive effect on BCC calls for further evaluation. Sunscreen use in AK patients is also supported as a therapeutic measure.

Early detection of potentially malignant changes in oral leukoplakia using a saliva test

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Objectives

The most common oral precancerous lesions are leukoplakia and erythroplakia. Investigation on salivary biomarkers for oral cancer detection have been reviewed that patients with elevated SolCD44 and protein levels may be 25 times more likely to have oral cancer (Franzmann et al, 2019). CD44 is present in the basal and suprabasal epithelial layers in normal mucosa but expression extends to the superficial layers, which would have contact with the oral rinse, in severe dysplasia and cancer (Donovan et al, 2018). Lateral Flow device (OncAlert RAPID test) measures CD44 and total protein. The purpose of study was to detect the presence of SolCD44 and total protein CD44 in saliva of patients with oral leukoplakia.

Materials and Methods

In the OncAlert Oral Cancer RAPID test validation studies were included 20 patients with oral leukoplakia, 5 patients with oral squamous cell cancer, 10 controls treated in the Department of Oral Pathology, RSU Institute of Stomatology. The clinical forms of leukoplakia, expression intensity of Sol CD44 and total CD44 were evaluated independently by 3 clinicians. A positive test was accepted when SolCD44 test strip shows a positive result. Total protein CD44 was determined using color-graded scale (0-4). Results were evaluated by Excel program.

Results

The following forms of leukoplakia have been clinically identified: 18 non-homogeneous (4 verrucous, 9 erosive, 5 nodular) and 2 homogenous leukoplakia. Positive SolCD44 expression was found in all carcinoma patients as well as in patients with all forms of homogeneous and non-homogeneous leucoplakias. The total protein CD44 was estimated as high (3) both in homogenous and non- homogenous, but extreme high (4) only in non-homogenous leucoplakias. The expression of SolCD44 in control patients was 100% negative.

Conclusions

The increased expression level of SolCD44 and of total protein CD44 possibly points to some malignant transformation changes in leukoplakia.

Epidemiology of rare breast cancer predisposing pathogenic gene variants in high hereditary breast cancer risk of population of Latvia, initial results

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Objectives

Genetic testing plays an invaluable role in hereditary breast cancer management. Massively parallel sequencing technology known as next-generation sequencing have been discovered and implemented in clinical oncology. Because of the large costs of extensive gene testing, there is a necessity for optimisation. The aim of the study is to establish the spectrum of rare breast cancer predisposing (non-*BRCA*) mutations in particular ethnic group.

Materials and Methods

Multigene panel testing was carried out in women with increased risk of hereditary breast cancer selected according to Manchester Scoring System and/or NCCN criteria from population of Latvia. Clinical and genomic data were reviewed on 70 individuals tested on a panels of up to 38 genes. Tested genes include moderate to high-penetrance *BRCA1*, *BRCA2*, *PALB2*, *PTEN*, *TP53*, *CHEK2*, *ATM*, *CDH1*, *NBN*, *NF1*, *STK11*, *RAD50*, *RAD51C*, *RAD51D*, *BARD1* and low-penetrance *MUTH1*, *MCPH1*, *BAP*, *MSH*, *BRIP1*, *MLH1*, *MSH2*, *MSH6*, *PMS2*, *EPCAM*, *APC*, *BMPR1A*, *CDKN2A*, *MEN1*, *POLD1*, *POLE*, *RET*, *SMAD4*, *VHL*, *BLM*, *FAM175A*, *MRE11A*, *XRCC2*. Informed Consent was obtained from all participants in this study.

Results

Germline pathogenic variants (PVs) were detected in 22 of 70 probands (31%) - 15 *BRCA* and 7 non-*BRCA*. Six cases of pathogenic *CHEK2* variants were observed, including 2 repeated pathogenic variants c.470T>C (p.Ile157Thr) and del5395(ex9-10del) as well single ones - c.444+1G>A and 1100delC. Eleven variants of uncertain significance (VUS) identified - 2 in *BRCA* and 9 in non-*BRCA* genes - *NBN*, *MSH6*, *ATM*, *STK11*, *MUTH*, *CDH1*, *RAD50*, *MRE11A*.

Conclusions

Genetic evaluation is becoming an integral part of the management of breast cancer patients and high-risk individuals. Risk assessment, early detection strategies in individuals with *BRCA1,2* mutations have been extensively studied, whereas less is known about the management of other mutation carriers with hereditary breast cancer predisposing gene variants. Our initial *CHEK2* mutational spectrum shows evidence of similarities with neighbouring countries and other European populations. Two repeated PVs were detected.

Evaluation of risk factors for perioperative complications after radical cystectomy

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Objectives

Older age and comorbidities are associated with increased perioperative risks and mortality. The mean age of the patients who underwent radical cystectomy (RC) continues to increase.

The aim of study was to evaluate the relationship between the rate of perioperative complications, age and comorbidities in patients who undergo RC.

Materials and Methods

A retrospective analysis of 144 patients who underwent RC due to muscle-invasive bladder cancer between January 1st, 2016 and December 31st, 2019 in Riga East University Hospital, Urology and Urologic Oncology Center was performed. The comorbidities of the patients were assessed according to *American Society of Anesthesiology* (ASA) classification and *Charlson Comorbidity Index* (CCI).

Results

125 (86,8%) males and 19 (13,2%) females were included in the study. The mean age was $67,9 \pm 8,7$ (35-86) years, median age - 69,0 years.

Intrahospital mortality (30-day mortality) was 6,9%(10 patients) and 90-day mortality was 12,5%(18 patients). Postoperative complications were observed in 84(58,3%) cases.

Comparing age groups >75 years and <75 years there was 4-fold increase in intrahospital mortality (6 patients(15%) vs. 4(3,8%), $p=0,018$) and 3-fold increase in 90-day mortality (10 patients(25%) vs. 8(7,7%), $p=0,009$) in age group >75 years.

There was 10-fold (7 patients(25,0%) vs. 3(2,6%), $p=0,000$) and 5-fold (10 patients(35,7%) vs. 8(6,9%), $p=0,000$) increase in intrahospital and 90-day mortality accordingly in patients with $CCI<50\%$ compared to patients with $CCI>50\%$.

Comparing groups by the ASA score there was 3-fold increase in intrahospital mortality (10 patients(10,9%) vs. 0(0%), $p=0,014$) and 5-fold increase in 90-day mortality (16 patients(17,4%) vs. 2(3,8%), $p=0,019$) in the group $ASA\geq 3$.

In the group $CCI<50\%$ there was approximately 1,5-fold increase in the rate of intraoperative complications compared to group $CCI>50\%$ (23 patients(82,1%) vs. 61(52,6%), $p=0,005$).

Conclusions

Increased patient's age, ASA score un CCI is associated with increased complication rate and mortality.

Summary comorbidity measures should be used in patient selection for surgery.

Ewing's sarcoma of orbit with partial central retinal vein thrombosis: case report

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A 16-year-old girl presented with pain in the right knee and proptosis, exotropia, decreased vision, diplopia, and restrictions on movements in the left eye. From the age of nine, patient has type1 diabetes. MRI examination revealed mass in the proximal tibial metaphysis with size CC4.5cm, LL2.9cm and an extraconal mass in the upper part of the left orbit with size 2.4×1.8×2.3cm with proptosis, dislocation of optic nerve, extraocular muscles and infiltration of sphenoid bone and dura mater. Additional PET scan, MRI examination revealed multiple metastasis in spine, pelvis, femur, ribs (pt3cN×M1). Patient underwent partial left orbital mass resection and right tibial biopsy. Histological examination revealed a PNET/Ewing's sarcoma in both locations. Chemotherapy according to CWS-2012 protocol was initiated. After four months the ophthalmic examination revealed improvement of visual acuity from V_{OS}0.16nc to V_{OS}1.0nc and absence of diplopia, exophthalmos, ptosis, but reduced eye movements were still present. No improvement in the size of the tumor after four chemotherapy courses (2xI3RVA, CEV, I3VE) was obtained. Radiotherapy for the right tibial and the left orbital mass and the 2nd line chemotherapy (2TC, 1Cyclo/Topo, 1I2VAdr, 1carboplatin/etoposide) was initiated. The last MRI revealed decrease of the size of the tumor in tibia and reduction of the infiltration in the left orbit after radiotherapy was completed. After 2nd

line chemotherapy was completed and maintenance chemotherapy (trofosphamid, etoposide/idarubicin) was started the patient was diagnosed with nonproliferative diabetic retinopathy changes in both eyes and partial central retinal vein thrombosis in the left eye. Three weeks later patient underwent an intravitreal injection with Sol. Bevacizumab in the left eye. One week after injection the visual acuity improved from V_{OS} 0.1nc to V_{OS}0.3nc and according to OCT spectralis examination data, the macular thickness improved from 831μm to 407μm. It is planned to continue therapy with intravitreal injections.

Expression and prognostic value of neuroendocrine peptides in neuroblastoma

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Objectives

Neuroblastoma (NBL) is the most common extra-cranial solid tumour in children. These tumours originate from neuroectodermal progenitor cells. In previous studies, the excretion of a subset neuroendocrine peptides by NBL cells was shown. In this study, we assessed the expression of several neuroendocrine peptides (Vasoactive intestinal peptide, Gastrin, Gastrin releasing peptide, Cholecystokinin, Pancreatic Polypeptide, Serotonin) and selected neuroendocrine receptors (VPAC1, AVP1a) in NBL-tissues and analysed the correlation with clinical outcome and histopathology.

Materials and Methods

64 specimens of NBL on a tissue micro array (TMA) were stained for VIP, VPAC-1, AVP1a, Gastrin, GRP, Cholecystokinin, Serotonin, and Pancreatic polypeptide by immunohistochemistry. Clinical patient data and histopathological findings were correlated with the expression status and co-expression of the neuroendocrine markers. Hierarchical clustering based on protein expression was performed, resulting clusters were further analysed regarding patient survival and histopathology.

Results

All investigated neuropeptides could be detected via IHC in NBL specimen. Selected neuropeptides correlated with cellular differentiation (GASTRIN, AVP1a), MYCN amplification (GASTRIN) or initial tumour location (VPAC1, CALCITONIN). Combined expression of GASTRIN and SEROTONIN was predictive of favourable outcome in our cohort. Hierarchical clustering revealed different subgroups of NBL regarding neuropeptide expression that were associated with histological differentiation and implicated potential in predicting patient survival.

Conclusions

Our data indicate that the expression of neuroendocrine peptides by NBL-tissue could be associated with a higher cell maturity and a lower biological aggressiveness of the tumours. Additionally, predicting patient survival based on neuroendocrine marker expression may be possible in contrast to sole tumour differentiation grading. Future studies are aiming at the biological role of these markers in malignant transformation.

Expression pattern of MRPS18 family, UCKL1, XAP2 and PKN1 genes in sera and tumor tissue of breast cancer patients, depending on molecular subtype

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*Dr. Elena Kashuba*¹

1. RE Kavetsky IEPOR

Objectives

To compare expression pattern of MRPS18 family, *UCKL1*, *XAP2* and *PKN1* genes in sera and tumor tissue of breast cancer patients, aiming to propose the new biomarkers for diagnostics and prognosis of tumor disease.

Materials and Methods

Quantitative PCR in real time, immunohistochemistry, a bioinformatic analysis of the publicly open databases, a statistic analysis.

Results

Studies of the expression of *UCKL1*, *XAP2*, *PKN1* and *MRPS18* genes were performed on the sera and tissue samples of 26 patients with breast cancer of stage I–II. Samples were distributed by a molecular subtype as follows: luminal A - 7 cases; luminal B - 7 cases; Her2/neu-positive - 6 cases, and basal - 6 cases. Serum samples from two healthy male and female individuals served as the control for qPCR. High levels of *UCKL1* and *MRPS18-1* were observed in patients with the Luminal A subtype, and these genes were expressed at lower levels in the basal-subtype samples. Samples of the basal type were characterized by a significant increase of *XAP2* and *PKN1*. Members of the MRPS18 family were differentially expressed as well. The highest level was observed for *MRPS18-1* for all molecular subtypes, and the lowest - for *MRPS18-3* at mRNA and protein levels.

Conclusions

Examination of expression levels of the *UCKL1*, *XAP2*, *PKN1* and *MRPS18-1* genes in the patient serum may be used as an additional criterion for characterizing the molecular subtype of breast tumor and the prognosis of the disease.

Health care specialist knowledge and opinion on cutaneous metastases diagnostic methods

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Objectives

Cancer still remains a major public health issue as the second leading cause of death world-wide. A crucial problem regarding treatment and management is its ability to produce metastases in every part of the body, affecting the skin in 1-10% of cases. In recent years, dermoscopy as a non-invasive method has improved the diagnosis and management of non-pigmented skin lesions and is used as an adjunct method to basic examination of suspicious lesions.

Materials and Methods

A questionnaire was distributed to health care specialists via the internet in closed health-care specialist social media groups. Doctors and residents completed the survey about their knowledge and opinion on cutaneous metastases and their diagnostic methods. The data was analysed using IBM SPSS.

Results

A total of 116 respondents (doctors (51%), residents (45%), other health care specialists (4%)) completed the survey. With 25% being completely sure and 58% quite sure of their knowledge of skin metastases and their formation, 18% did not have any information on this topic at all. Almost half of the respondents (45%) have encountered patients with cutaneous metastases and the majority would refer them to another specialist - oncologist (99%), dermatologist (78%), general practitioner (57%) and others (7%). 85% of all respondents consider dermoscopy to be an informative diagnostic method for patients with cutaneous metastases, alongside with the clinical features of lesions (58%), biopsy (98%), computed tomography (18%) and magnetic resonance imaging (23%).

Conclusions

A surprisingly high percentage of health care specialists from various fields have encountered cutaneous metastases in their everyday practice. As the use of dermoscopy in general increases yearly, this non-invasive diagnostic method should be used more frequently in cancer patient check-up visits.

HER2+ breast cancer specific hypoxia-associated molecular alterations and vulnerabilities in METABRIC cohort – bioinformatic analysis

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Objectives

Even the best available therapy delivers sub-optimal results in locally advanced/metastatic HER2+ breast cancer (BRCA) patients. Moreover, efficacy of individual anti-HER2 agents is short-lived, especially in recurrence after trastuzumab therapy. Therefore novel therapeutic approaches for HER2+ BRCA are needed. Up to 70% of BRCA cases in recent studies displayed high to intermediate hypoxia scores.

The aim of this study was to identify potential hypoxia-associated biomarkers and vulnerabilities in HER2+ BRCA samples of METABRIC data.

This study is a part of RSU grant No. 5-1/252/2020 "Hypoxia-associated biomarkers in HER2+ breast cancer cell lines for personalized therapy"

Materials and Methods

METABRIC data was accessed through the European Genome-phenome Archive. Unless specified otherwise, data manipulation was done with R, v.3.4. Data was adjusted for influence of confounding factors with PEER, v.1.2. Only samples that had information on all chosen covariates were kept for adjusting.

Samples were scored as corresponding to low, intermediate and high hypoxia with the use of 15-gene hypoxia signature [PMID: 20087356] by unsupervised hierarchical clustering analysis with 'ward.D' as method. Differential expression analysis was done using 'LIMMA'. Gene names were mapped to probes using annotations from 'illuminaHumanv3.db' package.

Results

142 samples from METABRIC validation set and 136 samples from discovery set matched at least 2 HER2 overexpression criteria (*ERBB2* ampl, PAM50, 3gene classifier, HER2expr).

78 genes were significantly ($\log_{2}FC \geq |1|$, adj.p<0.05) associated with hypoxia score. 26 downregulated genes are involved in estrogen-mediated signalling, FOXA1 transcription factor network and nuclear SMAD2/3 signaling, while 52 upregulated genes are associated with glycolysis and gluconeogenesis, vitamin D receptor pathway, beta1 and beta3 integrin cell surface interactions, HIF-1 and HIF-2 signaling pathways.

Conclusions

Use of open-access data allowed to identify several potential markers and vulnerabilities in hypoxic HER2+ BRCA, that remain to be experimentally validated in HER2+ BRCA cell lines for development of personalized approach to HER2+ BRCA management.

Initial experience with 18F-PSMA-11 PET/CT in recurrent prostate cancer evaluation

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Objectives

Early and precise diagnostics of recurrent prostate cancer (PCa) are a cornerstone for further adequate therapy planning. The aim of this study was to compare the diagnostic tools - 18F-PSMA-1007 positron emission tomography (PET/CT), magnetic resonance imaging (MRI) and bone scintigraphy for evaluation of local recurrence, regional lymph nodes and distal bone metastases.

Materials and Methods

In this prospective study 29 PCa patients with biochemical relapse were enrolled, who previously received radical prostatectomy and/or radiation therapy. All included patients underwent PET/CT, MRI and bone scintigraphy. Clinical data of patients and/or follow-up information were used as the reference standard.

Results

The evaluation of local recurrence and regional lymph node metastases was based on results of PET/CT and MRI.

Local recurrent disease in 29 patients was detected by PET/CT in 35 % (n=10/29) and by MRI in 31% (n=9/29) with sensitivity, specificity, accuracy 90.9%, 100%, 96.5% and 81.8%, 100%, 93.1%, respectively.

Nodal involvement was evaluated by PET/CT and MRI in 48% (n=14/29) and 28% (n=8/29). Against the standard of reference, sensitivity, specificity and accuracy for PET/CT were 92.9%, 93.3%, 93.1% and for MRI - 57.1%, 100%, 79.3%, respectively.

The evaluation of skeletal metastases is based on PET/CT and bone scintigraphy. Bone metastases by PET/CT and bone scintigraphy were seen in 21 % (6/29) and 19% (5/26) with sensitivity, specificity and accuracy 100%; 92.0%; 93.1% and 50.0%; 86.0%; 80.8%, respectively.

Conclusions

Our comparative study results revealed 18F-PSMA-1007 PET/CT as superior diagnostic tool to other methods for evaluation of recurrence. However, as study results show that MRI and scintigraphy also have relatively high accuracy and due to methods availability, multimodal imaging still has its role in recurrent prostate cancer diagnostics.

Initial findings in retinoblastoma patients

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Objectives

The purpose of the study is to assess the initial ocular and general findings in children treated for retinoblastoma and compare to the treatment outcome.

Materials and Methods

A retrospective study of all the retinoblastoma patients treated in LKH University Hospital Graz, Austria was conducted. Data were assessed using IBM-SPSS (Version 26).

Results

The 147 eyes of 101 patients 45 (44.6%), female and 56 (55.4%) male affected by retinoblastoma were analyzed. Unilateral retinoblastoma was presented in 54 (54%) patients, bilateral in 47 (47%) patients. Findings additionally to the tumor lesions at the first discovery were: intravitreal seeding n=31 (30.7%) tumor induced serous retinal detachment n=22 (21.8%), choroidal infiltration n=22 (21.8%), infiltration of the optic nerve n= 17 (16.8%), subretinal seeding of the tumor n=14 (13.9%), secondary rubeosis iridis n=9 (8.9%), secondary glaucoma n=6 (5.9%), scleral infiltration n=3 (3%), infiltration in anterior chamber n=3 (3%), optic nerve atrophy n=1 (1%) , epiretinal membrane n=1 (1%) , central neovascular membrane n=1 (1%) Affected eyes saved in 25 (25%) patients, 98 (97%) patients survived and no information of the outcome could be found in 2 patients (2%). Extraocular tumor spreading was found in 2 patients (orbital spreading and leptomeningeal metastases) 1 of these patients (1%) died.

Conclusions

Retinoblastoma survival ,with current therapy, is excellent in patients without extraocular tumor spreading. The presence of secondary ocular tumor findings did not influence patient's survival. Extraocular spreading, that is rarely seen in developed countries, is a life threatening condition and must be treated aggressively.

Large parathyroid carcinoma eight years after thyroid surgery

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Sixty three year old female presented with an enlarged mass on the left side of the neck. In 2012 left side hemithyroidectomy was done due to a benign goiter. In 2013 neck ultrasonography (US) displayed a homogeneous, hypoechoic mass 1.8x1.9cm in size. No routine follow up or US examinations were done. In 2020 Laboratory analysis showed elevated PTH (1241.9 pg/mL) and calcium (3.42 mmol/l). Multiparametric neck ultrasonography was performed: B-mode examination revealed a hypoechoic, irregular, nonhomogeneous mass sized 5.5x3.2x5.0 cm with multiple central calcifications and mixed vascularisation pattern on colour doppler and superb microvascularisation imaging modillites. Mass appeared less elastic on Shear wave elastography compared to normal thyroid tissue (28.8kPa and 16.8kPa respectively). Contrast enhanced ultrasound (SonoVue) showed diffuse, homogenous hypervascularity in early arterial phase - 6s, quickly reaching peak contrast con-centration - 12s, following homogenous early washout 23s. Computed tomography revealed irregular mass in proximity to trachea, oesophagus, slight dislocation of common carotid artery. Perifocal fatty tissue appeared normal. Scintigraphy displayed a suspect parathyroid tumor or suspect left lobe nodule of thyroid. Cytolog-ical analysis were suspicious of a follicular neoplasm (BETHESDA IV). Based on the biochemical diagnosis of primary hyperparathyroidism and radiological examinations a suspect parathyroid tumor was considered. In-traoperative findings demonstrated 9x6cm tumor adjacent to the external carotid artery laterally and recurrent laryngeal nerve medially. PTH levels before surgery 1545.4 pg/ml, during 1287.8 pg/ml, 20 min after resection 120.8 pg/ml, 6h after 17.2 pg/ml, next day - 13.4 pg/ml, next day calcium - 2.77mmol/l. Pathohistological exam-ination revealed tumor solid in structure, with focal necrosis, penetrating the capsule. Immunohistochemical analysis was positive for chromogranin, CD56, Ki-67 (8-10%) and negative for CK20 and CK7. The morphological and immunohistochemical results correspond to parathyroid carcinoma, known as rare entity among parathy-roid lesions (1 %).

Liver metastasis from retroperitoneal leiomyosarcoma 18 years after primary tumour resection: report of a case

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Leiomyosarcoma is a histological subtype of soft tissue sarcoma that arises from smooth muscle cells and account for up to 15% of all soft tissue carcinomas that form involuntary muscles, commonly found in the retroperitoneum, uterus, stomach, small intestine and vascular tissue.

Surgery with a wide margin of complete excision is the most effective treatment.

Liver and lungs are the most common sites of metastasis in leiomyosarcoma and it generally occurs within the first 3 years. Liver metastasis are usually observed in the recurrence of visceral and retroperitoneal sarcomas. We report a case of 70-year-old female patient with liver metastasis, detected 18 years after resection of a primary retroperitoneal leiomyosarcoma on the right side.

Abdominal CT scan showed sharply contoured, hypodense structure 7.3 x 5.3 cm.

Further MRI examination revealed suspicious for malignant lesion.

US guided CORE biopsy was performed after detecting suspicious liver lesion.

Pathohistological and immunohistochemistry examination of biopsy material showed high-grade (Grade 2) leiomyosarcoma liver metastasis.

According to oncologic council surgical liver metastasis resection was recommended. The surgical indication was single liver metastases, without evidence of extrahepatic disease.

Conventional right side hemi hepatectomy using OLYMPUS ultrasonic surgery system SonoSurg was performed. Size of metastatic lesion 88x55x70 mm. Negative resection margins were obtained. Lesion consists of spindle cells with cigar-shaped nuclei, expressive cell polymorphism, areas of necrosis and abundant mitoses ≥ 10 per 10 high-power fields. Positive for smooth muscle marker actin and negative for CD117, DOG-1 and S100, Ki-67 index 10% by immunohistochemistry.

Further follow-up by medical oncologist.

Early diagnosis and surgical removal of the tumor is the only potentially curative option for liver metastasis of leiomyosarcoma.

To the best of our knowledge, this case have had the longest disease-free interval before metastasis to the liver.

Non-CpG methylation of Oct4 genomic elements and the CpG methylation pattern of the PSA promoter make it possible to distinguish between aggressive and non-aggressive PCa in a model of cell lines

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Objectives

The purpose of the study is to identify the distinctive 5-mC patterns of Oct4 and PSA genomic elements using DNA of PC3 and LNCaP prostate cancer-derived cell lines and BPH-1 and HPrEC as non-cancerous control.

Materials and Methods

All cell lines were cultured at 37° C in a 5% CO₂ atmosphere incubator according to company-provided protocol. The bisulfite treated DNA was used to amplify the genomic region of the Oct4 and PSA genes with primers specific for bisulfite converted DNA. 10-12 clones for each PCR product were sequenced and analysed. DNA sequencing was performed using the ABI BigDyeTerminator Cycle Sequencing Kit v3 and the sequences were detected on an ABI 3130XL Genetic Analyzer.

Results

Only CpG methylation of Oct4 promoter region was found in HPrEC cell line. All CpG analysed of promoter region was methylated. In opposite, the cancerous PC3 and LNCaP cell lines and the benign prostatic BPH1 cell line in addition to CpG methylation had a CCWGG and WCWGG pentanucleotide methylation, where W=A/T. In respect to WCWGG this is new observation. We found that known CCWGG methylation predominantly distributed in PC3 cell line but WCWGG is more characteristic for BPH and LNCaP cell lines. Also, we demonstrated that the promoter region of PSA in cell line studied had the distinctive methylation pattern. The CpGs of PSA promoter in LNCaP cells were free of methylation, while PC3 cells showed fully methylated PSA promoter spanning region. Using the found differential methylation patterns we have designed the primers and developed the nested methylation specific PCR (MS-PCR) to distinguish between an aggressive and non-aggressive PCa in a model of cell lines.

Conclusions

The developed nested MS-PCR makes it possible to distinguish between an aggressive and non-aggressive PCa in a model of cell lines.

Novel recurrent BRCA1 pathogenic variants c.5117G>A (p.Gly1706Glu) and c.4675G>A (p.Glu1559Lys) identified after 20 years of BRCA1/2 research in Baltic region. Cohort study and a literature review

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Objectives

Several recent studies in the Baltic region have found extended spectrum of pathogenic variants (PV) of the BRCA1/2 genes. The aim of current study is to analyze the spectrum of the BRCA1/2 PV in population of Latvia and to compare common PV between populations of the Baltic region.

Materials and Methods

This study is based on a prospective cohort of 9543 unrelated individuals including ones with cancer and unaffected individuals from population of Latvia, who were tested for three most common BRCA1 founder PV. In second line testing, 164 founder negative high-risk individuals were tested for PV of the BRCA1/2 using next generation sequencing (NGS). Local spectrum of the BRCA1/2 PV was compared with the Baltic region by performing a literature review.

Results

A founder PV c.5266dupC, c.4035delA or c.181T>G was detected in 369/9543 (3.9%) cases. Other BRCA1/2 PV were found in 44/164 (26.8%) of NGS cases. Four recurrent BRCA1 variants c.5117G>A (p.Gly1706Glu), c.4675G>A (p.Glu1559Lys), c.5503C>T (p.Arg1835*) and c.1961delA (p.Lys654fs) were detected in 18/44 (41.0%), 5/44 (11.4%), 2/44 (4.5%) and 2/44 (4.5%) cases respectively. Additionally, eleven BRCA1 PV and six BRCA2 PV were each found in single family

Conclusions

By combining three studies by our group of the same cohort in Latvia, frequency of the BRCA1/2 PV for unselected breast and ovarian cancer cases is 241/5060 (4.8%) and 162/1067 (15.2%) respectively. The frequency of three "historical" founder PV is up to 87.0% (369/424). Other non-founder PV contribute to at least 13.0% (55/424). In relative numbers, c.5117G>A is currently the third most frequent PV of the BRCA1 in population of Latvia. In addition to three BRCA1 founder PV, a total of five recurrent BRCA1 and two recurrent BRCA2 PV have been reported in population of Latvia so far. Many of the BRCA1/2 PV reported in Latvia are shared among other populations of the Baltic region

Pathological grade in biochemical recurrence of prostate cancer after radiation therapy – preliminary data

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Objectives

Prostate cancer (PC) is the most common urological malignancy, and the incidence is 1286 new cases in 2017., in Latvia. Significant number of patients develop a biochemical recurrence (BCR), after primary radical treatment,(27%-53%)¹. Prostate Specific antigen (PSA) values serve as the foundation for defining BCR, however additional information is needed to identify potentially dangerous disease recurrence. Our objective in this study was to identify the use of MRI-fusion biopsy for the evaluation of PC pathological grade in BCR after radiotherapy (RT).

Materials and Methods

We analyzed first 15 patients with a BCR after RT in 2020. Mean age was 73 years. All patients had a localized disease with a mean PSA value at time of treatment 18,9 ng/ml (4,9-63,5 ng/ml). The primary biopsy *Gleason* score was 5-8 and ISUP grade 1-4. Additionally, 13 patients had received androgen deprivation therapy (ADT). Mean time to BCR was 61,2 month (31-90month). BCR was identified according to the ASTRO criteria. For these patients a multiparametric MRI was done and analyzed by the PI-RADS 2.0 system, followed by an MRI-fusion trans-perineal prostate biopsy. Mean number of cores were 12 (5-25).

Results

All together 11 patients had a positive biopsy of at least one core. Of those, 6 patients showed an upgrading of the *Gleason* score. 2 patients had no change in *Gleason* score and one patient had a lower grade. For 2 patients atypical cancers were seen. During restaging for one patient bone metastasis was diagnosed, and another patient had lymph node metastasis additionally. For 5 patients the biopsy and imaging were negative despite BCR.

Conclusions

Our preliminary data shows that the histological grade in BCR is variable and may differ from the primary disease, with a significant upgrading. MRI-fusion biopsies in BCR may aid in diagnosing relevant cancer recurrence and high-risk disease earlier. Further clinical studies are needed.

Plastic surgery concept for reconstruction of complex nose defects after tumor excision: case report

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The nose is a common site for skin cancer and is considered one of the most dangerous zones due to the aggressiveness of the disease. Nose reconstruction requires comprehensive knowledge in reconstructive surgery as well as special rhinoplasty concepts to restore the underlying framework.

In this report, authors present a 40- year- old male patient with biopsy- verified basal cell carcinoma in one side of the nose with an extensive infiltration of all nasal structures as well as spreading into cheek and upper lip area. A multiple step reconstruction procedure was used to restore the extensive facial defect. In the first operation extensive tumor excision was performed to achieve adequate surgical margins, which included partial nose amputation and extensive cheek and upper lip soft tissue excision. A free microvascular antero-lateral thigh flap (ALT) from left thigh region was harvested to cover large facial defect. Second surgery was performed one year later where remodeling of nose framework was accomplished including inner lining, cartilaginous structure reconstruction and final soft tissue coverage. The previously applied ALT flap tissue was deepithelialized and relocated over the nasal defect as inverted flap in order to provide inner lining. The nostril was stabilized by using ear cartilage from the helix region. The large soft tissue defect of the nose was covered with a full thickness forehead flap. During the third operation a forehead flap separation was performed and a defined nasal structure was made.

Small defects of the nose after resection of a tumor are a common challenge within the daily routine of facial plastic surgery. Defects can be of varying size and depth, which, during the surgery requires switching from simple concept of using local flaps to the concept of total nose framework remodeling using multiple stage approach.

Prevalence of central and lateral cervical lymph node metastasis in papillary thyroid carcinoma.

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Objectives

Papillary thyroid carcinoma (PTC) is the most common type of thyroid cancer. Lymph node metastasis are common in PTC. Aim of this study was to investigate prevalence of metastatic cervical lymph nodes (LN) in PTC and possible association between metastasis in central and lateral LN.

Materials and Methods

Five-year data (2016-2020) from Eurocrine registry of 117 patients who underwent thyroidectomy with LN dissection for PTC were retrospectively analyzed. Patients were divided in two groups - group A one side central LN dissection (n=104) and group B one side central and lateral LN dissection (n=13).

Results

In group A central LN metastases were found in 47 (45.2%) and in group B - 9 (69.2%) cases. There was no strong statistically significant difference found between positive central LN in group A and B ($p=0.058$). Average count of dissected central LN in group A was 6.3 (1-30) with positive 3.2 (1-16). In group B average count of dissected central LN was 8.2 (2-18) with positive 3.7 (1-10). In group B metastatic lateral LN were found in 9 (69.2%) cases. Average count of dissected lateral LN was 10.0 (3-17) with positive 5.2 (1-9). In group B there were 3 (23%) cases with positive lateral LN but negative central LN and vice versa – 3 cases (23%) with positive central and negative lateral LN. One patient (7.7%) had both negative central and lateral LN. Tumor size in group A vs B was T1-56.7% vs 38.5%, T2-20.2% vs 23.1%, T3-18.3% vs 30.8%, T4-4.8% vs 7.7%, respectively.

Conclusions

Although papillary thyroid carcinoma has good overall prognosis, possibility of metastases in cervical lymph nodes must be considered during preparation of every PTC surgery. Larger tumors were associated with higher risk of metastasis in lateral LN.

Prolonged mild hypoxia induced alterations in the proteome of triple negative breast cancer cell lines MDA-MB-231 and MDA-MB-436

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Objectives

Hypoxic areas are hallmark of most breast tumors. Adaptation of cancer cells to hypoxia is a driving force for the clonal selection of more aggressive phenotype. The aim of this exploratory study was to characterize alterations in the protein abundances in triple negative breast cancer (TNBC) cell lines MDA-MB-231 (M231) and MDA-MB-436 (M436) during prolonged adaptation to mild hypoxia.

Materials and Methods

Cell cultures were exposed to hypoxia (2% O₂) for 4 subcultures (length of hypoxic exposure was ~70 days for M231 and ~90 days for M436); normoxic cultures (19.6 %O₂) were used as controls; culture experiments were performed in triplicate. Two protein samples were obtained from control cultures and each culture after 1st (H1) and 4th hypoxic (H4) passage. Peptides obtained by filter-aided sample preparation (FASP) and *tryptic digestion* were analyzed by NanoUPLC-HDMS^E (Waters). Three UPLC-MS/MS runs were performed for each tryptic sample. Identification and label-free quantification of proteins was performed using Progenesis QI (*Nonlinear Dynamics*). Further statistical analysis was performed using R, version 3.6. Significance of differences was determined by ROTS test.

Results

1894 proteins were consistently quantified in both cell lines. Statistically significant ($p \leq 0.05$) at least 2-fold differences in hypoxic vs normoxic samples were detected for 293 proteins in m231_H1, 143 in m231_H4, 108 in m436_H1, and 73 in m436_H4. Only tropomyosin alpha 3 (TPM3) and ubiquitin carboxyl terminal hydrolase 5 (USP5) were significantly altered in all hypoxic samples. 60 and 10 proteins of M231 and M436, respectively, were significantly altered in both early and late hypoxia. Those proteins were associated with proteostasis related processes (ribosomes, translation, nonsense-mediated decay), amino acid metabolism and extracellular vesicle formation in M231, and with NRF2 pathway and cellular senescence/necroptosis in M436.

Conclusions

Adaptation to hypoxia in TNBC cancer cells involves modifications in nitrogen metabolism and protein synthesis, as well as oxidative stress regulation and cell fate determination pathways.

Renal cell carcinoma affects RedOx homeostasis and selenium content

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Objectives

With early detection and improved diagnostics Renal cell carcinoma (RCC) incidence in Latvia has increased over the last 20 years. Although overall survival rates are improving, they remain relatively low compared to the rest of the world. The aim of this study was to evaluate RedOx homeostasis factors that play a role in increased mortality rates in our population.

Materials and Methods

This prospective study conducted between April 2016 and July 2018 includes 72 Clear-cell RCC subjects who underwent nephrectomy and 30 healthy controls. Blood was collected for antioxidant and peroxidant analysis the day prior to surgery. Selenium (Se) deficiency was defined as level $<85\mu\text{g/l}$. Data were analyzed using nonparametric tests. Statistical significance was defined as $p<0.05$.

Results

Se level was lower in the RCC group compared to the control group, 81.5 vs 100.8 ($p=0.001$, $r=0.414$). Total antioxidant status (TAS) and Glutathione peroxidase (GPx) levels were lower in RCC group: 1.81 vs 2.06 ($p<0.001$, $r=0.651$) and 7978.0 vs 9087.5 ($p=0.002$, $r=0.386$) respectively. No difference was observed in Superoxide dismutase (SOD) level between two groups, 1811.8 vs 1852.0 ($p=0.917$, $r=0.015$). Lipid peroxidase derived Malondialdehyde/4-Hydroxynonenal (MDA/4-HNE) levels were higher in the RCC group vs controls, 4.92 vs 3.17 ($p=0.001$, $r=0.510$). Se level was higher in the Low grade (LG) RCC group compared to High grade (HG) group, 84.0 vs 68.0 ($p=0.047$, $r=0.338$). SOD level was lower in LG compared to HG group, 1741.0 vs 1927.0 ($p=0.019$, $r=0.396$). No difference was found in any of the RedOx analytes between different RCC stages. Se deficit was seen in 57.4% of RCC subjects compared to 23.3% of controls ($p=0.002$, OR 4.4, 95%CI 1.7 to 11.7).

Conclusions

RedOx homeostasis is disrupted in RCC patients. It is affected by tumor aggressiveness but not the stage. Se deficiency may play a role in RCC pathogenesis.

Role of MRPS18 family proteins in the control on stemness and differentiation of cancerous cells of childhood tumors of nervous system

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Objectives

To clarify the role of human mitochondrial ribosomal proteins of a MRPS18 family in the control on stemness and differentiation of cancerous cells in childhood tumors of nervous system.

Materials and Methods

Ubiquitination and degradation assays *in vitro*, cell transfections, fluorescent microscopy, immunohistochemistry, a bioinformatic analysis of the public open databases, a statistic analysis.

Results

Recently, we showed that MRPS18-2, together with RB, are essential for the maintenance of cell stemness. Now we found that MRPS18-2 is highly expressed in childhood tumors of nervous systems, such as esthesioneuroblastoma, neuroblastoma, teratoma, medulloblastoma and chordoma. One of the reasons for high protein levels might be increase in protein stability. In order to answer this question, we performed ubiquitination and degradation assays *in vitro*. Unexpectedly, all three proteins showed different stability and a half-life. The S18-1 protein degraded very effectively even at the room temperature. The S18-3 protein is slowly, but effectively degraded *in vitro*. The S18-2 protein showed high stability in the total reticulocyte lysate. The degradation pattern suggests that all three S18 family proteins have different functions.

Conclusions

The long half-life of the MRPS18-2 protein suggests its important function in maintenance of the cell stemness and proliferation. Downregulation of MRPS18-2 expression might be a promising approach to combat childhood tumors of nervous system.

Skin cancers and occupational sun exposure: pathogenetic mechanisms behind

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Objectives

Skin cancers are the most frequently diagnosed tumor, with incidence rates higher than those observed for breast and colorectal cancer. Basal cell carcinoma and squamous cell carcinoma represents 66% and 22% of all malignant skin tumors, respectively, while only a small percentage of malignant skin cancer is represented by cutaneous melanoma which is the most aggressive skin tumor. Several studies have demonstrated how several risk factors are associated with skin cancer; among these, chronic or intermittent exposure sun exposure represents the main risk factor for this pathology.

Materials and Methods

The aim of the study was to evaluate the frequency of BRAF^{V600E} mutation in a cohort of melanoma patients occupationally exposed to solar UV rays and in a cohort of melanoma patients performing indoor work activities without occupational sun exposure in order to establish the impact of such mutation in melanoma development. For this purpose, DNA samples were obtained from melanoma patients using the QIAgen Tissue kit. Subsequently, the presence of BRAF^{V600E} mutation assessed by using specific PCR primers was correlated with the sun exposure pattern of each patient.

Results

Surprisingly, BRAF^{V600E} mutation was observed in 73% of indoor workers and in 52% of outdoor workers. As regards indoor patients, BRAF^{V600E} mutation was mainly found in melanoma of the trunk (12 out of 14 indoor workers) while only 9 out of 19 outdoor workers had a BRAF^{V600E} positive melanoma of the trunk.

Conclusions

These data suggest that BRAF^{V600E} mutation and more aggressive melanoma arise in indoor patients with intermittent sun exposure while the tanning and the chronic sun exposure of outdoor patients could represent a protective factor able to prevent the onset of BRAF^{V600E} mutation. Nevertheless, both chronic and intermittent sun exposure are important risk factors for skin cancer development.

Surgical treatment of colorectal tubulovillous adenomas in Pauls Stradins Clinical University Hospital Department of Surgery from 2018–2020

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Objectives

Evaluate current situation in surgical management of colorectal tubulovillous adenomas and presence of malignization in operation material, recurrence of the disease in postoperative period.

Materials and Methods

A retrospective study of 71 cases in Pauls Stradins Clinical University Hospital (PSKUS Department of Surgery in a period of 3 years (2018–2020).

Results

Total number of the patients – 71. Patients with known medical conditions like FAP syndrome, Crohn's disease, ulcerative colitis were excluded. Female 55% (N=39), male 45% (N=32). Median age 69.0 years (66.4-70.8). Patients with several polyps (≥ 2 polyps) present at once – 12. Number of total polyps evaluated – 85. Localization of polyps: caecum – 8, ascending colon – 15, transverse colon – 3, descending colon – 2, sigmoid colon – 13, rectosigmoidal part – 3, rectum – 40. Types of operations: right side hemicolectomy – 18, resection of transverse colon – 3, left side hemicolectomy – 2, sigmoid resection – 9, rectosigmoidal resection – 4, rectum resection – 7, transanal excision – 30 (transanal vs transabdominal operations – 42% vs 58%; laparoscopic vs conventional transabdominal operations – 32% vs 68%). Tubulovillous adenoma in preoperative biopsies – in all cases. Malignization found in 31% of cases (22 out of 71). Correlation between malignization and the size of the polyp ≥ 2 cm ($r=0.396$, $p<0.001$) and volume of the polyp ($r=0.355$, $p=0.002$) was detected. No correlation between the volume and localization of the polyp ($p=0.411$), and malignization and localization of the polyp ($p=0.177$) was found. Recurrence was detected in one case after 2-year follow up.

Conclusions

Correlation between malignization of tubulovillous adenoma and the size and volume of the polyp was established. No correlation was found between localization and volume, as well as localization and malignization of the tubulovillous polyp. Risk of recurrence in case of radical surgery is low.

The use of novel diagnostic and treatment modalities in the case of primary localized prostate cancer

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Objectives

Nowadays focal therapy of prostate cancer (PCa) is topicality. Advances in the diagnosis of PCa provide the use of novel treatment modalities. Cryoablation, high intensity focused ultrasound (HIFU) and thermal ablation are being reviewed as suitable options for treatment of localized PCa. Even more, HIFU has already proven its role as definitive treatment option in selected cases of PCa, avoiding complications affecting quality of life that could otherwise occur with surgery.

Case report presents a 69 years old previously healthy, sexually active male patient with an intermediate risk PCa who received primary treatment with HIFU in April 2019. The first biopsy at PSA level 6,31 ng/ml as well as second biopsy due to increase in PSA level was negative. PSA kept rising and at PSA level 13,54 ng/ml mpMRI was done revealing PCa in the ventral part followed by transperineal MRI – TRUS fusion guided biopsy. Unilateral PCa located in transition zone (Gleason 3+3) was diagnosed. Patient received prostate gland hemi-ablation with HIFU. PSA nadir reached 2,41 ng/ml 5 months after treatment. On follow-up biopsy after 12 months no signs of malignancy were detected. No major complications after treatment were recorded.

Conclusions

Focal therapy with HIFU can provide reasonable functional and oncological outcomes in selected group of PCa patients as demonstrated by this clinical case. The role of prostate gland MRI and HIFU in case of primary localized PCa has increased, however, additional studies on treatment and follow-up protocols are required.

Ultrasound guided needle biopsy of axilla to evaluate nodal metastasis after preoperative systemic therapy of 106 breast cancer cases

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Objectives

Aim of the study is to evaluate the role of ultrasound guided fine needle aspiration cytology (FNAC) in the restaging of node positive breast cancer after preoperative systemic therapy (PST).

Materials and Methods

From January 2016 – October 2020 106 node positive stage IIA-IIIC breast cancer cases undergoing PST were included in the study. After PST restaging of axilla was performed with ultrasound and FNAC of the marked and/or the most suspicious axillary node. In 72/106 cases axilla conserving surgery and in 34/106 cases axillary lymph node dissection (ALND) was performed.

In order to assess diagnostic value of ultrasound guided FNAC, FNR and FPR as well sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy were calculated. Statistical analyses were performed using Medcalc, easy-to-use software and MS Excel 2010. Fisher's exact test was used for comparison of the results between groups.

Results

False Positive Rate (FPR) of FNAC after PST is 8% and False Negative Rate (FNR) – 43%. Overall Sensitivity - 55%, specificity- 93%, accuracy 70%.

Conclusions

FNAC after PST has low FPR and is useful to predict residual axillary disease and to streamline surgical decision making regarding ALND. FNR is high and FNAC alone are not able to predict ypCR and omission of further axillary surgery. However, FNAC performance in *BRCA1/2* positive subgroup is more promising and further research with larger number of cases is necessary to confirm the results.

Urinary exosomal miRNAs as potential biomarker for bladder cancer diagnosis: pilot study

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Objectives

In approximately 30% of bladder cancer (BC) cases are diagnosed at a late stage when the tumor has already grown in the muscle layer. It is characterized by a high metastatic risk and, despite new treatment strategies, correlates with high mortality rates. Unfortunately, currently available golden standard methods for diagnosing BC are not sufficient and have limited sensitivity. New markers for the diagnosis of BC need to be found and this could be miRNA, a small, non-coding RNAs that have been shown to play an important role in tumorigenesis.

Materials and Methods

The study analyzed urine samples from 10 BC (6 pTa or pT1 low-grade and 4 pT2 high-grade) and 7 healthy control patients, which were collected at Pauls Stradins University Clinical Hospital between 2018 and 2020. Inclusion criteria in study group: pathologically confirmed primary bladder urothelial carcinoma. Control group: gender and age-matched patients with absent BC. Exosome isolation were performed by miRCURY Exosome Cell/Urine/CSF Kit. MiRNeasy Mini Kit were used for RNA isolation. For reverse transcription miRCURY LNA miRNA PCR Starter Kit and miRCURY LNA SYBR Green PCR Kit were used. MiRCURY LNA miRNA miRNome PCR Panels were used for miRNA profiling, and RT-PCR was performed by ViiA-7. MiRNA data panel analysis was performed with miRCURY miRNA Data Analysis v1.0.

Results

Among the 752 miRNAs analyzed, the expression of 55 miRNAs in low-grade and 20 in high-grade (both up-regulated) group was altered with at least a 5.0-fold change in all 6 pooled BC low-grade group samples and 4 pooled BC high-grade group samples compared to 7 healthy controls pool samples ($p < 0.05$). Both tumor suppressor- and onco-miRNAs were found among the identified miRNAs. Many of the identified miRNAs are located under TP53 regulation.

Conclusions

Several differentially expressed miRNAs were found in urinary exosomes that could potentially be used as biomarkers for the diagnosis of BC.

Viscoelastic testing in major oncological surgery

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Objectives

Allogeneic blood transfusion may be detrimental in cancer patients. We evaluated whether ROTEM-guided algorithm to guide haemostatic resuscitation intraoperatively and in first 24 hours after surgery may affect routine haemotransfusions strategy.

Materials and Methods

Prospectively we included 23 patients undergoing oncological surgery in Latvian Oncology Centre, from March till December 2020. ROTEM was performed during surgery when an active blood loss exceed 1000 ml. Patients were randomized: group treated conventionally (CG, n = 10), group using haemotransfusions algorithm guided by ROTEM (RG, n = 13). Blood products were transfused if Hb < 9g/l with haemodynamic instability in ratio 2:1 red blood cell (RBC) : fresh frozen plasma (FFP) in CG group. In contrast, in RG FFP was transfused if Clotting Time (CT)_{ex} > 80s and cryoprecipitate (CRYO) if A10 fib < 10mm, RBC if Hb < 9 g/l.

We analysed ROTEM effect on haemotransfusions strategy and, length of stay in intensive care unit. Significance p<0.05.

Results

23 patients (mean age 61±12.6 years; 54% males) were eligible. Individual blood products FFP, RBC, platelets, CRYO as well as the total amount of haemotransfusions were compared between groups. In RG received significantly less FFP (238±277 ml vs. 317±256 ml, p = 0.03). Similar, the amount transfused of RBC was less in RG (635±500 ml vs. 879±373 ml, p = 0.07). No of patients received platelets and CRYO. The total amount of hemotransfusions was less in RG but didn't reach statistical significance (855±691 ml vs. 1196±507 ml, p = 0.1). Median ICU length of stay was 4 ± 3 vs. 4 ± 2 days without difference.

Conclusions

Haemotransfusions are reduced if hemotransfusions are guided by ROTEM test rather than by clinical judgement or conventional laboratory tests.

Hematology

Acute neutropenia induced by antibiotics: systematic review of case reports

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Objectives

The potentially life-threatening side effect of acute neutropenia is rarely associated with antibiotic use. Information about rare side effects of drugs is usually abstracted from case reports as experimental studies are ethically questionable. Thus, systemic reviews of published case reports could be an option to summarize available evidence about manifestation and treatment options of this condition. Aim of our review was to detect the most common antibiotics associated with AN, as well as severity of this side effect, chosen treatment strategy and outcome.

Materials and Methods

We extracted data about patient demographics, suspected antibiotic, duration of treatment before onset of AN, stage of AN (mild, moderate, or severe), used treatment and duration of recovery, through a search of databases (MEDLINE 1968-2020) and identification of published case reports.

Results

Overall 83 cases were included. The majority of cases were concerning antibiotics from beta-lactam or glycopeptide groups with *Ceftaroline* and *Vancomycine* being the two most commonly described drugs. Neutropenia developed after a median 21 days of treatment and in most cases, it was classified as severe with absolute neutrophil count below 500 cells/mm³ (85.5%). In 51.8% of cases the suspected antibiotic was discontinued, in 37.4% of cases it was substituted for another agent. Neutropenia was resolved after a median six days. Only three case reports mentioned death because of neutropenia. The use of granulocyte colony-stimulating growth factors shortened the duration of neutropenia and improved outcome for patients' health.

Conclusions

Neutropenia induced by antibiotics remains rarely reported side-effect. Long-term and high-dose treatment regimens by beta-lactam or glycopeptide antibiotics expose a higher risk for development of AN, thus regular full blood counts are advised during therapy.

Analysis of the chemokine receptor CCR1 mutations in patients with chronic lymphocytic leukemia

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Objectives

Earlier, applying multiparameter flow cytometry analysis of peripheral blood (PB) CLL cells, we determined a correlation between the cell-surface expression of chemokine receptor CCR1 and negative prognostic marker CD38. The aim of this study was to identify mutations within the *ccr1* gene in CLL patients with low, moderate, and high CD38 expression on leukemic cells.

Materials and Methods

A *ccr1* exon 2 genomic region, covering CDS, was amplified by PCR using PB mononuclear cell DNA of CLL patients. PCR products were cloned in the CloneJET plasmid vector. Ten clones for each sample were sequenced using Sanger method and analyzed in FinchTV software. Sequences were compared to the *ccr1* Reference sequence (RefSeq: NM_001295.2) and analyzed in the NCBI dbSNP database.

Results

Thirty-one patient samples have been analyzed: 10 with low, 11 with moderate, and 10 with high CD38 expression. In 11 patients (35%), 10 single nucleotide variants (SNVs) within *CCR1*CDS were detected: four were determined in patients with moderate CD38 expression (6-30% of CD38+ CLL cells), four – in patients with high CD38 expression (>30% of CD38+ CLL cells), and two - in CD38-negative patients. Notably, an identical frameshift variant was found in two patients from the CD38-moderate group. Three variants were identified in two to four patients. Variants that were not previously reported in the NCBI dbSNP database, were detected in 81% (25/31) of samples.

Conclusions

Eight SNVs were detected in patients with the prognostic marker CD38 expressing leukemic cells, which suggests that the identified SNVs within the *ccr1* exon 2 might correlate with the more aggressive type of the disease. Further analyses of the *ccr1*exon 1 and 5'UTR, as well as an extended cohort of patients, are needed for unfailing conclusions.

The study was conducted in the frame of the Latvian Council of Science research project No lzp-2018/1-0156.

Implementation of the TP53 somatic variant detection for prognosis detection in case of chronic lymphocytic leukemia

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Objectives

The *TP53* encoded protein is an important tumor suppressor. Somatic pathogenic variants in the *TP53* in the case of chronic lymphocytic leukemia (CLL), the same as 17pdel, are associated with resistance to chemoimmunotherapy and a particularly dismal clinical outcome. As result of genetic variant is affecting the treatment choice there is initiative from the Network of the European Research Initiative on Chronic Lymphocytic Leukemia (ERIC) to harmonize the testing and reporting methodology.

Aim was to implement the *TP53* testing in Latvia for risk assessment in the CLL.

Materials and Methods

In the study were included 10 patients with CLL diagnosis, and eight samples in the frame of external quality schemes (five samples from the ERIC network and three from Instand de). DNA was isolated using the phenol-chloroform method from whole blood with EDTA conservant. *TP53* analysis was done using Sanger sequencing according to ERIC suggested protocol, variant interpretation was done using IUARC *TP53*, COSMIC, and other available databases.

Results

In 9 patients, there were not identified clinically important pathogenic variants with somatic mosaicism: >20% (detection limit for the Sanger sequencing). In one patient there was an identified variant - p.Ser215Ile. The patient has the CLL diagnosis in 2012, had received treatment. This was the first time when *TP53* variants were tested for the patient, there were not detected 17p deletion.

For the samples from the external quality schemes, there were samples with different *TP53* genotypes that were correctly identified and interpreted according to quality standards.

Conclusions

TP53 gene analysis is performed according to ERIC quality standards allowing to have more precise risk estimation for the CLL patients in Latvia.

Primary extramedullary plasmacytoma of small pelvis

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Objectives

Extramedullary plasmacytoma (EP) is less common form of solitary plasmacytoma. EP can be located in any parts of the body, but the most frequent localization are upper respiratory and gastrointestinal tracts. Primary localization in small pelvis is extremely rare and there are only several cases of EP published.

Case report: A 62 years old male patient was hospitalized by an emergency service with complains of oligoanuria, pain in the left groin and leg, general weakness, edema on both legs. The patient had undergone right kidney nephrectomy 5 years ago because of right kidney carcinoma. MRI and CT revealed bulky mass that compressed and infiltrated organs of the small pelvis. Diagnose of renal cell carcinoma was set. Due to atypical clinical course, couple of weeks later it was retested on plasmacytoma CD138 and CD79a markers that were highly positive. No atypical plasma cells were found in bone marrow biopsy. A diagnose was changed to plasmacytoma of the small pelvis, os pubis and inguinal lymph nodes. Before PET scan and chemotherapy patient was tested positive on COVID-19, the treatment had been postponed.

Keywords: extramedullary plasmacytoma, multiple myeloma.

Conclusions

Primary EP is rare clinical entry. Most of EP of abdomen and pelvis are diagnosed at the stage were bulky local mass is compressing surrounding organs. The main differential diagnosis include other plasma cell tumors, non hematological tumors, metastases. As there are very few cases of pelvis EP localization described and published, there is no guidelines for EP treatment.

Prognostic markers of disease progression in untreated patients with chronic lymphocytic leukemia

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Objectives

Recently updated guideline recommendations by the National Comprehensive Cancer Network (NCCN) and the CLL International Prognostic Index (CLL-IPI) include host factors (gender, age, lymphocytosis, lymphadenopathy, splenomegaly, thrombocytosis, hemoglobin level), disease staging (Rai and Binet), serology (lactate dehydrogenase, beta-2-microglobulin, and thymidine kinase), genetics (*TP53* and *NOTCH1* genes mutation status), immunogenetics (immunoglobulin heavy chain variable region [IGHV] gene mutational status), and phenotype of leukemic cells (CD38, ZAP70, CD200, and CD49d/VLA-4). The precise value of these markers for prognosis of disease progression in naïve CLL patients remains in question. A simplified prognostic index applicable in naïve CLL is required.

Materials and Methods

Peripheral blood (PB) lymphocytes of 61 newly diagnosed CLL patients were analyzed by polychromatic flow cytometry (pFC) for expression of the CLL-specific markers (CD19, CD5, CD23), the known negative prognostic marker CD38, and the chemokine receptors CCR1 and CCR2. *ZAP70* mRNA expression levels and the IGHV gene mutational status were assessed. Rai staging and host factors were also included in Spearman's rank correlation analyses.

Results

Out of 61 CLL patients, 39 were CD38-positive and 22 were CD38-negative. CCR1 and/or CCR2 were always expressed on the PB CD19⁺CD5⁺lymphocytes in patients with >30% of the CD38⁺leukemic cells ($n = 16$). Spearman's rank correlation analysis defined correlations between the frequency of the CCR1/CCR2 and CD38 on PB CD19⁺CD5⁺lymphocytes ($r_s = 0.50$ and $r_s = 0.38$, respectively). Unmutated IGHV gene was detected as in CD38-positive as in CD38-negative patients. No significant correlations were determined between *ZAP70* mRNA expression levels and the frequency of the CCR1⁺ or CCR2⁺ CD19⁺CD5⁺ lymphocytes.

Conclusions

CCR1/CCR2 on the PB CD19⁺CD5⁺ lymphocytes could be suggested as additional prognostic markers applicable in routine clinical FC tests for diagnosis of the high-risk CLL patients.

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Cardiovascular Diseases

Acute alcohol intoxication effects on cardiac conduction system in healthy adults

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Objectives

Heavy alcohol consumption and binge drinking is still a huge concern all over the world. It is well known that alcohol is a risk factor for cardiac arrhythmias such as atrial fibrillation, but there are not enough studies that analyse ECG changes due to acute alcohol intoxication. The aim of this study was to investigate the effects of ethanol alcohol intoxication on the heart conduction system of young and healthy adults.

Materials and Methods

A retrospective study was conducted in Riga East University Hospital. 172 patients aged between 18 and 40 years without known cardiac abnormalities or concomitant diseases were enrolled. 67 of them were hospitalised in department of Toxicology with alcohol intoxication and blood alcohol concentration (BAC) above 1 g/l, and 105 patients were included in control group from hospital outpatient clinic. The ECG results were analysed for heart rate, heart rhythm, P wave interval, PR interval, QRS interval, QT interval and heart rate adjusted QT interval (QTc). Data were entered and processed using Microsoft Excel and IBM SPSS 22.0 software.

Results

Mean age of hospitalised patients with high BAC was 30,9±6,2 years and mean age in control group was 29,1±5,6 years. Mean BAC in hospitalised patients was 3,28±1,27 g/l. 66 patients or 98,5% of intoxicated patients had sinus rhythm and one (1,5%) had ectopic atrial rhythm. A wider P wave (107,2 vs 89,7 (ms), P<0,001), and prolongation of PR interval (165,7 vs 145,5(ms), P<0,001) was observed in ECGs of hospitalised patients, compared to control group. There was slightly wider QRS complex (100,4 vs 95,6 (ms) P=0.003), and a little longer QTc interval (410,0 vs 396,3(ms), P<0.001) in group of hospitalised individuals.

Conclusions

Patients without known underlying heart diseases and with alcohol intoxication had conduction disturbances in both intraatrial and intraventricular conduction systems, compared to patients without alcohol intoxication.

AFibDI – Atrial Fibrillation Diurnal Index. The index for risk assessment derived from twenty-four hours Holter monitoring

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Objectives

The autonomic nervous system (ANS) adapts heart rate (HR) to current person's needs increasing HR during a daytime for physical and mental activities and decreasing HR during rest conditions and a nighttime. The prognostic significance of heart rate (HR) diurnal pattern had not been widely studied in permanent atrial fibrillation (PAF) patients.

Materials and Methods

In total of 463 PAF patients exposed to Holter monitoring in 2007 – 2012 four simple indexes characterizing twenty-four hours HR behavior (average day and night HR ratio and difference, maximum and minimum HR ratio and difference) were calculated, checked for diagnostic and predictive accuracy, and dichotomized by using ROC curves, and then included in Kaplan-Meijer survival analysis. The indexes were grouped into newly created Atrial Fibrillation Diurnal Index (AFibDI, range 0-4).

Results

For 5 years follow-up 180 deaths were documented in study patients' group. AFibDI showed fair accuracy for death prediction (AUC-.745 (.698;.972) p-.000) and statistically significant survival prediction value (p<.000). Decrease of diurnal heart rate variability (higher AFDI) conferred higher death risk after adjustment for CHA₂DS₂-VASc score and age (hazard ratio 1.39 (95% CI: 1.25; 1.54) for each AFibDI point increment. The AFibDI was included in survival analysis together with left ventricle ejection fraction (LV EF). Combination of AFDI together with LV EF distinguished patients at higher death risk among ones with the same range of LV EF.

Conclusions

AFibDI improves risk assessment in PAF patients and adds predictive accuracy for death risk prediction in patients with similar other risk predictors.

The index can be applied for every technic, which registers continuous twenty-four hours ECG.

Atrial fibrillation patient health-related quality of life change over 6- and 12- months depending on the used oral anticoagulant type

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Objectives

Atrial fibrillations (AF), the most common sustained rhythm disorders, prevalence rises with the aging society. Although atrial fibrillation has been researched widely, the field of health-related quality of life (HRQoL) has become just recently more investigated. The aim of the study is to determine how different oral anticoagulant (OAC) usage influence the HRQoL for high-risk atrial fibrillation patients.

Materials and Methods

High-risk non-valvular atrial fibrillation patients were enrolled during their hospitalization in Pauls Stradins Clinical University Hospital and Riga East University Hospital "Gailezers" year 2017 - 2020. Demographic data, medical history, therapy and modified SF-36 form were collected with a follow-up after 6- (6m) and 12 months (12m). Acquired data were analysed with Microsoft Excel and SPSS (Kruskall Wallis H-test).

Results

The 6-month follow-up included 213 patients; 12-month follow up - 186. Mean age 71.5 years. Mean CHA2DS2-VASc score 4.4. Study group: Non-OAC users 15.0% (32), Warfarin users 33.8% (72), NOAC users 51.1% (109). In warfarin group statistically significant difference ($p < 0.05$) was identified in physical functioning (0m-0.41, 6m - 0.71, 12m - 0.63), emotional well-being (0m-0.73, 6m - 0.84, 12m - 0.76), social functioning (0m-0.72, 6m - 0.94, 12m - 0.89), general health (0m-0.33, 6m - 0.47, 12m - 0.46); in DOAC group physical functioning (0m-0.63, 6m - 0.65, 12m - 0.72), role limitations due to physical health problems (0m-0.51, 6m - 0.75, 12m - 0.73), social functioning (0m-0.79, 6m - 0.92, 12m - 0.97), general health (0m-0.37, 6m - 0.44, 12m - 0.51). In Non-user group a statistically significant negative change was in general health (0m-0.52, 6m - 0.43, 12m - 0.39) evaluation.

Conclusions

Statistically significant ($p < 0.05$) positive changes in health-related quality of life were determined in warfarin and DOAC user group. Non-user HRQoL during 12-month period had a negative correlation of health-related quality of life in 1 of 7 sections.

Cardiac damage in patients with pulmonary and lymph nodes sarcoidosis

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Objectives

To assess early changes of cardiac geometry and function by 2D echocardiography and left ventricular (LV) myocardial deformation indices by speckle tracking method in patients with newly radiologically or morphologically verified pulmonary and lymph nodes sarcoidosis (PLNS).

Materials and Methods

36 patients were enrolled as PLNS patients' group (SG) and 36 patients as control group (CG). 2D echocardiography and speckle tracking echocardiography were performed. Echocardiographic LV and right ventricle (RV) geometry and function parameters, LV longitudinal strain (LS) indices were analysed. Statistical analysis was performed by IBM SPSS 25.0 software. Student t test, Mann-Whitney U criteria were used to compare groups, Pearson correlation coefficient - to evaluate correlation.

Results

Increased LV myocardial mass index was detected in SG ($p=0.017$). Impaired LV global LS with preserved ejection fraction (EF) was detected in SG to compare with CG, accordingly $-18.67 \pm 3.33\%$ and $-22.58 \pm 1.74\%$, ($p<0,001$). Decreased systolic velocity of LV myocardial basal segments was found by tissue doppler method ($p=0.001$) in SG patients. Evaluating LV diastolic function, lower E/A rate ($p<0.01$) and higher E/e' rate ($p=0.002$) were found in SG. RV end diastolic diameter, RV longitudinal function parameters did not differ between groups ($p=0.431$). RV systolic function was preserved in both groups, but fractional area change was lower in SG ($43.25 \pm 2.93\%$ and $45.25 \pm 2.37\%$, $p=0.002$). Mean pulmonary artery pressure was higher in SG ($p=0.002$).

Conclusions

Decreased LV global longitudinal strain with preserved LV ejection fraction and decreased RV global systolic function were detected in pulmonary and lymph nodes sarcoidosis patients.

Cardiovascular disease assessment for patients between 20–39 years

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Objectives

CVD are the most common cause of death in Latvia and worldwide and are more common in the elderly population. The general practitioner consults also young patients with an anamnesis of cardiovascular diseases before the age of forty, with complains of arterial hypertension or isolated risk factor of cardiovascular disease. Cardiovascular risk assessment for young patients is done with the relative risk assessment. However, it is not a routine method for patients between 20 - 39 years. The objective was to assess the relative cardiovascular risk for patients between 20 – 39 years.

Materials and Methods

In a cross-sectional study 70 patients with no cardiovascular disease anamnesis between the age of 20-39 were included. Physical parameters, BMI, blood pressure, total cholesterol, LDL, HDL and glucose were measured. Anamnesis of illnesses and family history of CVD was analysed. Based on the parameters CVD SCORE relative risk assessment was done. A statistical analysis of the results was performed.

Results

The mean age was 32,2 years (*min.20, max.39, median32,5*), 38 female and 32 males.

The results of the study showed that the relative risk is elevated for 62 (88,6%) patients. BMI was evaluated for 57% (n=42) patients. Around one third of patients had elevated blood pressure (22,9%) and total cholesterol level (31,4%). The relative CVD risk correlate with patient's age $p=0.014$. Total cholesterol has a direct correlation with patient's age ($p=0.002$). Also, these factors correlate with patients age (blood pressure $p=0.018$ and total cholesterol $p=0.01$), there was no statistical difference between patients' sex, smokers, family history of CVD.

Conclusions

The risk is assessable in this patient group. This helps to identify the high-risk patients and make early prophylactic measures for the risk management. With increased age the relative CVD risk increases which is determined by elevated total cholesterol and blood pressure level.

Changes in heart rate, blood pressure and O₂ content of masters basketball player during training and competition

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Objectives

Compare training and competition intensity for masters basketball players by assessing their heart rate; to evaluate potential cardiovascular benefits and risks for this intensity; to assess usability of blood pressure and oxygen saturation changes in determining exercise intensity.

Materials and Methods

22 male masters basketball players from four teams participating in the MaxiBasket league were included in the study. Measurements were taken by the CONTEC™ Pulse Oximeter CMS50D1 and Little Doctor® sphygmomanometer LD-71. Heart rate, blood pressure and oxygen saturation were measured before warming-up, three times during process (training/game) and after stretching.

Results

The mean age of participants was 49 ± 6 years. The average heart rate (HR) during training was 136 ± 14 [95% confidence interval (CI) = 130-142], bpm but during game 148 ± 10 [CI = 144-152], bpm which showed statistically significant difference between both events ($p = 0,001$). There is statistically significant difference between systolic (SBP) and diastolic blood pressure (DBP) during training (dT) and competition (dC): SBPdT 164 ± 21 [CI = 155-173], mmHg vs. SBPdC 181 ± 18 [CI = 173-188], mmHg; $p = 0,01$. DBPdT 83 ± 9 [CI = 79-87] vs. DBPdC 91 ± 8 [CI = 88-94], mmHg; $p = 0,001$. There is no statistically significant difference between mean systolic blood pressure after training 129 ± 11 , mmHg and after competition 132 ± 12 , mmHg; $p = 0,220$. Comparison between median (25; 75 percentile) oxygen saturation during training 96 (95; 97), % and during game 97 (96; 98), % shows the same trend ($p = 0.06$).

Conclusions

Heart rate increase during competition is more pronounced than during training. Competition raises blood pressure more than training process. Oxygen saturation changes during training and competition is the same. Study shows that competition is greater load than in training, therefore medical examination are required before and during competition season.

Characteristics of high-risk non-valvular atrial fibrillation patients

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Objectives

Aim - analyse clinical characteristics of high-risk non-valvular atrial fibrillation patients hospitalized in Pauls Stradins Clinical University Hospital and Riga East Clinical University Hospital Centre "Gailezers".

Materials and Methods

Patients were enrolled during their hospitalization. Demographic data, medical history was acquired from medical records and interviews. Patients were divided in three study groups depending on the oral anticoagulant (OAC) type they used. Data were collected with Microsoft Excel, analysed with SPSS.

Results

386 high-risk non-valvular atrial fibrillation patients were enrolled 2016-2020. Of them 167 (43.3%) males. Non-OAC users (Non) 110 (28.5%), Warfarin (W) 135 (35.0%) and DOAC (D) 141 (36.5%). Mean age: Non - 73.8; W - 71.5; D - 68.5 years. The largest part of Non (20.9%) and W (29.6%) users had AF >10 years. D for 1-3 years (17.0%). Mean CHA2DS2-VASc score: Non - 4.8, W - 4.4, D - 4.1; HAS-BLED score respectively Non - 2.8; W - 2.9; D - 4.1 points. Smokers in Non group were 12.7% (14) used to smoke - 16.4% (18), non-smokers - 76.4% (84); respectively W - 3.0% (4); 13.3% (18), 90.4% (122); D - 12.8% (18); 10.6% (15), 73.0% (103). Coronary artery disease: Non 63.6% (70), W - 48.1% (65), D - 34.8% (49); Diabetes: Non - 26.4% (29), Warfarin - 29.6% (40), D - 21.3% (30); Chronic Heart failure: Non - 60.8% (67), W - 68.1% (92), D - 55.3% (78); anamnesis of PCI: Non - 17.3% (19), W - 14.1% (19), D - 12.8% (18); Cerebral Infarction: Non - 13.6% (15), W - 11.1% (15), D - 8.5% (12). Mean left ventricular ejections fraction: Non - 53.9%; W - 51.3%; D - 55.8%.

Conclusions

Physicians should be aware of the high incidence rate of diabetes, cerebral infarction anamnesis, high prevalence of smokers, incidence of patients who do not use proper anticoagulation for stroke prophylaxis.

Circulating growth factors as clinical biomarkers in aortic valve stenosis

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Objectives

Aortic valve stenosis (AS) develops with a pronounced local inflammatory response, where a variety of growth factors are involved in the process, and may have a pro-inflammatory and anti-inflammatory effect. The aim of our study was to elucidate whether circulating growth factors: growth differentiation factor 15 (GDF-15), angiopoietin-2 (Ang-2), vascular endothelial growth factor A (VEGF-A), fibroblast growth factor 2 (FGF-2), fibroblast growth factor 21 (FGF-21) could be proposed as clinically relevant biomarkers to improve risk stratification in AS patients

Materials and Methods

AS patients were classified into three groups: 16 patients with mild AS stenosis; 19 with moderate and 11 with severe AS, and 30 subjects without AS (echocardiographically approved) were selected as a control group. GDF-15, Ang-2, VEGF-A, FGF-2 and TGF-21 were measured in plasma by ELISA method.

Results

GDF-15 levels differ significantly not only when comparing AS patients with control groups ($p < 0.0001$), but also a statistically significant difference was achieved when comparing mild degree AS patients at mild stage with control individuals. We found strong relationship of GDF-15 levels regarding AS severity degree ($p < 0.0001$). VEGF-A, FGF-2 and FGF-21 levels were significantly higher in AS patients than in controls, but relationships regarding AS severity degree were weaker ($p < 0.02$). ROC analysis of the study growth factors showed that GDF-15 might serve as a specific and sensitive biomarker of AS stenosis (AUV = 0.75, $p = 0.0002$). FGF-21 correlated with GDF-15, Ang-2, and FGF-2, but it did not reach the level to serve as a clinically relevant biomarker of AS stenosis.

Conclusions

AV stenosis is associated with significantly increased GDF-15, VEGF-A, FGF-2 and FGF-21 levels in plasma, but only GDF-15 shows pronounced relationship regarding AS severity degree, and GDF-15 may serve as a specific and sensitive biomarker of AS stenosis.

Comparison of different tactics for atrial fibrillation treatment in the emergency medical center stage

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Objectives

To find out what approaches are used for acute onset atrial fibrillation [AF] in ED and to compare their efficiency.

Materials and Methods

The study summarizes data on 468 AF patients hospitalized in the Emergency Medicine Center of P. Stradins Clinical University Hospital in the period from July 1, 2020 to September 21, 2020. Of these, 181 patients who underwent cardioversion at the ED stage were selected and analyzed. The primary endpoints were conversion to sinus rhythm (SR) after pharmacological (PC) and electrical cardioversion (ECV), as well as depending on the antiarrhythmic drugs (AAD) used. Secondary results were a comparison of time spent at the ED by type of cardioversion and AAD

Results

PC was used as the first-line tactic to restore sinus rhythm in 83% (n=123) of patients, and was successful in 76% (n=93) of cases. ECV was given to 17% (n=26) of patients, ensuring 100% (n=26) conversion to SR, including patients after unsuccessful PC (24,4%, n=30). To promote maintenance of SR after ECV, 62% (n=16) of patients were premedicated with amiodarone. Amiodarone was predominantly used during PK (88%, n=106), although more than half of the patients in the amiodarone group had no contraindications to propafenone, which was used in only 12% of cases. Sinus rhythm was restored to a statistically insignificantly higher proportion of patients in the propafenone group than in the amiodarone group (86% (n=12) vs. 75% (n=79), p=0,358). Analyzing the time spent in the ED, similar results were obtained in the propafenone and ECV groups (5.2 vs. 6.2 hours, p=0,528), while in the amiodarone group it was twice as high (10.7 hours, p=0,001).

Conclusions

ECV is more effective in restoring sinus rhythm than PC with intravenous amiodarone or propafenone. ECV and PC with intravenous propafenone restore sinus rhythm faster than PC with amiodarone, allowing patients to be discharged twice as fast.

Comparison of various aspects of cardiac resynchronization therapy between Latvia and Europe: data from CRT survey II

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Objectives

Heart failure is one of major cardiovascular health problems and guideline based approach in treatment guidance includes cardiac resynchronization therapy (CRT) along with optimal medication therapy if dyssynchrony between cardiac chambers is present. To compile data of CRT device implantation practice in European countries as a joint initiative between the Heart Failure Association (HFA) and the European Heart Rhythm Association (EHRA) CRT II survey was created.

Materials and Methods

The study was designed to include all patients assigned to *de-novo* implantation of CRT with pacemaker function (CRT-P), CRT with an incorporated defibrillator (CRT-D), an upgrade from permanent pacemaker (PPM) or an implantable cardioverter defibrillator (ICD) from October 1st 2015 til December 31st 2016 and for each patient electronic case report form (eCRF) was completed. Each participating country, had each eCRF data-point benchmarked against the total cohort.

Results

In total 79 patients were included from Latvia. Mean age of patients was 68,1 similarly to total cohort of other ESC member states and 21,8 % of patients were female. Latvian patients compared to other countries more often had permanent atrial fibrillation, NYHA class III and IV, ejection fraction >35 %. CRT-Ds and multipolar lead implantation rates were higher. Peri-procedural complication rates were similarly low in both groups. At the discharge prescribed medication rates were similar but more frequently MRAs, ivabradine and calcium channel blockers were prescribed and slightly less ACE inhibitors/ARBs were prescribed.

Conclusions

CRT survey II is valuable resource that describes ongoing practice of cardiac resynchronization therapy around Europe and benchmarking against total cohort is nationally significant for each participating country.

Deep hypothermic circulatory arrest and its impact on long term quality of life for patients after aortic surgery

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Objectives

To evaluate the possible effect of aortic surgery with DHCA on patients' long term quality of life in a retrospective crosssectional study.

Materials and Methods

From January 2019 to December 2020 24 patients had undergone aortic surgery requiring DHCA in a tertiary hospital, 7 of those were excluded because of intrahospital death. For the rest of the patients quality of life (QOL) was evaluated using RAND SF36 questionnaire and MMSE test. Patient data and clinical characteristics were collected and analysed with IBM SPSS, a *P* value of less than 0.05 was considered significant.

Results

Of the 17 patients included in the study, 12 (71%) were men and 5 (29%) were women. Their mean age 60,71±13,8 years. Leading co-morbidity was PAH (64.7%).

There were 6 (35.3%) elective and 11 (64,7%) emergency cases. Mostly there was Stanford A dissection(82.4%). 94.7% had aortic arch replacement. Most common postoperative complication was infection- 29.4%.

The mean cardiopulmonary bypass time, aortal obstruction and reperfusion time was 212±38,3, 124±33.8 and 70,2±32,9 minutes, respectively. Core temperature during DHCA was 23,2±3,2. Rewarming rate was 0,12±0,07 C/min.

No statistically significance between QOL and lowest DHCA temperature (p0.059), Ao (p0,544), reperfusion time (p0,618), CPB time (p0.305) was observed. QOL and rewarming rate showed statistical significance (p0,02)

Mean long term quality of life was 71.9±10.2% and mean cognitive 27.9±5,3.

Conclusions

There was no statistical significance between lower quality of life and average temperature, Ao, CPB DHCA duration(p>0.05). Only rewarming time was found to be correlating with QOL.

Compared to other studies QOL was the same or higher, but compared to general population QOL is slightly decreased.

Exercise stress test in patient with persistent form of atrial fibrillation receiving treatment with Class Ic antiarrhythmic drugs after sinus rhythm restoration

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Objectives

Class Ic antiarrhythmic medications are widely used for rhythm control in patients with atrial fibrillation. Currently, the data regarding the use of exercise testing in patients with normal ejection fractions testing to screen for proarrhythmia and Class I drugs safety is limited. The purpose of our study was to determine the efficacy and utility of bicycle exercise stress test in evaluating outcomes managing atrial fibrillation with Class I antiarrhythmic medications.

Materials and Methods

This prospective study included 35 patients undergoing ECV (electrical cardioversion) for persistent form of AF in the Latvian Centre of Cardiology, Pauls Stradins Clinical University Hospital from September 2019 to June 2020. The patients were asked to perform a stress test before and after receiving therapy with propafenone or aethacizinum. For safety evaluation blood tests and electrocardiogram were performed.

Results

25 patients (71%) were admitted for ECV by emergency service, while 10 (29%) were referred by a cardiologist or general practitioner. At the baseline 20 patients (57%) received therapy with aethacizinum 50 mg daily and 15 patient (43%) – propafenone 300 mg daily. No proarrhythmic events were observed during the study. There were no important changes in performed safety tests. The bicycle stress test time increased from a mean of 5.52 minutes to 6.04 minutes ($p = 0.005$).

Conclusions

With screening, initiation of Class Ic agent is associated with very low rate of proarrhythmia. Bicycle exercise stress testing is an effective and safe, widely used test that should be performed in all patients after initiation of Class Ic antiarrhythmic drugs for evaluation of safety and physical activity level changes during treatment.

Hemodynamic and demographic characteristics of potential patients to undergo balloon pulmonary angioplasty at Pauls Stradiņš Clinical University Hospital

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Objectives

In the recent RACE trial, balloon pulmonary angioplasty (BPA) was found to be more effective than treatment with riociguat in non-operable CTEPH patients (Jais et al., 2018). The aim of this study is to summarize baseline characteristics of CTEPH patients who are selected to potentially undergo BPA at Pauls Stradiņš Clinical University Hospital (PSCUH).

Materials and Methods

This is a registry study of Latvian PH registry summarizing baseline characteristics of symptomatic (WHO-FC II-IV), non-operable CTEPH patients, with baseline assessment from May-December 2020 and were deemed eligible by multidisciplinary CTEPH team to undergo BPA within the framework of project "Implementation of BPA and evaluation of its effectiveness in treatment of CTEPH at PSCUH" approved by Latvian Council of Science.

Most recent right heart catheterization (mean pulmonary artery pressure (mPAP), pulmonary vascular resistance (PVR), cardiac index (CI)) and echocardiography (Tricuspid Annular Plane Systolic Excursion (TAPSE), left ventricular ejection fraction (LVEF)) data, six-minute walking distance (6MWD) and B-type natriuretic peptide (BNP) levels are presented as mean \pm SD, where applicable.

Results

15 patients were included in this study, 8 (53%) were female. Mean age was 65 \pm 6 years. Most patients were WHO-Functional Class III (WHO-FC II/III/IV; 4/10/1). All patients were receiving vasodilator therapy, with 5 patients (33%) (95% CI: 15-59%) being on dual-combination therapy.

Mean mPAP, and PVR showed progressed PH (49 \pm 8 mmHg and 9.1 \pm 2.2 Wood) with impaired CI (2.09 \pm 0.24 L/min/m²), albeit mostly preserved Left heart (LVEF 55 \pm 7%), and right heart (TAPSE 18 \pm 2 mm) function seen on echocardiography. The burden of PH was reflected in elevated BNP levels (386.2 \pm 189.7 pg/ml). Mean 6MWD of 267 \pm 59 m showed severe functional impairment.

Conclusions

According to ESC/ERS (2015) guidelines, these patients had several high mortality risk factors. Creation of the first BPA center in the Baltic States would offer additional treatment options for this patient cohort.

Incidence of blood culture negative infective endocarditis in patients undergoing cardiac surgery

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Objectives

Blood culture negative infective endocarditis (BCNIE) is a term used for infective endocarditis where no causative microorganism can be detected in blood using routine culture methods. In scientific literature its incidence is approximately 30%, however in some studies it varies from 2.5 to 70%. Data for BCNIE regarding outcome and clinical course are controversial. In this retrospective study we analyze its incidence and possible impact on the outcome.

Materials and Methods

In this study we compiled medical records of 207 patients who underwent cardiac surgery due to infective endocarditis. We assessed the rate of BCNIE incidence and its possible impact on patients' preoperative condition, laboratory, echocardiographic findings, and short and long-term outcome. Results were analyzed by SPSS 26.0 version. Study was approved by Central Medical Ethics committee of Latvia.

Results

The incidence of BCNIE was 44.90 %. Aortic valve was involved in 41.94 %, mitral valve in 22.58 %, aortic and mitral valve in 29.03 % in BCNIE patients. Prosthetic valve infective endocarditis was observed in 19.30 % of cases. Embolic events due to IE were observed in 27.96 % of patients. Mean EuroScore II risk was 6.80%. Intrahospital mortality was 5.38 %. A 3-year mortality reached 31.40 %. When compared to the patient group with known causative microorganism no statistically significant difference was found for both intrahospital and 3-year mortality ($p=0.062$ and $p=0.509$).

Conclusions

- We observed high incidence (44.90 %) of blood culture negative infective endocarditis in this study.
- Despite of relatively low intrahospital mortality (5.38 %), a 3-year mortality is high (31.40 %).
- There was no statistically significant difference between blood culture negative infective endocarditis regarding intrahospital and 3-year mortality when compared to the patients with known causative agent.

Indirect antiarrhythmic effects of renin-angiotensin-aldosterone system inhibition for arrhythmia recurrence prevention after electrical cardioversion for persistent atrial fibrillation

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Objectives

Electrical cardioversion (ECV) is quick and effective method for rhythm control in atrial fibrillation (AF) patients. Nevertheless, long-term results are modest, especially with progression of remodelling, including major contribution of renin-angiotensin-aldosterone system (RAAS), which could be a target to attenuate arrhythmia relapse. Aim was to evaluate effects of RAAS inhibition by angiotensin-converting enzyme inhibitors (ACEIs)/angiotensin receptor blockers (ARBs) and mineralocorticoid receptor antagonists (MRAs) for arrhythmia recurrence prevention after ECV in patients with persistent AF.

Materials and Methods

Prospective research was conducted among patients with persistent or longstanding persistent AF undergoing ECV in the Latvian Centre of Cardiology. Baseline face-to-face interview was conducted, according to data collection protocol, with subsequent 1-, 3-, 6-, 9- and 12-month follow-up, focusing on sinus rhythm maintenance and medication persistence. Data analysis was carried out with MS Excel and SPSS Statistics software ($\alpha=0.05$).

Results

Among 103 participants, 93.2% had persistent AF and 6.8% – longstanding persistent type, with total arrhythmia recurrence rate 46.6%. Each month of AF history was established to increase AF recurrence likelihood by 2.1% (OR=1.021, 95%CI 1.008-1.034, $p=0.001$), nevertheless no significant impact of current arrhythmia episode duration in weeks prior to ECV was found (OR=1.004, 95%CI 0.993-1.014, $p=0.507$). Regarding RAAS inhibiting medications, ACEI/ARB therapy, compared to non-use, showed no significant contribution to AF relapse prevention (OR=0.897, 95%CI 0.358-2.250, $p=0.817$), whereas MRA intake was linked to decreased odds for AF recurrence by 72.9% (OR=0.271, 95%CI 0.098-0.751, $p=0.012$). With AF history and MRA intake as variables in regression model, present MRA therapy was associated with reduced prospects for AF relapse by 75.7% (OR=0.243, 95%CI 0.078-0.757, $p=0.015$), when adjusted to AF history.

Conclusions

Prolonged AF history is associated with impaired long-term sinus rhythm maintenance prognosis, presumably attributed to remodelling progression. RAAS inhibition by MRAs has demonstrated significant contribution to arrhythmia recurrence prevention via indirect antiarrhythmic action, with potentially emphasized chronic use.

Inotropic function of myocardium in patients with persistent form of atrial fibrillation receiving antiarrhythmic drugs class Ic

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Objectives

The aim of our study was to evaluate structural changes in the myocardium in patients with persistent AF receiving class Ic antiarrhythmic drugs and to determine whether they are hyperdiagnosed and associated with an adverse treatment prognosis.

Materials and Methods

This prospective study included 62 patients undergoing ECV (electrical cardioversion) for persistent form of AF in the Latvian Centre of Cardiology, Pauls Stradins Clinical University Hospital from September 2019 to June 2020. The inclusion criteria were as follows: atrial fibrillation recurrence, patient have not received any antiarrhythmic drugs before (except amiodarone and beta blockers). All patients received beta blockers bisoprolol 5 mg daily, amiodarone 200 mg daily, propafenone 300 mg daily or aethacizinum 100 mg daily for 6 months from the day of admission to the hospital. Symptoms and safety were evaluated by brain natriuretic peptide (BNP) level, rest electrocardiogram (ECG), exercise test, echocardiography, complete blood count, clinical biochemistry, Holter monitoring and transthoracic electrocardiography.

Results

The total number of patients finished study per protocol – n=57. Between AF group and SR group echocardiographic data no significant changes were found. Early diastolic atrial myocardial velocity and strain showed no significant difference between groups. No safety parameters changed significantly in patients completed the study. Recurrence rate of AF in aethacizinum group showed close to statistically significant superiority compared to propafenone (55,6% vs 72,5%) (p=0.05). Patients with higher atrial strain have better opportunity to maintain sinus rhythm.

Conclusions

Antiarrhythmic medications of Ic class may be safe in patients with persistent form of atrial fibrillation and have no negative impact on inotropic function of myocardium. The most commonly used drug from Ic class is aethacizinum.

Meldonium improves functioning of the right ventricle and mitochondrial bioenergetics in experimental model of pulmonary hypertension

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Objectives

Pulmonary hypertension (PH) is a progressive and debilitating vascular disease with limited treatment options to prevent the development of right ventricular failure and death. Meldonium is a cardioprotective drug which improves heart functioning in preclinical models of left-sided heart failure as well as induces clinical improvements in heart failure patients. The aim of our study was to assess effects of meldonium on monocrotaline (MCT)-induced PH and right ventricular (RV) failure in rats.

Materials and Methods

Male Sprague-Dawley rats (n=34) were randomly divided into three groups. The control group (n=10) received saline injection. A single subcutaneous injection of MCT at a dose of 60 mg/kg was done in remaining 24 animals: MCT (n=12) and MCT+Meldonium (n=12) group rats. Animals from MCT+Meldonium group started to receive meldonium at a dose of 200 mg/kg together with drinking water for 4 weeks.

After 4 weeks of treatment echocardiography and direct measurement of the RV systolic pressure were performed. After euthanasia, pulmonary and cardiac tissues were collected, weighted and prepared for histological analysis. Mitochondrial function was tested in the permeabilized cardiac fibers of the right ventricle by respirometry measurements.

Results

MCT administration increased RV systolic pressure, Fulton index, lung to body weight index and decreased RV fractional area change (RVFAC). Treatment with meldonium decreased lung to body weight index, right ventricle to body mass index along with Fulton index ($p<0.05$), reduced end systolic area ($p<0.05$) and increased RVFAC ($p<0.05$).

Administration of MCT resulted in a decrease in the FAO-dependent OXPHOS coupling efficiency with concomitant increase in pyruvate metabolism and complex I dysfunction. Treatment with meldonium restored FAO-dependent OXPHOS coupling efficiency and complex I function as well as decreased pyruvate metabolism.

Conclusions

Meldonium decreased dilation, improved function of RV and protected functionality of cardiac mitochondria in experimental model of PH and RV failure

Morphology of electrocardiogram P wave in correlation with pulmonary vein orientation in the left atrium in computed tomography

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Objectives

Electrocardiography is a gold standard test for patients with any type of heart disorder, measuring cardiac electric activity. Multi-slice cardiac computed tomography scan is more specific for anatomical and volume evaluation. The aim of the study was to find statistically significant correlations between anatomical and volume parameters in relation to electrical activity of the heart.

Materials and Methods

The retrospective study included 145 patients, all of them underwent surgical treatment of peripheral artery disease. Cardiac CT scan analysis was performed by making a 3D model of the left atrium and analyzing the volume and anatomical variety including pulmonary vein orientation.

Results

Mean age of patients was 66.9 years (SD = 7.9), 75.2% (109) were men. It was found out that the angle between the left superior and inferior pulmonary veins negatively correlates with the volume of the left atrial appendage ($r_s = -0.269$, $p = 0.002$), right angle showed no significant correlation with the left atrium appendage volume ($p = 0.678$). The angle between left pulmonary veins also has statistically significant differences between left atrial appendage morphology groups ($p = 0.019$), there was not found any right pulmonary vein angle difference ($p = 0.688$). The number of left pulmonary vein orifices have statistically significant distribution differences among ECG P wave notching groups in II lead ($p = 0.026$), but the number of right pulmonary vein orifices has a positive correlation with P wave axis ($r_s = 0.239$, $p = 0.008$). The distance between two pulmonary veins negatively correlated with the amplitude of ECG P wave on the right side ($r_s = -0.193$, $p = 0.047$). There was also a positive correlation between the right and left pulmonary vein angle ($r_s = 0.325$, $p < 0.001$).

Conclusions

Despite the fact that strong correlations were not found, there are statistically significant differences between pulmonary vein anatomy variations impact on ECG findings.

One clinical center experience of outcome in patients with acute pulmonary embolism in 2018

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Objectives

Acute pulmonary embolism (PE) is the third most common cause of death in hospitalized patients. The prognosis of patients with PE depends on various factors including patients' general condition and presence of co-morbidities.

The aim of this study was to evaluate the vital signs and the presence of co-morbidities from patients' medical records, that could affect treatment outcome in patients diagnosed PE.

Materials and Methods

A retrospective study was made to evaluate vital signs and co-morbidities in medical records among hospitalized patients with diagnosis ICD-10 I26 from January to December 2018. Data were processed by IBM SPSS Statistics 22 program.

Results

A total of 108 patients were included - female 70 (65%), male 38 (35%). Median age was 74 (SD 11.9 years). The patients were divided into two groups according to hospital outcome – survivors 95 (84%) and non-survivors 15 (16%).

Mann Whitney U test gave statistically significant association between presence of chronic heart failure (CHF) (III-IV functional class by NYHA) (U=22.22; p=0.001), chronic kidney disease (CKD) (stage > II) (U=898.0; p=0.045) and old myocardial infarction (MI) (U=873.0; p=0.043) between both groups. There was statistically significant difference in distribution of systolic (SBP) (U=761.500; p=0.041) mean 117.0 (SD 32.7) vs 136.5 (SD 36.9), diastolic blood pressure (DBP) (U=785.500; p=0.019) mean 68.8 (SD 16.6) vs 81.9 (SD 25.5); in distribution of PESI (U=353.5; p=0.019) mean 162.4 (SD 45.4) vs 133.8 (SD 50.3) and of bed days (U=1532.0; p=0.0001) mean 4.9 (SD 3.9) vs 14.2 (SD 7.6) between non-survivors and survivors.

Conclusions

In presence of CHF, CKD, old MI, low SBP and DBP, high score of PESI, it would be reasonable to start therapy without radiological findings. To reduce risk of mortality, it would be suggested to improve diagnostic algorithm to provide faster initiation of the therapy.

Patient adherence to antihypertensive medications during arterial hypertension therapy

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Objectives

This study aims to evaluate medication adherence in hypertensive patients. The Morisky Medication Adherence Scale (MMAS-8) is a commonly used survey. It has been validated in patients with chronic diseases, providing reliable results on drug adherence.

Materials and Methods

All data were collected through face-to-face survey at Pauls Stradiņš Clinical University Hospital. The selection criteria were respondent age over 18 years, diagnosis of arterial hypertension and use of blood pressure lowering medications for at least six months. MMAS-8 was evaluated against measured arterial pressure using manual blood pressure monitor.

Results

The study involved 81 participants with hypertension - 31 women and 50 men - all of whom had been taking antihypertensive medicines for at least six months. The mean age of total respondents was 66.6 years, where 64.6 years and 69.8 years for male and female, respectively. The average level of adherence was 6.57 (SD = 1.61): the adherent group consisted of 66 respondents. The prevalence of non-adherence to medications was 18.52%. Adherent respondents in age 65 and older with systolic blood pressure (SBP) below and above 140 mm Hg consisted of 24 and 15, respectively. In spite that respondents younger than 65 years with SBP below and above 130 mm Hg consisted of 13 and 14, respectively. While non-adherent respondents in age 65 and older with SBP below and above 140 mm Hg consisted of 4 and 2, respectively. Along with non-adherent respondents younger than 65 years with SBP below and above 130 mm Hg consisted of 13 and 14, respectively.

Conclusions

We found poor correlation between patient adherence to medications using MMAS-8 scale in different age groups to target clinic blood pressure. Further investigation of the concentration of blood pressure lowering medications in patient's blood would give more reliable results about adherence to medication.

Patients experience and actions of hypertension crisis management

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Objectives

Severe increase in arterial blood pressure can lead to urgent or emergent hypertensive crisis and may induce acute organ damage. The aim of this research was to determine patients, general practitioners and State Emergency Medical Service doctors opinion about primary hypertension daily treatment and hypertensive crisis solving options.

Materials and Methods

Quantitative data analysis from patients and doctors filled questionnaires. 75 primary arterial hypertension patients, 27 general practitioners and 72 State Emergency medicine doctors in Riga were included in this study.

Results

From responders (patients) 54 (69.3%) have called for Emergency medical help, 23 have not (30,7%). There were statistically significant association between patients who already have medication for hypertensive crisis treatment and have called for an Ambulance (52,2%) than those who has not medication for hypertensive crisis management (17.3%), $p < 0.05$. In case of hypertensive crisis only 6 of responders (8%) have called to Medical Advice line and 25 (33.3%) have called their general practitioner.

74,6% Ambulance doctors regard that most of hypertension patients call for Emergency help unreasonable, but so do only 5 out of 27 general practitioners; 20 out of 27 general practitioners regard that most of those patients actually need urgent medical help.

Conclusions

Most of patients who call for an Emergency medical help already have medications for hypertensive crisis management and only few of them in case of hypertensive crisis call for a medical consultation.

Peculiarities of biomechanical behavior of human varicose veins

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Objectives

Endovenous surgery nowadays is a common practice, leaving vascular surgeons in selected cases (radical venous surgery in patients with peripheral and coronary occlusive disease) with no venous grafts for possible future arterial bypass surgery. The aim of this study was to investigate the biomechanical properties of human varicose veins, and provide recommendations for the extent of future venous surgery.

Materials and Methods

Taking into considerations many variables, patients were divided according to duplex ultrasonography data into three main groups (sever venous reflux > 2 seconds, group A; moderate venous reflux < 2 seconds, group B, and control group, no reflux, group C). Variants such as gender, vein location (above or below knee level), standing vein diameter and, disease severity (according to Clinical, Etiological, Anatomical, and Pathophysiological (CEAP) classification) were registered.

At the laboratory, a special experimental load-standing bench with a video camera connected to a computer measured venous internal pressure, and external diameter. During the experiments, vein samples were gradually loaded with saline solution (NaCl 0.9%), raising their internal pressure from 0 to 200 mmHg while maintaining the length of vein specimens constant. Venous internal pressure was increased gradually by 20 mmHg increments, holding it constant at each step for 1 minute. Vein specimens, thus, stretched at their *in situ* length. Stress, strain and incremental modulus of elasticity in venous wall calculated at each experimental point.

Results

Results show that stress – strain relationship is non-linear. Venous diameter increases rapidly until internal pressure reaches 40 mmHg, and any further increase in internal pressure leads to an increase in vein wall stiffness and modulus of elasticity.

Conclusions

Further evaluation of biomechanical properties of varicose vein segments and comparison of these properties with the properties of arterial specimens will assess the possibility of using multiple vein segments at least sutured end-to-end as arterial bypass grafts.

Performance of the American Heart Association 14-point evaluation versus electrocardiography for the cardiovascular screening of university's volleyball teams players in Latvia

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Objectives

The objective was to perform cardiovascular screening for volleyball teams of universities in Latvia and compare the American Heart Association (AHA) 14-point evaluation and resting 12-lead electrocardiogram (ECG) methods.

Materials and Methods

A prospective study was where volleyball athletes from universities of Latvia participated in cardiovascular screening using the AHA 14-point evaluation method and a resting 12-lead ECG. Research takes place from November 2019 till March 2020 in each university sports club facility. Collected data were analyzed with SPSS 23 using descriptive and inferential statistic methods (binary classification test).

Results

154 athletes participated in this research. 21 (13.6%) athletes needed further evaluation after resting 12-lead ECG screening. 100 (64.9%) athletes were found to have at least one physiological change in their resting 12-lead ECG. The most frequent physiological change was left ventricular hypertrophy - 66 (42.9%) athletes, incomplete right bundle branch block - 49 (31.8%) athletes, resting bradycardia - 34 (22.1%) athletes. Abnormal ECG findings were found for 11 (7.1%) athletes, most frequent were T wave inversion for 8 (5.2%), long QT interval for 2 (1.3%) athletes, and premature ventricular contractions for 2 (1.3%) athletes. Borderline ECG findings were found for 24 (15.6%) athletes, from which 4 (2.6%) had 2 borderline findings and 6 (3.9%) had cardiovascular symptoms or have a positive family history of inherited cardiac disease or sudden cardiac death. 121 (78.5%) volleyball players answered positively to at least one question in the AHA 14-point evaluation survey. The sensitivity of the AHA 14-point evaluation compared to resting 12-lead ECG with abnormal findings was 90.5% (69.7%-98.8%(CI95%)), specificity – 24.8% (17.7%-33% (CI95%))

Conclusions

The AHA 14-point evaluation has high sensitivity but low specificity compared to resting 12-lead ECG with abnormal findings, which lead to many false-positive results. Further research is needed to find a more specific question-based screening method for the Latvian athlete population.

Right ventricular myocardial infarction: it's incidence, clinical, laboratory, ECG and ECHO characteristics

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Objectives

RV involvement in the infarct increases the risk of hemodynamic collapse; thus, early recognition of RVMI is essential to guide the correct early treatment. Left-sided ECG and difficulties in visualizing RV free wall by ECHO make it's recognition challenging. Early mechanical reperfusion of affected vessels, adequate fluid replacement and maintaining sufficient heart rate and atrioventricular synchrony are essential in treating RVMI, especially when concomitant cardiogenic shock is present.

This study aims to evaluate the incidence of RVMI among STEMI patients, analyze typical characteristics of RVMI by ECG, ECHO, and laboratory values, and to study the incidence of complications arising from the RVMI.

Materials and Methods

Fist 100 patients who were diagnosed with STEMI from the start of the year 2018 (data was collected 2.1-15.12.2018) in Riga East Clinical Hospital with wide laboratory investigations, ECHO and PCI done were screened. Out of the 100 patients, all cases of the RVMI were identified from ECHO results and enrolled in this retrospective quantitative observational study. RVMI incidence, ECG, ECHO characteristics and laboratory values of RVMI were analyzed.

Results

In the study group 25 % (25/100) of STEMI patients had signs of RV systolic dysfunction in ECHO, from them 24 (96%) patients were discharged from hospital, 1 (4%) patient died. Mean ranks of ALT, AST were higher and GFR was lower in case TAPSE (tricuspid anulus plane systolic excursion) was decreased. Heart rhythm and conduction disturbances were found in 18 (72%) of RVMI patients. Standard 12-lead ECG did not show any signs indicatory for RVMI in 39% of RVMI cases.

Conclusions

RVMI incidence was high in the study group. Kidney and liver function laboratory values worsening may suggest RV systolic function decrease. Standard 12-lead ECG has low efficacy in the diagnostics of RVMI. Implementation of extended ECG with right precordial leads recording is necessary for RVMI early diagnostics improvement.

Satisfactory outcome of the complicated STABILISE technique for type B aortic dissection – a one year follow up

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Acute Stanford type B aortic dissection (TBD) is emergency requiring treatment of complications: impending rupture, dilatation, pain, hypertension and malperfusion of organs. Provisional extension to induce complete attachment (PETTICOAT) technique has shown good results, however, some perfusion of the false lumen is maintained and aorta still has a tendency to grow distally. Evolution of this technique is known as stent-assisted balloon-induced intimal disruption and relamination (STABILISE). In the present case we would like to report one year follow up of STABILISE complicated aortic dissection repair.

A 46 year old hypertensive male presented to the emergency department with thoracoabdominal back pain. Computed tomography angiography (CTA) confirmed TBD with entry tear located distal to the a. subclavia sin. Dissection extended to the aortic bifurcation. A. iliaca com. dx. was thrombosed by dissection flap (asymptomatic). Left renal artery emerged from the false lumen. Dissection flap extended in a. mesenterica superior and truncus coeliacus.

STABILISE technique was performed, consisting of true lumen (TL) catheterization. Stent graft was deployed with proximal landing to cover the primary entry tear and a subclavia sin. Two dissection stents were deployed. A balloon was used to sequentially dilate the stents. Covered stent was deployed in a proximal part of a. mesenterica superior. The completion angiogram confirmed adequate sealing and complete realignment of the aorta with TL patency. A. renalis sin was occluded and a. iliaca dx lumen completely reestablished. One year follow up CTA revealed abdominal aorta distal tear in uncovered sent part which is going to be closed by covered stent. In our case, one year follow up demonstrated complete aortic remodeling, no aortic enlargement, thrombosed false lumen and good visceral organ perfusion. This case adds to the knowledge that the STABILISE technique is a valid endovascular alternative in treatment of emergent complicated aortic dissections.

Significance of genetic testing in personalized approach of dilated cardiomyopathy: case report

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35 years old male presented to a cardiology department due to an episode of dyspnea. He denied any chest pain, palpitations or syncope. Previous medical history was unremarkable. However, his niece died suddenly at the age of five years. She was diagnosed with dilated cardiomyopathy (DCM) since she was three months. Patient's mother died during pregnancy at the age of 33 due to unclear reason. No genetic analysis or family screening was performed.

Patient underwent comprehensive investigation. Echocardiography showed dilation of left ventricle (LV EDD 82-88 mm) and atrium (LAVI 50 ml/m²) with diffuse hypokinesia and severely reduced ejection fraction (EF 20%). Coronary angiography revealed no stenotic lesions. Cardiac magnetic resonance imaging showed LV dilation, diffuse hypokinesia, reduced EF (18%) and increased extracellular volume (ECV 36%). Frequent polymorphic premature ventricular complexes (150-200 per hour) and 7 episodes of short non-sustained ventricular tachycardia (NSVT) were recorded during 24-hour Holter monitoring. Based on investigation and family history diagnosis of hereditary DCM was made. Due to high suspicion of genetic aetiology, next generation sequencing of comprehensive cardiology panel (217 genes) and mitochondrial genome was performed. Test revealed likely pathogenic variant *TTN* c.82240C>T, p.(Arg27414*) and variant of uncertain significance in *TPM1* c.725C>T, p.(Ala242Val). *TPM1* variant is considered to be causative as well, but segregation analysis of the family is needed. It is established that presence of more than one pathogenic or likely pathogenic variants in DCM carries higher risk of sudden cardiac death (SCD). Taking into account presence of NSVT and high-risk genetic background, patient underwent implantation of cardioverter-defibrillator for primary prevention of SCD. Cascade screening of the family is ongoing. This clinical case shows a rare case of DCM in a patient with two causative genetic variants as well as importance of genetic testing in personalized management of inherited cardiomyopathies.

Statin use in outpatient period after primary percutaneous coronary intervention for acute coronary syndrome

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Objectives

Secondary prevention of cardiovascular events is very important in reducing morbidity and mortality in patients after ACS. Studies have shown the effectiveness of pharmacotherapy in improving patient prognosis. According to many published studies, up to 40-75% of patients after ACS do not receive adequate pharmacotherapy in the outpatient period, which is increasing risk of mortality and re-hospitalization. The objective of the study is to analyze statin use in outpatient period after primary percutaneous coronary intervention (PCI) due to acute coronary syndrome (ACS).

Materials and Methods

In a cross-sectional observational study 28 patients were examined after primary PCI for ACS. The average duration of the study was 7 months. Study patients completed face-to-face and telephone survey to obtain data of statin use and serum LDLH levels.

Results

All study patients received recommendations for statin use at the moment of discharge from a hospital. At the moment of the survey only 21 patients (75%) had correct statin therapy. One patient used statin 2 times a week. Three patients used inappropriately low statin dose. One patient had double medication. LDLH target level <1.4 mmol/L was reached in 2 patients of 7.

Conclusions

Statin use for secondary prevention of cardiovascular events in outpatient period after ACS is not sufficient in the study patients, which was reflected in failure to achieve target LDLH values. The most common treatment errors are underuse of medications, incorrect medication dose and double medication.

Ten-year experience of percutaneous transcatheter left atrial appendage occlusion, procedural success and safety. Data from Latvian Centre of Cardiology during 2010–2020

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Objectives

Stroke is second leading cause of mortality worldwide. Cardioembolic stroke account for 20–30% of ischaemic strokes. Atrial fibrillation (AF) comprises a fivefold increased risk for ischemic stroke. Treatment with oral anticoagulation (OAC) significantly reduce stroke in patients with AF, however up to 12% of patients have contraindications for oral anticoagulant use. Left atrial appendage occlusion (LAAO) is a non-pharmacological method to prevent cardioembolic stroke in patients with AF and contraindications for long-term oral anticoagulant use.

Materials and Methods

Data analysis on all LAAO procedures performed at the Latvian Centre of Cardiology (LCC) from May 2010 to October 2020 was collected using LCC registry of LAAO procedures.

Results

A total of 74 LAAO procedures were performed during years 2010-2020. Patients aged 72 ± 7 years, 63% (n=46) were woman. CHA₂DS₂-VAsc score was 5.6 ± 1.7 and HAS-BLED score 3.0 ± 1.1 . A total 48% (n= 36) had a prior bleeding 42% (n=15) of which gastrointestinal bleeding makes up 21% (n=15). Noncompliance to OAC use composed 18% (n=13) and recurrent stroke 14% (n=10). Device used for majority of cases was *Amplatzer Amulet*® 55% (n=41). *Amplatzer*® cardiac plug used in 26% (n=19) and *Watchman*® device 20% (n=15). Implant success rate was 96% (n=72, p= <0.05) Major in-hospital adverse events including stroke, death, myocardial infarction, pulmonary embolism or significant bleeding did not occur. Minor bleeding was detected in 2.8% (n=2) and vascular access complications was seen in 8% (n=6). Device embolization occurred in 4% (n=3).

Conclusions

Our ten-year experience performing LAAO has showed high success rate, which coincides with other studies. CHA₂DS₂-VAsc score in our study was generally higher and major in-hospital adverse event rate compared to other studies was lower, except device embolization rate 4% (n=3). LAAO is a safe procedure with low complication rate.

The effectiveness of out-of-hospital resuscitation and the factors influencing it

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Objectives

Sudden cardiac arrest or sudden cardiac death is one of the leading causes of death all over the world. The objectives of the study were to research effectiveness and influencing factors of resuscitation in prehospital stage and create suggestions and methodical recommendations as possible. In order to help these people and improve their chances of survival, it is necessary to provide assistance as soon as possible. Bystanders are usually non-medical persons why it is more complicated to implement.

Materials and Methods

A retrospective study was developed, which summarizes and analyzes the electronic call cards (IEK) of the Emergency Medical service of Latvia (EMS) for 2018 and 2019. IEK were selected that identified "successful resuscitation" and "unsuccessful resuscitation" as a complication of diagnosis (classification developed and validated by EMS of Latvia).

Results

Overall 2538 resuscitations were performed, of which 27,6% were successful resuscitation. About a quarter (24,2%) of all resuscitations happened in a public place. The increase in the number of successful resuscitations is observed for resuscitation events that happened in public places. In most of cardiac arrest cases, bystanders did not perform CPR (60,3%). Arrival time of EMS in 2018 was 7,52 - 8,44 minutes and in 2019 was 7,75 - 8,23 minutes. The research shows that approximately 23% of cases the first monitored rhythm by EMS were VF/pVT. There is a significant difference in the increase in successful resuscitations if EMS performed defibrillation during the call.

Conclusions

The most important influencing factors in the outcome of resuscitation are the patient's age, the location, the first aid provided by bystanders, the time until the arrival of EMS and the first observed heart rhythm in a patient with cardiac arrest. It is necessary to create a national register of AED (automated external defibrillator), to ensure the availability of data to the EMS service and the public

The most serious complication of cardiac implantable electronic devices: two-decade experience

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Objectives

Cardiac implantable electronic devices (CIED) are well known for their ability to improve quality of life and survival of many patients around the world, despite all the benefits, there is a price to pay. Lead-related infective endocarditis (LRIE) is rare, but an exceptionally serious complication causing considerable harm and even patient death. The aim of this study was to find and analyze all LRIE cases during the last 20 years.

Materials and Methods

This retrospective study evaluated patients who were admitted to Pauls Stradins Clinical University Hospital due to LRIE in time period between January 2000 and December 2020. LRIE cases were found in the procedure journals from Latvian Centre of Cardiology.

Results

Sixty-five patients were found to have LRIE, with mean age of 63.8±16.7 years, 44 (67.7%) of them were male, 56 (86.2%) had a permanent pacemaker, 8 (12.3%) had cardiac resynchronization therapy devices and 1 (1.5%) had an implantable cardioverter-defibrillator. A total of 0.29% of all implantations resulted in LRIE. In 36 (55.4%) patients LRIE developed after reimplantation of CIED, and in 30 (46.2%) cases more than two years after last procedure. Fifty-five (84.6%) patients had visible lead vegetations during transthoracic or transesophageal echocardiography, 7 (11%) patients had heart valve involvement. Forty-eight (73.8%) patients had received antibacterial treatment before sample collection, 32 (49.2%) had positive blood cultures. Most commonly isolated pathogen was *S. aureus* (32.3%). Most common comorbidities were chronic heart failure (81.5%) and hypertension (63.1%). Surgical lead extraction was carried out in 43 (66.2%) patients, transvenous in 22 (33.8%), in all cases a complete and successful lead extraction was achieved. Nine (13.8%) patients died due to LRIE.

Conclusions

Highly experienced operators (nearly all with >300 CIED implantations per year) and certain preventive measures have resulted in a very low LRIE incidence at our centre.

The reality of antithrombotic therapy used to prevent ischemic stroke among elderly people

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Objectives

Ischemic stroke is a sudden brain damage that is caused by clogged blood vessels and it leads to disability. It can occur at any age, however, the risk is especially high among elderly people. Antithrombotic therapy can significantly reduce the risk of the ischemic stroke development, however, in reality elderly people receive it insufficiently. The aim of this study is to evaluate the frequency of antithrombotic treatment that is being given for elderly people in Latvia.

Materials and Methods

The prospective study included 51 patient ≥ 80 years who were hospitalized with an acute ischemic stroke in the Riga East Clinical university hospital 'Gaiļezers'. It was determined whether the patients have had a known atrial fibrillation before the hospitalization. Three months later a telephone interview was carried out in order to determine whether patients were receiving prescribed antithrombotic therapy.

Results

Before the hospitalization 21/51 (41%) patient had received prior antithrombotic therapy, 23/51 (45%) of them had not received antithrombotic therapy, but about 7/51 (14%) patients data were not available. Before the hospitalization there were 27/51 (53%) patients with a known atrial fibrillation, of whom 6/27 (22%) did not receive antithrombotic therapy, 16/27 (59%) received antiplatelet agents, and 5/27 (19%) - anticoagulants. At the time of discharge, 23/51 (45%) patients were advised to take antiplatelet agents (17/23 (74%) patients took them also after 3 months, 2/23 (9%) – did not take them, 4 (17%)– no data), 28 patients (55%) – anticoagulants (26/28 patients (93%) took them also after 3 months, but 2 patients (7%) took antiplatelet agents).

Conclusions

In order to prevent ischemic stroke, anticoagulant therapy is taken insufficiently by the patients who have known atrial fibrillation. For patients with known atrial fibrillation often is recommended improper antithrombotic therapy. Most patients receive the recommended antithrombotic therapy for 3 months after discharge.

The relationship between intraoperative hypotension and high sensitivity troponin T level in hip and knee replacement surgeries

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Objectives

Myocardial injury is diagnosed by changes in high sensitivity troponin T (hsTnT). It is hypothesized that the injury may be caused by intraoperative hypotension (IOH). The aim of the study was to investigate the correlation between intraoperative hypotension and changes in high sensitivity troponin T levels.

Materials and Methods

Totally, 33 orthopedic patients, 25 female, 8 male, with average age 67 ± 8.4 years were included in prospective observational study, 36.4% had hip replacement surgery (n=12) and 63.3% had knee replacement surgery (n=21). Routine medication, co – morbidities, ECG changes were obtained. HsTnT was evaluated at two time points: T1 right before the surgery and T2 - on the first postoperative day. IOH was defined as MAP ≤ 65 mm/Hg that lasts at least five minutes. Significantly increased hsTnT level was defined as ≥ 14 ng/L or $> 20\%$ from T1 measurement if it was ≥ 14 ng/L.

Results

Results from 33 patients demonstrates significantly increased levels of hsTnT postoperatively in 24.2%. The average surgery time for knee replacement was 84 ± 25.9 minutes and for hip replacement was 79 ± 23.6 minutes without intergroup difference. Mean hsTnT level at T1 was 10.3 ng/L and at T2 12.62 ng/L without significant difference (p = 0.89). Eight patients had increased hsTnT at T2 by 56,7 % compared to T1. There was no association between surgery type and hsTnT elevation. Elevated hsTnT levels postoperatively were found in 21.4% for those with IOH compared to 26.3% in those without IOH, p = 0.72. No cardiovascular emergencies were detected in postoperative period. There was not found significant correlation between IOH and postoperative hsTnT changes (p=0.77).

Conclusions

After joint replacement surgery elevated hsTnT levels were found in both groups of patients with and without intraoperative hypotension. Intraoperative hypotension seems not to affect changes in hsTnT levels after joint replacement surgeries.

Women with atrial fibrillation diagnostic of peripheral arterial disease with noninvasive methods

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Objectives

Peripheral artery disease (PAD) is described as systemic atherosclerosis induced lesion of main organism arteries, except heart and brain arteries, which are associated with increased cardiovascular morbidity and mortality. Early diagnostic of PAD is important, cause more than half patients have no symptoms. The aim was to compare non-invasive PAD diagnostic methods in patients with atrial fibrillation and to evaluate their sensitivity and specificity.

Materials and Methods

A prospective follow-up study was performed over a 4-year period, in which 352 patients with cardiovascular disease were examined by non-invasive PAD diagnostic methods – ankle-brachial index and impedance plethysmography. These two tests were compared these and the relationship between the results of tests and chronic atrial fibrillation was evaluated.

Results

78 (44,1%) women were diagnosed with peripheral arterial disease, 25 (33,3%) of them had no symptoms. The mean value of ABI in group with AF was 0,83 (\pm 0,28), while the mean value of ABI in group of women without this arrhythmia was 0,97 (\pm 0,28) ($p < 0,001$). There was a statistically significant ($p < 0,001$) decrease of ABI in the group of women older than 69 years – 0,87 (\pm 0,30) compared to ABI 1,07 (\pm 0,23) in women younger than 69 years. A statistically significant correlation was found between the decreased ABI and the prolongation of crest time (CT) - parameter used in impedance plethysmography - correlation coefficient $r = -0,683$, $p < 0,001$.

Conclusions

There was a statistically significant reduction of ABI in the group of women with chronic AF compared to the sinus rhythm group. A statistically significant correlation was found between the parameters of impedance plethysmography and ABI – while ABI decreases the crest time increases; while ABI increases, alternating blood flow increases also. Impedance plethysmography with a sensitivity of 73% and a specificity of 96% is a possible alternative diagnostic test for PAD.

Metabolic and Endocrine Diseases

Adrenal surgery: single center 10+10 years experience

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Objectives

Aim of this study is to compare two decade data of adrenal surgery - before and after multidisciplinary team meetings (MDT) were implemented in daily practice.

Materials and Methods

Retrospective 252 patients' data who underwent adrenalectomy in Pauls Stradins Clinical university hospital were analysed regarding surgery type, time, morphology, perioperative complications. Differences between period prior and after MDT meetings were implemented (2009) in adrenal management were estimated.

Results

Mean patient age was 54.8 (19-83) years, predominantly female - 186 (73.8%) vs 66 (26.2%) male. Indications for adrenalectomy were in first and second decade respectively: hormonally active tumors 32 (25.4%) vs 69 (54.8%), hormonally inactive - 89 (70.6%) vs 47 (37.3%) and malignancy 5 (4.0%) vs 10 (7.9%). Laparoscopic adrenalectomy (LA) was method of choice performed in 202 (80.2%) cases, open (OA) in 41 (16.2%) cases, 9 (3.6%) operations were converted (CA). LA prevalence tend to increase over last decade - 92 (73.0%) vs 110 (87.3%) but CA to decrease - 6 (4.8%) vs 3 (2.4%). Mean operation time has decreased - 112±42 vs 88±26 min. Morphology revealed 141 (56.0%) adrenocortical adenoma, 37 (15.1%) benign pheochromocytomas, 13 (5.3%) malignant pheochromocytomas, 12 (4.9%) Mts, 11 (4.4%) ACC and 38 (12.3%) cases of various other rare pathologies. Malignancy rate tend to increase - 8 (6.4%) in the first decade vs 28 (22.2%) in second. Perioperative complication rate decreased from 16 (12.7%) to 11 (8.7%).

Conclusions

Adrenal surgery outcome and perioperative complications are associated with learning curve and experience. MDT meetings are highly recommended to select patients for surgery.

Analysis of selenium intake score and its affecting factors in young adults

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Objectives

Autoimmune thyroid disease (ATD) is the most common organ-specific autoimmune disease clinically manifested as thyroid dysfunction. The two most common ATDs are Graves' Disease and Hashimoto Thyroiditis. It is estimated that 70-80% of the development of ATDs is determined by genetic factors and 20-30% by environmental factors. Selenium is a trace mineral found naturally in foods, and most of human selenium pool is stored in the thyroid gland (0.2–2 µg Selenium per 1 tissue gram). Dietary selenium deficiency is thought to contribute to the development of ATDs. We aimed to evaluate selenium intake affecting factors.

Materials and Methods

All 89 subjects filled a food frequency questionnaire (FFQ) and gave samples for biochemical tests. We analyzed selenium intake and calculated Selenium Intake Score (SIS). Results are shown as median (Interquartile range).

Results

Median age 30.5 years (26.0-46.0). There was a trend of higher age associated with higher SIS: $\rho=0.18$, $p=0.098$. Subjects aged 30 and above had significantly higher SIS as compared to younger subjects from pork ($p=0.003$), fish ($p=0.021$), rye bread ($p=0.023$) and caffeine drinks ($p=0.033$).

The total number of smokers was 31 (35%), and this group had a significantly lower SIS than non-smokers ($p=0.007$). Higher number of cigarette pack-years correlated with lower SIS: $\rho=-0.285$, $p=0.007$. Non-smokers had showed significantly higher SIS as compared to current smokers from these food groups: curd ($p=0.009$), cheese ($p=0.012$), fish/shrimp ($p<0.005$), rye bread ($p=0.001$), vegetables ($p=0.043$), fruit ($p=0.022$) and Brazil nuts ($p=0.004$).

Conclusions

Food frequency questionnaire revealed higher selenium intake in non-smokers in comparison to smokers, particularly, with lower SIS seen in participants with higher numbers of pack-years. In addition, an increase in SIS with age (above 30 years) was observed- pork, fish, and rye bread were the main contributing products for higher SIS.

This study was supported by the Latvian Council of Science (Grant No: lzp-2018/2-0059).

Association between physical fitness, cardiovascular health risk factors and glycemic control in people with type 2 diabetes

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Objectives

Evaluate the relationship between cardiovascular health risk factors and glycemic control outcomes in people with type 2 diabetes.

Materials and Methods

56 subjects (females 37 and males 19), mean age 59.1 (\pm 9.3) years with T2DM history of 7.1 (\pm 5.2) years were recruited by contacting the local doctors.

Results

Physical fitness related outcomes indicated that 48.6% reported good physical activity level ($>$ 3000 METmin/week), and 75% presented satisfactory exercise tolerance during cardiac exercise stress test. The mean results for waist-to-hip ratio and BMI was 0.95 ± 0.08 cm and 37.2 ± 5.0 , respectively. The mean outcome of VO₂ peak was 21.9 ± 5.2 mL/min/kg. There was a significant difference between genders in achieved %max HR during cardiac exercise stress test ($p < 0.05$) and relative VO₂ peak ($p < 0.05$).

Cardiovascular risk assessment outcomes indicated that mean of the ST/heart rate index was 0.71 ± 0.58 and Robinson index was 241 ± 47.6 . The mean of total cholesterol was 5.2 ± 1.1 mmol/L. Glycemic control mean outcomes were HbA_{1c} $6.8 \pm 1.2\%$, fasting glucose 7.4 ± 2.5 mmol/L and HOMA index 4.86 ± 3.7 . Relationship analyses presented moderate correlation between VO₂ peak relative and duration of cardiac exercise stress test ($r = 0.51$; $p < 0.05$).

Conclusions

Findings of this study indicated that patients with T2D have a reduced physical fitness due to high BMI, low cardiovascular level and increased glycemic control scores. The higher relative VO₂ peak the longer duration of cardiac exercise stress test. LU Foundation SIA «Mikrotikls» MikroTik (project nr.2189)

Association of multiple single nucleotide polymorphisms and autoimmune thyroid disease

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Objectives

Autoimmune thyroid diseases (AITD) are common and affect up to 5% of the general population. AITD are represented by Graves' disease (GD) and Hashimoto's thyroiditis (HT) and are multifactorial. It arises from an interplay of genetic, environmental, and immunologic triggers. Thyroid Stimulating Hormone Receptor (TSHR) and Thyroglobulin (Tg) coding genes in chromosomes 14 and 8, respectively, have been described in association with AITD.

Aim: to detect thyroglobulin (Tg) and TSHR gene polymorphisms and to study their association with autoimmune thyroid disease (AITD).

Materials and Methods

A total of 1001 subjects were included in a cross-sectional study. They were divided into 3 groups: GD Group, HT Group, and a Control Group. Subjects were diagnosed with AITD based upon laboratory examinations that confirmed thyroid autoimmunity as well as functional disturbances. DNA samples were genotyped using Infinum Global Screening Array, Affymetrix Axiom Genome-Wide, Human EU un OmniExpressExome BeadChips. Association analysis was performed by using PLINK 2.9 and SAIGE.

Results

The most significant single nucleotide polymorphism (SNP) associations with AITD in the TSHR gene were rs60227643 (OR=24.13 (95% CI 4.75-122.5), p=0.0001235) and rs144801375 (OR=5.09 (95% CI 2.15-12.05), p=0.0002126). The most significant SNP associations with AITD in the Tg gene were rs2687828 (OR=1.48 (95% CI 1.21-1.81), p=0.000142) and rs2687825 (OR=1.46 (95% CI 1.19-1.79), p= 0.0002106).

Conclusions

Tg gene SNPs - rs2687828 and rs2687825 - correlated with GD and HT. We found a previously undescribed strong association of TSHR gene SNPs rs60227643 and rs144801375 and susceptibility for AITD.

This study was supported by the Latvian Council of Science (Grant No: lzp-2018/2-0059).

Central diabetes insipidus as an early manifestation of Erdheim–Chester disease: case report

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Erdheim–Chester disease is a rare form of non-Langerhans cell histiocytosis characterized by excessive production of histiocytes. Multiple organs involved and various manifestations are observed in patients with this disease. The aim of this clinical case report is to demonstrate a case of diabetes insipidus which was the first sign of Erdheim–Chester disease.

The patient is a 41-year-old man who was admitted to Pauls Stradiņš Clinical University Hospital due to polydipsia (the patient had drunk about 10 litres of water a day) and polyuria. Biochemical urine test showed low urine osmolality (76 mOsmol/kg). Urine osmolality was increased to 240 mOsmol/kg after administration of Desmopressin 0,1mg/ml intranasally during the water deprivation test and the diagnosis of central diabetes insipidus was established. Pituitary magnetic resonance imaging revealed low signal in the neurohypophysis without any other pathological findings. The treatment with Desmopressin was initiated. Also, the patients had complaints of subfebrile temperature and inflammatory markers were elevated, so computed tomography of lungs was performed. It did not reveal pneumonia, however there were unusual changes in the perinephric region, and computed tomography of the abdomen was carried out, which showed uroastasis and perirenal masses bilaterally – the changes that are typical for Erdheim–Chester disease. Also, magnetic resonance imaging of the heart and bone scintigraphy showed characteristic findings of Erdheim–Chester disease. After histopathological examination of the renal biopsy specimen, histiocytic infiltrate and positive BRAF mutation in perirenal tissue was revealed. Due to involvement of various organs (heart, bone, kidneys) and development of diabetes insipidus, the specific therapy with BRAF-kinase inhibitor Vemurafenib 480 mg 2 times a day was indicated.

In conclusion, although Erdheim–Chester disease rarely occurs, the knowledge of the pathogenesis of it is necessary to start specific therapy as soon as possible to stop disease progression.

Consumption of nonnutritive sweeteners and sweetened beverages and healthy lifestyle habits in young adults' population

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Objectives

As one of the habits of a healthy lifestyle is to reduce the fast sugars in our meals, the supply of nonnutritive sweeteners in the food supply has increased by offering sweeter meals without extra calories.

The aim of study was to explore the characteristics of young adults' lifestyle habits and consumption of non-nutritive sweeteners.

Materials and Methods

A cross-sectional population study was carried out on social media including 303 respondents aged 19-30. A voluntary anonymous questionnaire about their anthropometric data, lifestyle, eating and physical activities habits was conducted. Data was statistically analyzed by Microsoft Excel 2010, SPSS program version 19.0 software for Windows and RStudio IDE 1.3.

Results

21.12 % of respondents were overweight or obesity (BMI>85th perc.). 67.33% of respondents eat less fruits and vegetables than WHO recommended 5 portions of fruits and vegetables per day (Normal weight =64.32%, Overweight= 75%)

27.7% of respondents add extra sugar to tea or coffee, only 3.3% of respondents add nonnutritive sweeteners in daily use. 12.5% of respondents use natural sweetener stevia.

51.20 % of respondents drink at least 250ml of sweetened beverages per day (men more than women $p = 0.00187$). Overweight adults drink more sweetened beverages than those with normal weight ($p = 0.0194$). Most popular sweetened beverage is fruit juice (40% drink once per month, men>women, $p=0.02$), but the least popular is *CocaCola Zero*(70.3% never drink $p=0.0132$). Overweight people drink more *CocaColaZero* than adults with normal weight ($p=0.009$).

36.9% of adults do physical activities at the level that WHO recommends for prevention of noncommunicable diseases. Men are more physical active than women $p=0.03$.

Conclusions

Young adults choose more sugar sweetened meals than nonnutritive sweetened. Being overweight correlates with the consumption of nonnutritive sweeteners, the consumption of fruits and vegetables as well as the level of physical activities.

How to clinically differentiate pancreatogenic diabetes mellitus from type 1 and type 2 diabetes mellitus?

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Objectives

To detect clinical signs that help to differentiate pancreatogenic diabetes mellitus (PDM) from type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM).

Materials and Methods

Retrospective study was performed, including 90 patients randomly selected from 1087 patients who had been treated in departments of endocrinology, gastroenterology and surgery at the Pauls Stradiņš Clinical University Hospital for period 2018-2019. Among selected patients 30 patients were with T1DM, 30 - with T2DM and 30 - with PDM. The types of diabetes mellitus (DM) were compared according to the patients' gender, age and laboratory tests – C-peptide, glycated haemoglobin (HbA1C) and C-reactive protein (CRP).

Results

The study revealed statistically significant difference comparing the types of DM according to the gender – 29 men and 1 woman were with PDM, 15 men and 15 women were with T1DM, 9 men and 21 women were with T2DM ($p < 0.001$). The average age of the patients with PDM, T1DM and T2DM was significantly different - 51 years vs 32 years vs 67 years, respectively ($p < 0.001$). Also, there was statistically significant difference comparing mean C-peptide level - 0.37 ng/ml vs 0.14 ng/ml vs 1.74 ng/ml, respectively ($p < 0.001$). However, HbA1c level was not significantly different - HbA1C was 10.7% in T1DM patients, 10% - in T2DM patients and 9.9% - in PDM patients ($p = 0.301$). Statistically significant difference was observed comparing mean CRP between PDM, T1DM and T2DM - 22.38 mg/L vs 5.75 mg/L vs 10.39 mg/L, respectively ($p = 0.04$).

Conclusions

In the study we observed that PDM predominantly affects the male gender, the average age of patients was 51 years, the mean C-peptide level was 0.4 ng/ml and the mean CRP level was 22.4 mg/L. C-peptide and CRP levels as well as the gender and age of patients may help to differentiate PDM from T1DM and T2DM.

Landscape of circulating miRNAs in plasma from bilateral inferior petrosal sinus sampling of corticotroph pituitary neuroendocrine tumor

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Objectives

Circulating micro RNAs (miRNAs) are found in bodily fluids including plasma and can serve as biomarkers for diseases. Studies on the pituitary neuroendocrine tumor (PitNET) derived circulating miRNAs are scarce due to rarity of the disease with clinical manifestations, tumor volume and mass, and miRNA dilution in blood. The objective of this study was to characterize circulating miRNAs from bilateral inferior petrosal sinus sampling (BIPSS), a gold standard in detecting adrenocorticotrophic hormone (ACTH) secreting PitNETs.

Materials and Methods

BIPSS blood for miRNA next-generation sequencing was collected in three time points: before the stimulation by corticotropin-releasing hormone (CRH), 5 minutes after CRH, 15 minutes after CRH. Peripheral venous blood (PVB) samples were collected 24 hours before BIPSS and after BIPSS. At the resection of PitNET PVB samples were taken before and 24 hours after the resection. Plasma was separated and RNA was extracted. Before the library preparation, the quality of RNA was evaluated using qPCR.

Results

The highest amount of ACTH was released in the sinistral blood between the 3rd and the 5th minute (664.5 pg/ml) confirming the presence of ACTH-secreting PitNET. We compared the composition of sinistral plasma miRNAs with dextral and evaluated the results against the plasma miRNAs from PVB. During the 5th minute mark, we observed the highest number of differentially expressed miRNAs (20 upregulated, 14 downregulated). We identified two miRNAs that were highly expressed within sinistral plasma at the 5th minute compared to other BIPSS and PVB samples: hsa-miR-7-5p and hsa-miR-375-3p. The hsa-miR-375-3p was also upregulated within PVB 24 hours after BIPSS.

Conclusions

This study provides the first insight of circulating miRNAs that are most likely produced by ACTH-secreting PitNET. The results indicate that the release of ACTH is accompanied by the release of two miRNAs: hsa-miR-7-5p and hsa-miR-375-3p. Further studies of these miRNA as biomarkers of ACTH-secreting PitNET are needed.

Long-chain acylcarnitines: from mitochondrial metabolism to clinical applications

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Properly functioning mitochondria are critical for sufficient ATP production in every cell. A lower number, inadequate performance and damaged membranes of mitochondria result in various diseases. Carnitine palmitoyltransferase 1 (CPT 1)-mediated long-chain acylcarnitine synthesis is a step in mitochondrial fatty acid (FA) oxidation. Various mitochondrial disorders are characterized by incomplete FA oxidation and following accumulation of long-chain acylcarnitines. In this case, the highest concentrations of long-chain acylcarnitines are found in the mitochondrial inner membrane and the intermembrane space. In cardiac mitochondria, long-chain acylcarnitines inhibit pyruvate and lactate metabolism even at physiological concentrations. At elevated levels, the accumulation of long-chain acylcarnitines inhibits OXPHOS, inducing mitochondrial membrane hyperpolarization, and stimulating production of reactive oxygen species. Thus, the high mitochondrial content of long-chain acylcarnitines could increase the risk of mitochondrial and cardiac damage, particularly in conditions of cardiac ischemia.

Decreased long-chain acylcarnitine synthesis has been confirmed as a promising approach in various disease models including myocardial infarction, atherosclerosis, and insulin resistance. In recent studies, a pharmacological decrease of long-chain acylcarnitines is studied in models of cardiometabolic diseases, inherited disorders, cancer, endotoxemia- and pulmonary hypertrophy-induced cardiac damage opening new horizons for long-chain acylcarnitine-lowering and mitochondria-protective strategies.

Long-chain acylcarnitine measurements in the fasted state are appropriate for the assessment of mitochondrial function, while insulin resistance can be detected only in the postprandial state after a controlled glucose load. In a recent study, we tested whether a decrease in circulating long-chain acylcarnitine concentrations after glucose administration in a glucose tolerance test is associated with insulin sensitivity and can be used for the diagnosis of insulin resistance. We found that contrary to short-chain and medium-chain acylcarnitines, the measurements of changes in plasma long-chain acylcarnitine concentrations after glucose load in fasted subjects are useful as diagnostic markers for heart and muscle-specific insulin resistance in clinics.

Metformin decreases the plasma concentration of pro-atherogenic metabolite trimethylamine N-oxide in an experimental model of type 2 diabetes

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Objectives

Increased plasma levels of trimethylamine N-oxide (TMAO), a gut microbiota-derived metabolite, are associated with higher cardiovascular risk and incidence of diabetes in clinical studies. Metformin is the most widely prescribed type 2 diabetes drug, but its effects on the turnover of TMAO in the organism have not been evaluated. This study aimed to investigate the effects of metformin *in vitro* on the microbial metabolism of choline, a dietary precursor of TMAO, and plasma TMAO levels *in vivo* in an experimental model of diabetes.

Materials and Methods

Metformin was administered to diabetic db/db mice and age-matched nondiabetic controls at a dose of 250 mg/kg for up to 8 weeks. Mice were fed either standard chow or choline-enriched diet that mimics meat and dairy product intake. Subsequent plasma sampling was carried out, faecal samples were collected from choline-supplemented mice. Moreover, the effects of metformin on bacterial growth and the production of TMAO precursor trimethylamine (TMA) *in vitro* were studied. Quantification of TMA, TMAO, and choline in the collected samples was performed by UPLC/MS/MS.

Results

Diabetic mice presented 10-13 times higher plasma TMAO concentrations than nondiabetic mice. The administration of metformin resulted in a twofold decrease in TMAO levels compared to db/db control mice. Metformin selectively affected the growth of various bacterial genera and significantly decreased the production of TMA by gut bacteria *in vitro*. When choline was administered to facilitate microbiota-dependent TMA/TMAO production *in vivo*, metformin decreased plasma TMAO by ~50%.

Conclusions

Our data provide evidence that metformin suppresses bacterial TMA production and significantly decreases TMAO levels in db/db mice. These data support the hypothesis of TMAO as a metabolic disease risk marker and warrant further investigation of TMAO for diabetes research applications.

Acknowledgement: Latvian Council of Science project "Trimethylamine-N-oxide as a link between unhealthy diet and cardiometabolic risks" No. Izp-2018/1-0081.

Patients with Grave's disease exhibit higher plasma concentrations of acylcarnitines and non-esterified fatty acids

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Objectives

Acylcarnitines(ACs) are fatty acid metabolites formed from free carnitine and acyl-coenzyme A for the transport of fatty acids across the inner mitochondrial membrane and beta-oxidation. The important pathological consequences of metabolism disorders arise from the detrimental effects of accumulated long-chain fatty acids and their respective ACs. We aimed to evaluate AC and non-esterified fatty acid(NEFA) levels in patients with Grave's disease compared to an age and sex-matched control group.

Materials and Methods

In a cross-sectional study, 23 subjects(4 men, 19 women) were enrolled. They were divided into 2 groups:Group 1–control group and group 2 - patients with Grave's disease. Biochemical samples were collected to assess the thyroid status. NEFA and AC levels were measured in plasma samples. Data were processed using IBM SPSS statistical analysis.

Results

Eleven study participants were diagnosed with Grave's disease (Group 2) and 12 were in the control group(Group 1). Mean age of participants was 41.25 years(SD 13.07;min 26, max 69) in Group 1 and 44.36 years(SD 16.16;min 28,max 72) in Group 2. Mean level of NEFA in Group 1 was 0.55 mM(SEM 0.07) and 0.74 mM(SEM 0.09) in Group 2(t-test p=0.12).Mean levels of short-chain AC concentrations were 13.0 μM(SEM 1812) in Group 1 and 20.7 μM(SEM 2497) in Group 2(t-test p=0.013). Mean medium-chain AC concentrations were 676 nM(SEM 80) in Group1, 1055 nM(SEM 134) in Group 2(t-test p=0.016), long-chain AC concentrations were 625 nM(SEM 66) in Group 1 and 921 nM(SEM 156) in Group 2(t-test p=0.067),respectively.

Conclusions

Significantly higher concentrations of short-chain and medium-chain AC levels were measured in patients with Grave's disease in comparison to healthy subjects. Also, a tendency of increased NEFA and long-chain AC concentrations were observed in case of Grave's disease, which might imply the pathogenesis of metabolic disorder in Grave's disease.

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Plasma selenium status in newly diagnosed Graves' disease and Hashimoto's thyroiditis patients: case-control study

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Objectives

Selenium status is an important marker of general population health. It has been hypothesized that nutritional selenium deficiency may trigger the development of thyroid autoimmunity. Furthermore, relatively low selenium levels have been found in patients with autoimmune thyroid diseases (AITD). Very little information is currently available on the selenium status in AITD in Latvia.

We aimed to assess selenium status in patients with newly diagnosed, treatment-naïve Graves' disease (GD) or Hashimoto's thyroiditis (HT).

Materials and Methods

Selenium status was assessed by measuring plasma selenium and selenoprotein P (SEPP) levels, and glutathione peroxidase (GPx) activity in the blood of 12 GD and 46 HT patients compared to 39 healthy subjects. GPx activity was determined by the methods of Paglia and Valentin. Plasma selenium level was determined using the Alfthan fluorimetric method, whereas SEPP levels were measured by ELISA. Results shown as median (interquartile range).

Results

Serum selenium level was 83.98 (68.22-111.59) µg/L in control group, 90.17 (66.03-119.94) µg/L in HT group, and 70.70 (58.86-104.40) µg/L in GD group (p=0.253). GPx level was 12962 (9350-14792) U/L in control group, 12827 (10191-15006) U/L in HT group, and 10571 (7526-13194) U/L in GD group (p=0.203). SEPP level was 6.41 (4.37-7.85) mg/L in control group, 6.92 (4.94-9.50) mg/L in HT group, and 5.79 (4.52-7.71) mg/L in GD group (p=0.750). No significant differences in selenium, SEPP or GPx levels were found among the studied groups. In GD patients, anti-TSHR antibody levels correlated significantly with GPx (rho=-0.718, p=0.013). In addition, we found that Se positively correlated with SEPP in HT patients (rho=0.392, p=0.007).

Conclusions

The selenium status of Latvian patients with new-onset GD or HT was at a suboptimal level – only 23.91% of the HT patients and 8.33% of the GD patients had optimal (>120µg/L) plasma selenium levels.

This study was supported by the Latvian Council of Science (Grant No: lzp-2018/2-0059).

Potential factors for predicting thyroid malignancy in cases of Bethesda system for reporting thyroid cytopathology III and IV nodules

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Objectives

Aim of study was to determine potential factors for predicting malignancy in patients with fine needle aspiration cytology (FNAC) results belonging to Bethesda system for reporting thyroid cytopathology (BSRTC) III and IV categories.

Materials and Methods

One hundred thirteen patients were included in study and divided into two groups regarding the extent of surgery: total thyroidectomy (TT) - 66 and hemithyroidectomy (HT) - 47 patients. A retrospective analysis of demographic parameters, indications for surgery, operation time, excised thyroid gland weight was performed to determine the differences in groups regarding final morphology - benign vs malignant.

Results

In TT group 35 (53%) patients had a benign and 31 (47%) a malignant lesion. Analyzed parameters of benign vs malignant groups included: age (55.1±12.6 vs 57.3±13.3, p=0.738), male gender (7 vs 5, p=0.521), compression symptoms (5 vs 1, p=0.110), exclusion of malignancy (28 vs 28, p=0.230), thyrotoxicosis (2 vs 2, p=0.920), operation time (125.9±27.7 vs 140.7±48.2, p=0.241), excised thyroid gland weight (50.4±43.2 vs 28.2±19.7, p = 0.024).

In HT group 33 (70%) patients had a benign and 14 (30%) a malignant lesion. Analyzed parameters of benign vs malignant groups included: age (48.1±13.1 vs 51.0±11.3, p=0.269), male gender (11 vs 1, p=0.077), compression symptoms (10 vs 4, p=0.920), exclusion of malignancy (19 vs 10, p=0.368), thyrotoxicosis (4 vs 0, p=0.162), operation time (88.9±21.8 vs 96.7±35.6, p=0.589), excised thyroid lobe weight (28.1±23.4 vs 46.1±98.2[ZN1], p=0.315).

Conclusions

The possibility of malignancy in TT group was higher in patients with a smaller goiter. The excised thyroid gland weight can potentially be used for predicting malignancy in cases of BSRTC III and IV nodules.

Precipitating risk factors, clinical presentation, and outcome of diabetic ketoacidosis

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Objectives

Diabetic ketoacidosis (DKA) is a life-threatening but preventable complication of diabetes mellitus (DM) characterized by uncontrolled hyperglycemia (>13.9 mmol/L), ketosis and metabolic acidosis, which occurs due to a relative or complete lack of insulin. The aim of this study was to investigate the incidence and predisposing factors of DKA and its consequences.

Materials and Methods

All DM patients, who had been hospitalized due to DKA in Riga East Clinical Hospital, Latvia during 2015 – 2019, were included in a retrospective study. Predisposing factors, clinical presentation, biochemical parameters and predictors of mortality were evaluated. Data were processed using IBM SPSS statistical analysis.

Results

445 (mean age 51.7 ± 19.0 ; min 18, max 90 years) patients with DKA were included in the study. The rate of readmission was high as 7 patients were responsible for 24 admissions. The majority (47.9%) were type 2 DM patients. Median initial blood glucose was 24 mmol/L (IQR 18.2-31.4). Severe DKA was more frequent than moderate and mild forms (47.2%, versus 34.7% and 18.1%, respectively).

The most common precipitating factors of DKA were newly diagnosed diabetes mellitus ($n=166(38.2\%)$), delay of diabetes treatment intensification ($n=97(22.4\%)$), discontinuation of or inadequate insulin injections ($n=51(11.8\%)$), alcohol abuse ($n=50(11.5\%)$), infection ($n=37(8.5\%)$), and cerebrovascular accidents ($n=33(7.6\%)$). HbA1c levels were highest in new-onset type 1 diabetes group $12.3 \pm 1.2\%$ followed by insulin omission $11.1 \pm 1.9\%$, $p=0.05$. DKA hospitalization rate has declined from 2015 ($n=108$) to 2019 ($n=61$). Median length of hospital stay was 8 days (IQR 5-12). The most common complication was hypokalemia (34.7%).

Conclusions

Newly diagnosed DM and insulin omission were the main factors associated with DKA. Although the continued decline in DKA admission rates is encouraging, rates have remained to be high and further work might help identify populations at risk.

Predictors of parathyroid adenoma vs hyperplasia in primary hyperparathyroidism

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Objectives

Primary hyperparathyroidism (PHPT) is a common endocrine disorder presenting with symptoms like osteoporosis, kidney stones or as asymptomatic hypercalcemia. The purpose of this study was to determine if there are clinical features that raise suspicion for parathyroid adenoma and hyperplasia.

Materials and Methods

In time period 2005-2019 cohort of 412 patients with PHPT who underwent parathyroidectomy were reviewed. Patients (n=388) were divided into two groups according to morphology - 343 (83.3%) adenoma, 45 (10.9%) hyperplasia. From study 15 (3.6%) cancer and 9 (2.2%) patients with both morphologies (adenoma and hyperplasia) were excluded. Preoperative and postoperative calcium, symptoms - kidney stones and osteoporosis were analysed in patients with adenoma and hyperplasia.

Results

Median preoperative calcium in adenoma group was 2.80 mmol/l (2.24-4.36); hyperplasia group - 2.75 mmol/l (2.26-3.55). Median calcium drop after surgery in adenoma group was 0.53 mmol/l vs 0.51 mmol/l in hyperplasia group. Ninety-six (24.7%) of included PHPT patients had kidney stones, 164 (42.3%) osteoporosis, 48 (12.4%) both symptoms and 176 (45.4%) had no symptoms. No statistically significant difference was found between morphological groups regarding to kidney stones, osteoporosis or both.

Conclusions

Calcium drop, kidney stones, osteoporosis are not reliable factors to distinguish between adenoma and hyperplasia preoperatively.

Status of nutrient among Latvian children with classical phenylketonuria

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Objectives

Phenylketonuria (PKU) is the most common autosomal recessive genetic disorder in Europe. The main treatment in PKU is dietary treatment. Strict dietary restriction of natural phenylalanine (Phe) in the diet causes severe nutrient deficiency in PKU patients. Special Phe-free protein substitute based on L-amino acids supplemented with minerals, vitamins can reduce risk of nutrient deficiency. This is first review of Latvian PKU patients eating habits and nutrient status in the last 10 years. The aim of this study was to evaluate the nutritional status of children with PKU.

Materials and Methods

22 patients, who filled their FD and gave blood samples, were enrolled in this study. Nutritional status of PKU patients was evaluated using anthropometric measurements, 72-hour FD and biochemical markers such Selenium and Zinc. Data from FD was compared with recommendation made by Ministry of Health of the Republic of Latvia (MHRL).

Results

In 83% cases Selenium (Se) intake among patients and Se blood levels were in normal range, in 13% cases there was low Se intake, but Se blood levels were normal and in 4% cases nutrient intake was adequate, but level in blood was low. In 48% cases Zinc (Zn) intake and Zn blood levels were in normal range, in 17% cases nutrient intake was below recommendations, but blood levels were normal. In 35% cases Zn deficiency was found in patients, although Zn intake was adequate.

Conclusions

Due to Phe-free protein substitution with micronutrients there is no significant nutrient deficiency among PKU patients in Latvia, although there is a higher risk to have zinc deficiency despite of adequate nutrient intake. We will continue to assess our PKU patients' nutritional status.

Targeting mitochondrial bioenergetics as a therapeutic strategy for cardiopulmonary complications related to COVID-19

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Objectives

Cardiovascular complications are common in COVID-19, manifested as right ventricular (RV) and left ventricular (LV) dysfunction in a significant number of hospitalized patients. Alterations in ventricular function are usually induced by the changes in bioenergetics of cardiac mitochondria. This study was conducted to assess the effects of cardiometabolic drug meldonium on the development of ventricular dysfunction and mitochondrial bioenergetics in experimental models of RV and LV dysfunction.

Materials and Methods

RV failure in Sprague-Dawley rats and LV systolic dysfunction in C57Bl6/N mice was induced by a single administration of monocrotaline (MCT) at a dose of 60 mg/kg and lipopolysaccharide (LPS) at a dose of 10 mg/kg, respectively. Meldonium at a dose of 200 mg/kg was administered to rats for 4 weeks after MCT injection. Mice received meldonium at a dose of 100 mg/kg for three weeks before the administration of LPS. Dimensions and function of heart ventricles were assessed by echocardiography. Mitochondrial function was tested in the permeabilized cardiac fibers by respirometry measurements.

Results

Administration of MCT increased Fulton index and decreased RV fractional area change (RVFAC). Treatment with meldonium attenuated increase of Fulton index for 20% and decline of RVFAC for 50%. LV ejection fraction (LVEF) in LPS-treated mice decreased for 30%. Treatment with meldonium significantly prevented the decrease of LVEF. Administration of MCT or LPS resulted in a significant decrease in the FAO-dependent OXPHOS coupling efficiency with concomitant increase in pyruvate metabolism. Treatment with meldonium in both models restored FAO-dependent OXPHOS coupling efficiency and decreased pyruvate metabolism to the level of healthy control.

Conclusions

Obtained results show that meldonium treatment prevents development of RV and LV systolic dysfunction and improves mitochondrial function in experimental models of cardiovascular diseases which resemble cardiovascular complications of COVID-19.

The human gut microbiome as a prediction tool for personalized type 2 diabetes therapy

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Diabetes mellitus is a heterogeneous and complex group of metabolic disorders characterized by hyperglycemia. At the moment more than 460 million adults (age 20-79) worldwide have been diagnosed with this disease, and ~90% of these specifically with type 2 diabetes (T2D). The human gut microbiome has been shown as one of the key mediators in the pathogenesis as well as in therapeutic efficacy and tolerance of T2D. Moreover, the possibility to modify the composition of the microbiota has promoted the search for biomarkers with potential application in personalized therapy. A significant example is the widely studied first choice antidiabetic drug metformin, for which the interaction with the gut microbiome has revealed new pharmacodynamic mechanisms of action. In addition, despite the worldwide research of microbiome and its role of T2D and its therapy, the results and possible biomarkers are highly population specific. Therefore, the current knowledge is emphasizing on the urgent need to use large local cohorts for developing personalized medicine based approaches using the gut microbiome as a prediction tool. The first steps in this field have been taken in Latvia as well, providing the first results highlighting the possible microbiome biomarkers for prediction of both the T2D therapy efficacy and tolerance.

The pathogenic role of Th17 cell pathway in autoimmune thyroid diseases

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Objectives

Th17 cells have been established to play a significant role in the pathogenesis of thyroid autoimmunity. Furthermore, selenium deficiency can impair the differentiation of Th cells, leading to cellular and humoral response dysfunction. We aimed to assess the levels of Th17 cytokines levels and the selenium status in treatment-naïve patients with new-onset Graves' disease (GD) or Hashimoto's thyroiditis (HT).

Materials and Methods

Eighty-eight participants were recruited for this study: 11 hyperthyroid GD patients, 41 patients with HT, and 26 age- and sex-matched healthy subjects as controls. Plasma levels of IL-17a, IL-22, IL-23, IL-6, and IL-10 were detected by xMAP technology (Magpix system; Luminex Corporation, USA). Tests were performed in accordance with the manufacturer's instructions (Cat#: HTH17MAG-14K; Kit Lot#: 3323752; Milliplex). The plasma selenium level was determined fluorometrically by using the fluorescence spectrophotometer.

Results

We did not find significant differences in IL-17a, IL-22, IL-6, IL-23, or IL-10 levels among the HT patients, GD patients, and controls. However, in the HT patients, IL-22 was correlated with IL-6, IL-10, and IL-23, while IL-17a levels were positively correlated with IL-23, IL-22, IL-6, and IL-10. In the GD group, IL-17a levels were positively correlated with IL-22, IL-23, and IL-10; IL-22 was positively correlated with IL-23, IL-6, and IL-10. In addition, FT3 was positively correlated with IL-17a, IL-23, and IL-10; and FT4 was positively correlated with IL-17a and IL-10 levels in GD patients. No difference in selenium levels was observed among the studied groups. Interestingly, plasma selenium levels were negatively correlated with anti-thyroid peroxidase antibody titres in the HT patients.

Conclusions

Th17 cytokines were positively correlated with the severity of hyperthyroidism, suggesting their possible role in GD pathogenesis. The selenium status of the Latvian patients with GD or HT was at a suboptimal level. This study was supported by the Latvian Council of Science (Grant No: lzp-2018/2-0059).

Transcriptome alterations in pituitary neuroendocrine tumour tissue

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Objectives

Acromegaly is a disease mainly caused by pituitary neuroendocrine tumours (PitNETs) overproducing growth hormone. First-line medication for this condition is the use of somatostatin analogues (SSAs), that decrease tumour mass and induce antiproliferative effects on PitNET cells. Dopamine agonists (DAs) can also be used, if SSA treatment is not effective. This study aimed to determine differences in transcriptome signatures induced by SSA/DA therapy in PitNET tissue.

Materials and Methods

We selected tumour tissue from twelve patients with somatotropinomas, with half of the patients receiving SSA/DA treatment before surgery, and the other half treatment naive. Transcriptome sequencing was then carried out to identify differentially expressed genes (DEGs) and their protein-protein interactions, using pathway analyses.

Results

We found 34 upregulated and six downregulated DEGs in patients with SSA/DA treatment. Three tumour development promoting factors *MUC16*, *MACC1* and *GRHL2*, were significantly downregulated in therapy administered PitNET tissue, this finding was supported by functional studies in GH3 cells. Protein-protein interactions and pathway analyses revealed extracellular matrix involvement in the antiproliferative effects of this type of the drug treatment, with pronounced alterations in collagen regulation.

Conclusions

Here, we have demonstrated that somatotropinomas can be distinguished based on their transcriptional profiles following SSA/DA therapy, and SSA/DA treatment does indeed cause changes in gene expression. Treatment with SSA/DA, significantly downregulated several factors involved in tumorigenesis, including *MUC16*, *MACC1* and *GRHL2*. Genes that were upregulated, however, did not have a direct influence on antiproliferative function in the PitNET cells. These findings suggested that SSA/DA treatment acted in a tumour suppressive manner and furthermore, collagen related interactions and pathways were enriched, implicating extracellular matrix involvement in this anti-tumour effect of drug treatment.

Psychiatry

Alexithymia and suicidality in patients with depression in acute and subacute departments of psychiatric hospital "Ģintermuiža"

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Objectives

Alexithymia is a personality trait associated with poor emotional awareness and self-regulation with estimated prevalence around 13% in general population. It may increase vulnerability to depressive symptoms (Tolmunen et al., 2011). There is evidence that alexithymia may be considered a risk factor for suicide, either per se or by increasing the risk of development of depressive symptoms (Hintikka et al., 2004).

The aim was to detect the prevalence of alexithymia among patients with depression (F32, F33; ICD-10) and a possible connection between presence of alexithymia and suicidality of patients with depression in psychiatric hospital "Ģintermuiža".

Materials and Methods

The patients were interviewed during the 1st week after admission gathering sociodemographic data and using Patient Health Questionnaire-9 (PHQ-9), 20-item Toronto Alexithymia Scale (TAS-20) and Module B of the MINI International Neuropsychiatric Interview to detect severity of depression, alexithymia and severity of suicidality respectively. The data was analysed using descriptive statistics, independent samples Kruskal-Wallis test and Spearman's correlation.

Results

In total 101 patients were included in the study during the period from 01.12.2019. to 01.12.2020., 28,7% (n=29) of them were male and 71,3% (n=72) were female. Mean age of participants was 44,14 years. According to the TAS-20 cutoff score of ≥ 61 , 27.7% (n=28) of sample didn't have alexithymia, 20.8% (n=21) possibly had alexithymia and 51,5% (n=52) had alexithymia. Severity of depression was positively associated with alexithymia (Kruskal-Wallis $p < 0,01$, Spearman's $\rho = 0,427$ $p = 0,001$) and with severity of suicidality (Kruskal-Wallis $p = 0,009$, Spearman's $\rho = 0,340$ $p < 0,01$). Alexithymia was not significantly associated with suicidality.

Conclusions

The prevalence of alexithymia was much higher among patients with depression than in general population. Severity of depression was linked to alexithymia and severity of suicidality, although, contrary to data from previous research, alexithymia itself was not linked to suicidality, which could be explained by relatively small sample size.

Association between depression and anxiety symptoms, mental disorders and the prevalence and duration of sick leave in the economically active population in primary care in Latvia

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Objectives

One of the major concerns when it comes to depression and anxiety is the effect of ability to work – these disorders are associated with increased risks of disability as well as sick leave (both short and long-term). So far these factors have not yet been studied in primary care population Latvia. The aim of this study was to examine the association of depression and anxiety with short term sick leave during the prior 3 months in a primary care population of Latvia.

Materials and Methods

This cross-sectional study was carried out within the National Research Program BIOMEDICINE to assess the prevalence of mental disorders at 24 primary care facilities. During one week period in 2015 all consecutive adult patients during a primary care visit were invited to complete an assessment survey. Diagnoses of disorders were confirmed using medical records. A follow up assessment was conducted over the telephone within 2 weeks after the visit. The statistical significance of differences of prevalence of dependent variable among strata of independent variables was detected using Chi square test.

Results

The data shows that patients with depressive symptoms more often had longer sick leave with 13.7% having 15+ days of sick leave compared to 6.8% with no depressive symptoms ($p=0.002$). Patients with anxiety symptoms also had longer duration of sick leave (13.3% 15+days) than without (7.2%) ($p=0.04$). Mental disorders associated with longer duration of sick leave were current depressive disorder (9.6% with vs 7.4% without with 15+ days of sick leave) ($p=0.047$) and lifetime recurrent depressive disorder (10.1% with vs 7.5% without) ($p=0.04$), lifetime depression (9.6 with vs 7.4% without) ($p=0.03$) and current post-traumatic stress disorder (30.8% with vs 7.8% without) ($p=0.006$).

Conclusions

Symptoms of depression and anxiety have an impact on the length of sick leave.

Cognitive impairment among patients with first-time diagnosed depressive episodes and recurrent depressive disorder

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Objectives

The study evaluates cognitive impairment between patients with the first depressive episode (FDE) and those with recurrent depressive disorder (RDD).

Materials and Methods

The interview consists of sociodemographic information, Montreal Cognitive Scale (MoCA), the Patient Health Questionnaire-9 (PHQ-9). Data is statistically processed in MS Excel and SPSS 20.

Results

All 50 respondents complained about their cognitive function. Results indicated a positive correlation between the severity of depression and the impairment of executive function ($r(50)=0.383$, $p=0.006$) as well abstract thinking ($r(50)=0.360$, $p=0.01$) when testing on MoCA; however, the total MoCA score didn't correlate with the depression severity on PHQ-9 scale ($r(50)=0.111$; $p=0.443$). Although patients with RDD showed considerably lower scores ($M=3.39$; $SD=1.128$) on the PHQ-9 scale than patients with FDD ($M=3.39$; $SD=1.111$) ($t(48)=3.005$; $p=0.004$), there was not a significant difference of MoCA's total score between the group with FDE ($M=-0.386$; $SD=-0.782$) and the group with RDD ($M=-0.386$; $SD=0.753$) ($t(48)=-0.494$; $p=0.624$). Patients with RDD demonstrated considerably better attention ($M=-1.263$; $SD=0.321$) than the patients with FDE ($M=-1.263$; $SD=0.328$); ($t(48)=-0.398$; $p<0.005$). The impairment of the executive function was worse among patients with RDD ($M=0.393$; $SD=0.119$) than FDD ($M=0.393$; $SD=0.134$); ($t(48)=2.294$; $p=0.005$). The impairment of abstract thinking was not significantly different between patients with FDE ($M=-0.58$; $SD=0.149$) and RDD ($M=-0.58$; $SD=0.145$) ($t(48)=-0.393$; $p=-0.056$). All patients showed difficulty remembering (mean 3.5 of max score 5); however, there was neither correlation with the severity of depression nor difference between patients with FDE and RDD.

Conclusions

The severity of depression correlates with executive function and abstract thinking. Patients with RDD demonstrated better attention and worse executive function than the patients with FDE, but the abstract thinking was equal in both groups. All depressive patients show difficulty remembering, but it doesn't correlate with the severity of depression and doesn't show a difference among the patients with FDE and RDD.

Depressive disorder and generalized anxiety disorder in adult outpatients with attention deficit hyperactivity disorder symptoms in addiction medicine clinic of Riga Psychiatry and Addiction Medicine Centre

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Objectives

To examine the prevalence of self-reported depression and anxiety in patients with attention deficit hyperactivity disorder (ADHD) symptoms comparing to patients without ADHD symptoms in a sample of outpatients of an addiction medicine clinic in Riga, Latvia.

Materials and Methods

Self-report surveys that included sociodemographic data, PHQ-2, GAD-2 and Adult ADHD Self-Report Scale (ASRS-v I.I) were completed by outpatients of Riga Psychiatry and Addiction Medicine Centre. Patients were divided into groups – patients with ADHD and patients without ADHD symptoms. PHQ-2 score 3 or greater were considered screened positive for depression; GAD-2 score 3 or greater were considered screened positive for general anxiety disorder.

Results

Self-report survey was completed by 312 outpatients. A total of 19,6% of patients were screened positive ADHD. 38,8% patients with ADHD symptoms were also screened positive for depressive disorder and 27,9 % screened positive for generalized anxiety disorder (patients without ADHD symptoms 12,3% and 17,2%, respectively). Data shows significant higher depression rates ($p<0,000$) or anxiety rates ($p=0,049$) in patients with ADHD symptoms, comparing to patients without ADHD symptoms. There was found significantly higher rates of anxiety among females with ADHD symptoms comparing to males ($p<0,000$).

Conclusions

Patients with ADHD symptoms report higher levels of depression or anxiety comparing to patients without ADHD symptoms, consistent with the current literature. Identifying psychiatric comorbidities in patients with ADHD might improve the outcome of treatment.

Factors that predict anxiety during the COVID-19 pandemic emergency state

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Objectives

The WHO warned that the COVID-19 outbreak is expected to trigger feelings of fear, worry, and stress, as responses to an extreme threat for the community and the individual. Moreover, social factors, employment, economical issues, as well as social difficulties, and psychological factors are expected to impose further stress, especially with the expectation of an upcoming economic crisis and possible unemployment. The aim of the study was to investigate the association of various socio-psychological factors with clinically significant anxiety during the COVID-19 emergency state.

Materials and Methods

The nationwide representative online study in the general population of Latvia was conducted in July 2020 during three week period. Clinically significant anxiety was assessed by the State-Trait Anxiety Inventory-Y1; for psychological factors Psychological Resilience Scale, Emotion Regulation Skills Questionnaire (ERSQ-27), Social Problem-Solving Inventory – Revised version (SPSI-R), one-item Loneliness scale, composite measure of the Fear of COVID-19, and Domestic Violence scale were used. Background information data analysed were age, gender, education level, marital, parental and occupational status, financial strain, general health status and anxiety in the past. Based on valid cases (N = 2533, men 40.4%, aged 18 – 75 years) and gender weight data multivariate forward-stepwise regression analyses were performed to develop a model that included significant contributing variables.

Results

Certain factors were associated with anxiety score: fear of the COVID-19 ($\Delta R^2 = 24.0\%$), loneliness ($\Delta R^2 = 14.6\%$), self-rated psychological resilience ($\Delta R^2 = 6.4\%$), gender (being woman, $\Delta R^2 = 2.2\%$), subjective evaluation of the general health status ($\Delta R^2 = 2.3\%$), financial strain ($\Delta R^2 = 1.4\%$), age (being young, $\Delta R^2 = 0.8$), anxiety in the past ($\Delta R^2 = 0.3$), negative problem orientation ($\Delta R^2 = 0.2\%$), domestic violence ($\Delta R^2 = 0.2\%$).

Conclusions

The study's findings can help to develop future strategies to management of psychological support for different groups in general population of Latvia.

Gender identity disorder – diagnostic and therapeutic tendencies in Children's Clinical University Hospital, Latvia

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Objectives

As the numbers of gender nonconforming/transgender youth seeking medical care increases worldwide, it is necessary to summarise the existing experience and create a systematised, unified approach to patient management and care in Latvia. Limited data exists regarding the current practice, therefore, the aim was to summarise the diagnostic and therapeutic experience in Latvia.

Materials and Methods

Medical records of all child and adolescent patients diagnosed with gender identity (ICD-10, F64) or other sexual disorders (ICD-10, F66) from 2015 to 2020 were investigated, information regarding hospitalisation and outpatient treatment care was analysed.

Results

During the period of 2015-2020 28 patients have been newly diagnosed with gender identity or other sexual disorders (3, 1, 1, 5, 4, 14 patients per year respectively). 6 patients were assigned male gender at birth. Only 25% (N=7) patients came in contact with psychiatric care with gender identity problems as the primary concern, 5 of them in year 2020.

46,4% (N=13) patients were hospitalised in a psychiatric unit in their first contact with psychiatric care specialists. Overall, 60.1% (N=17) continue treatment in an outpatient clinic after being diagnosed.

Mean age of diagnosis was 14,96 years (SD=0,24) and from the collected data, median time from the onset of gender identity related dysphoria to subsequent diagnosis was 3 years (IQR=2.75-5).

Hormonal treatment with GnRH analogue to suppress pubertal progression was given to 3 patients. No patients are undergoing cross-hormonal therapy under the hospitals supervision.

Conclusions

Number of newly diagnosed gender identity disorder patients is increasing with a substantial surge in year 2020. Patients tend to suffer from a range of psychiatric comorbidities, oftentimes, making them the primary reason for seeking psychiatric care. The diagnoses of gender identity disorders are made fairly late, delaying access to care and increasing subsequent risks. Efforts need to be made to improve diagnostic and care strategies in Latvia.

Inpatient treatment and rehabilitation of children and adolescents with autism spectrum disorders: retrospective chart review

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Objectives

The goals of treatment and rehabilitation of autism spectrum disorders (ASD) are to increase functional independence and quality of life through learning and development, improved communication, and social skills. The aim of this study was to investigate the patterns of use of pharmacological treatment and psychosocial rehabilitation in children and adolescents with ASD in Latvia.

Materials and Methods

A retrospective study based on analysis of data on inpatient medical records. This study includes patients with a diagnosis of ASD (ICD-10, F84*) that received inpatient psychiatric care in Children's Clinical University Hospital in the period from January 2015 to December 2019. Data were analyzed using Microsoft Excel and IBM SPSS Statistics 26.0.

Results

The study included 316 inpatient admissions, 214 of them were first admissions. 80% of ASD patients were boys. Mean age 6,5 (SD-4,0). Mean duration of hospital stay was 6,7 (SD-4,6) days. The most frequent clinical diagnosis was Childhood autism (F84.0)(81,6%). The most frequent comorbidity was Specific speech and language development disorders (F80*), which was diagnosed in 227 (71,8%) cases. From these 316 cases 206 (65,2%) received only psychosocial rehabilitation, 24 (7,6%) received only pharmacological treatment and 76 (24,1%) received a combination of pharmacological treatment and rehabilitation.

The most frequently used rehabilitation methods were speech and language therapy - 225 (71,2%) and occupational therapy -174 (55,1%). The most frequently used pharmacological treatments were Atypical antipsychotics: Risperidone - 36 (47,3%) and Quetiapine - 14 (18,4%). Patients that received only pharmacological therapy were more likely to be re-hospitalized.

Conclusions

Various psychosocial rehabilitation methods are used in the inpatient care of ASD patients in Children's Clinical University Hospital, with the majority of patients receiving a combination of several non-pharmacological interventions, and only a minority requiring pharmacological interventions for symptom management. Psychosocial rehabilitation should be made more available to patients with ASD also in the outpatient care settings.

Intermediate care in caring for people living with dementia: analysis of general practitioners' assessment of intermediate care in Latvia as part of a multinational European study

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Objectives

Intermediate care is often defined as healthcare occurring somewhere between traditional primary (community) and secondary (hospital) care settings. A survey performed by the European General Practice Research Network (EGPRN) found great variation in the use of intermediate care for persons with neurocognitive disorders across Europe. This study aims at investigating intermediate care services for people with neurocognitive disorders. No previous studies on intermediate care from the general practitioners' (GP's) point of view have been carried out in Latvia.

Materials and Methods

This study is a part of a European wide study in collaboration with the EPRN. A key informant survey that used a semi-structured 14-item questionnaire, designed by the EPRN, was translated into Latvian and completed by 20 Latvian general practitioners from June-September 2020. We aimed to examine how general practitioners perceive the advantages and disadvantages of intermediate care, availability of services and quality of care. A mixed method approach was applied in analysing the questionnaire where the open-ended questions followed a "Sequential Explanatory Design".

Results

In Latvia, the most accessible types of intermediate care include integrated home services, nursing homes and residential homes. The availability of services between regions was perceived by 70% of respondents as being non-homogeneous. Intermediate care was perceived by all respondents as either improving the quality of patient care, the quality of life for care givers, or both. The quality of intermediate care was perceived by 80% as low. Access to intermediate care was limited by lack of financial support and difficult bureaucratic procedures.

Conclusions

Responses of Latvian GP's imply that limited finances affect the availability, accessibility, and quality of intermediate services for patients in Latvia. Latvian GP's perception is that intermediate care improves the quality of care for patients with dementia, and the quality of life for their care givers.

Is there a difference between microglial activation in the human brain between individuals, who have committed suicide and the control group?

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Objectives

Suicide is a deliberate act of the intentional self-inflicted death. Neuroinflammation is suggested to be linked to suicide. Microglia – a cell of the innate immune system of the central nervous system (CNS) – is known to release cytokines that can modulate noradrenergic or serotonergic neurotransmission in the cortex leading to individual's suicidality. The aim of this study was to find out if there is any difference between microglial activation in three different CNS regions between individuals, who had committed suicide and the control group.

Materials and Methods

Post-mortem human brain tissues were obtained from seven individuals, who had committed suicide (median age 26±7.2 years) and from eight individuals (control group), who died from other causes (median age 29.5±6.0 years). Quantitative analysis of activated microglia/macrophages location in the white and gray matter of prefrontal cortex, *striatum* and *substantia nigra* was done using immunohistochemical staining with a marker CD68. Statistical analysis was done by SPSS 26.

Results

Significantly more diffuse CD68 positive (CD68+) cells were found in the white matter of prefrontal cortex compared to its gray matter ($p=0.005$). The number of CD68+ cells found in all three regions both white and gray matter of the brain did not differ between both groups - controls and suicides. However, CD68 positivity was different between brain regions, where only none to few CD68+ cells per visual field were found in the *striatum*, but significantly more CD68+ cells were found in the *substantia nigra* compared to prefrontal cortex ($p=0.001$) taking into account white and gray matter.

Conclusions

As this study could not confirm increased number of CD68+ cells in individuals, who had committed suicide, it suggests that different inflammation pathways could be involved. Interestingly, we found that comparing three different brain regions *substantia nigra* had the most CD68+ cells.

Lifestyle changes during the COVID-19 emergency state in the general population of Latvia

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Objectives

There is evidence of negative impact on various lifestyle-related behaviours as a potential implication of COVID-19 pandemic. The purpose of this study was to determine whether the unique COVID-19 state of emergency from 12th of March – 10th of June 2020 has remodelled the lifestyle of the Latvian population, particularly in smoking habits, alcohol consumption, diet, exercising, sleep and intimate life.

Materials and Methods

The study was a part of an international survey with more than 40 participating countries and was carried out within the framework of the National Research Program. It was conducted as a structured online survey in July 2020 for three weeks using a randomized stratified sample of the general adult population.

Results

The weighted sample consisted of 2608 respondents. Almost half of the respondents 44.4% (95% CI (42.5-46.3) (n=1158) reported modifying their exercise regime. A fraction of people 16.5% (95% CI 15.2-18.0) (n=431) admitted to eating more and 11.8% (95% CI (10.6-13.1) (n=307) consumed less food during the emergency state. The BMI increased in 24.4% (95% CI (22.8-26.1) (n=636) and decreased in 12.6% (95% CI (11.3-13.9) (n=327) of respondents. The quality of sleep worsened in 17.2% (95% CI (15.8-18.7) (n=449) and 14.9% (95% CI (13.6-16.3) (n=389) had to take sleep medication. The craving for cigarettes was intensified in 10.6% (95% CI (8.6-13.1) (n=76) of smokers. More alcohol was consumed by 7.9% (95% CI (6.9-9.0) (n=206) of respondents. Sexual desire diminished for 11.9% (95% CI (10.7-13.2) (n=311).

Conclusions

The state of emergency brought alterations to everyday lives for a percentage of people, a situation that presumably brings hardship to people. Recommendations on healthier lifestyle adaptation during the pandemic could be applicable.

Mental health and conspiracy theories in the general population of Latvia during the COVID-19 emergency state

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Objectives

A wave of conspiracy believers has emerged in the midst of the COVID-19 crisis. The purpose of this study was to characterize an individual who believes in conspiracy theories, to discover whether believing in such theories is associated with mental health and complying with the government's implicated restrictions.

Materials and Methods

Data was collected as an online survey in a randomized stratified sample for three weeks in July 2020 as a part of the National Research Program. Precisely selected and segmented database corresponding to the general population of Latvia was used. Non-parametric tests to compare medians (Kruskal-Wallis test) as well as Spearman correlation to measure the strength of relationship were used.

Results

The weighted study sample consisted of 2608 participants. Positive correlation was detected between age and belief in conspiracies among females ($r=0.061$; $p=0.017$). Median conspiracy theory points were higher in female subjects ($p<0.001$) who more often resided in a town ($p<0.001$) as opposed to occupying the capital or the countryside. Those who were divorced (or estranged) ($p=0.022$) in contrast with being single or in a relationship. Along with those being unemployed ($p<0.001$) compared to the employed, retired individuals or students. As well as mainly having primary or high school education ($p<0.001$) rather than higher education. Depressive respondents more often than healthy respondents believed that COVID-19 was created in laboratory ($p<0.05$), that COVID-19 is a result of 5G antenna ($p<0.05$) and that COVID-19 is a sign of divine power to destroy our planet ($p=0.001$).

Conclusions

Since conspiratorial thinking was unequivocally associated with low level of education, the important messages conveyed to the public should be reviewed so that they are more relatable and comprehensible. In addition, more attention should be paid to critical thinking in education programs.

Parent reports on internalising difficulties in child-adolescent psychiatric outpatient setting using Strengths and Difficulties Questionnaire and their relation to clinical diagnosis

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Objectives

Aim of this study was to examine the prevalence of parent reported internalising difficulties in outpatient child and adolescent psychiatry setting using SDQ (Strengths and Difficulties Questionnaire) and examine the relation between parent reported results and clinical diagnosis set by a child-adolescent psychiatry specialist.

Materials and Methods

The study was conducted in two outpatient centers in Latvia. The study group was 370 patients aged 2-17 y.o. who received outpatient child-adolescent psychiatry care, and their parents. Parent reported internalising difficulties were assessed using SDQ parent version – emotional and peer problem subscale (combined – internalising difficulties scale). Internalising disorders in this study were F3x, F4x, F50, F92, F93 – according to ICD-10. When analysing the score, 4-band categorisation was used, 3rd and 4th band were defined as “high”.

Results

337 valid parent reports were analysed. An internalising disorder was diagnosed in 37% (N=126) of children. The levels of parent reported internalising symptoms by SDQ were high, with 60,2% of parents reporting high level of peer problems and 48,7% of parents reporting high level of emotional problems. Patients with internalising disorder diagnosis had higher parent reported results in emotional sub-scale of the SDQ (mean - 5,56 points vs 3,95), $p=0,000$, and internalising disorder scale – (mean - 9,17 points vs 8,18), $p=0,043$, than those who did not have the diagnosis.

Conclusions

Parents reported high levels of internalising difficulties, higher than the prevalence of diagnosed disorders. For patients with internalising disorder parent reports were higher in emotional subscale and internalising disorder scale, accordingly to the diagnosis. This suggests scale validity and reliability as well as cut-off values should be explored in Latvian population.

Patients' with schizophrenia spectrum and affective spectrum disorders satisfaction correlation with compliance to treatment after discharge

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Objectives

The study was conducted after the adaptation process of the PIPEQ-OS (Psychiatric Inpatient Patients Experience questionnaire on-site) tool. There were no studies in Latvia on an exploration of adult patients' satisfaction correlation with compliance ratios among mental health care patients. The aim of the study was to determine patients' satisfaction with the quality of health care in the psychiatric acute and subacute wards and to explore satisfaction correlation with compliance to treatment.

Materials and Methods

A cross-sectional study was conducted over 12 months period in 2018. The total amount of 823 patients returned the questionnaire. The descriptive statistic analysis and regression analysis were performed. Spearman correlation coefficient was used for the relationship detection between different indicators in diagnostic groups, satisfaction in questionnaire factors and ratios of compliance.

Results

Patients with schizophrenia spectrum disorders showed less satisfaction with care received. In patients with affective spectrum disorders and schizophrenia spectrum disorders, a positive correlation was observed between satisfaction with interaction factor (ρ 0.207, $p=0.010$; ρ 0.151, $p=0.000$ as appropriate) and structure and facilities factor (ρ 0.236, $p=0.000$; ρ 0.184, $p=0.001$ as appropriate) and frequency of medication use. PIPEQ-OS questionnaire all three factors were identified for poor correlation of satisfaction with the number of subsequent outpatient visits in patients with affective spectrum disorders. A positive correlation was established for all questionnaire factors (interactions (ρ 0.174, $p<0.001$), structure (ρ 0.086, $p<0.001$) and outcomes (ρ 0.073, $p=0.039$)) and further medication use.

Conclusions

Higher satisfaction generally correlated with medication use and all three questionnaire factors showed a positive correlation with further medication use. Our findings could be used for improvements in the treatment process in inpatient care facilities. Our results could help to improve compliance in patients with different diagnoses and influence patients' adjustment to the treatment.

Prevalence of anxiety and depression in parents caring for children in departments of Neurology and Psychiatry, Children's Clinical University Hospital, during COVID-19 pandemic

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Objectives

The aim was to examine the prevalence of anxiety and depression symptoms in parents, who care for hospitalized children in departments of Neurology and Psychiatry in Children's Clinical University Hospital (CCUH).

Materials and Methods

Participants: parents who cared for children under the age of 7 in departments of Neurology (12.08.–10.09.2020.) and Psychiatry (02.09.–30.09.2020.) in CCUH were offered to participate in the study, to fill-in questionnaire. Depression symptoms were evaluated using PHQ-9 (Patient Health Questionnaire-9) and anxiety symptoms were evaluated using GAD-7 (Generalized Anxiety Disorder 7-item) scales, both adapted in Latvian and Russian languages.

All parents (including those who refused to fill in questionnaires) were offered handouts on possibilities where to receive mental health support.

Statistical analysis was performed using IBM SPSS 26 statistics (Spearman correlation), MS Excel.

Results

In total 26 parents completed the study. Average age 35.3 years, 96.1% were female.

Clinically significant depression was found in 5 parents (19.3%), clinically significant anxiety was found in 4 parents (15.4%), 3 of these parents had both – clinically significant depression and anxiety.

Statistically significant correlation between depression and lack of support was found ($p=0.031$).

No statistically significant correlations were found between depression and duration of child's illness ($p=0.686$), nights spent in hospital ($p=0.334$), child's night sleep ($p=0.112$), fear of COVID-19 ($p=0.342$), parent's age ($p=0.577$), parent's employment status ($p=0.411$).

There were no statistically significant correlations between anxiety and lack of support ($p=0.241$), duration of child's illness ($p=0.440$), nights spent in hospital ($p=0.103$), child's night sleep ($p=0.296$), fear of COVID-19 ($p=0.141$), parent's age ($p=0.469$), parent's employment status ($p=0.241$).

1 parent (female, 35) refused to participate in the study.

Conclusions

Depression and anxiety is common in hospitalized children parents, more prevalent in parents lacking appropriate support.

Due to COVID-19 pandemic, fewer parents were in the wards, further research is needed with larger samples, focusing on mental health support.

Prevalence of attention deficit hyperactivity disorder symptoms among adult outpatients with substance use disorders in addiction medicine clinic in "Riga Psychiatry and Addiction Medicine Centre"

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Objectives

Many studies show a link between attention deficit hyperactivity disorder (ADHD) and substance use disorders (SUD). Identifying patients ADHD symptoms could help improve treatment results and quality of life, therefore the aim of this study is to evaluate the prevalence of ADHD symptoms in Riga Psychiatry and Addiction medicine centre (RPNC) outpatient population and study the link between SUD and ADHD.

Materials and Methods

In a period of 30 days all consentient clients of RPNC outpatient addiction clinic who would fit the inclusion criteria were asked to take part in the study. Patients were surveyed for basic sociodemographic data and screened with Adult ADHD Self-report Scale (ASRSv1.1) in Latvian or Russian depending on preferred language. Results were compared between previously diagnosed treatment seeking SUD patients and clients who seek to get a medical allowance of any sort (control group).

Results

Out of 312 participants 237 were treatment seeking SUD patients, 75 controls. Mean age was 38.07. 78.2% of the respondents were male, males were also more often being treated for SUD's 82,7% vs 17,3%.

General prevalence of ADHD symptoms was 19.6% (61 respondents), patients with SUD were significantly more likely to screen positive for ADHD symptoms than control group (23,2% and 8% respectively, $p=0.004$ using Chi-square equation). In SUD patients group female participants tended to screen positive more often (34,1% vs 20,9%) but the link didn't reach statistical significance ($p=0.068$). Among SUD patients education, employment status and nationality were not significant factors for positive ASRS screener.

Conclusions

Patients with SUD are more likely to screen positive on ASRS v1.1 than general population. It is important to identify ADHD symptoms in SUD patients, and take them into account when planning the treatment and rehabilitation program.

Prevalence of depressive and anxiety symptoms among the middle medical staff in Hospital Ģintermuiža in 2020

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Objectives

The aim of this study was to evaluate the prevalence of depressive and anxiety symptoms among the middle medical staff of psychiatric hospital and to observe clinically significant depression or anxiety.

Materials and Methods

Study design was cross-sectional. A total of 105 nurses were surveyed, 4 did not meet the inclusion criteria. Depressive and anxiety symptoms were assessed using The Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder scale-7 (GAD-7). A score above 10 is considered clinically significant depression as well as anxiety. Data was statistically processed in IBM SPSS and MS Excel.

Results

A total of 101 nurses were included in the study – 99 women and 2 men with mean age 48,04 years. The mean PHQ-9 score among nurses was 3,14 (SD=2,425). Clinically significant depression (PHQ-9 score above 10) was observed in 3 % of study participants (N=3). Mild depressive symptoms was observed in 22,77 % (N=23). The mean GAD-7 score was 2,59 (SD=1,976). Mild anxiety symptoms was observed in 19,8 % (N=20). Clinically relevant anxiety was not observed.

Conclusions

The prevalence of depressive and anxiety symptoms among middle medical staff was lower than in average population. Comparing depression and anxiety results with previous studies in Hospital Ģintermuiža in 2013, clinically significant depression was found in 8 % of nurses (N=8), but anxiety in 9 % of nurses (N=9). In 33% of nurses was observed clinically significant depression at different psychiatric hospital, which could be explained of various inspections by that time.

Prevalence of the internalizing and externalizing symptoms and associated factors in children and adolescents receiving inpatient psychiatric care

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Objectives

Mental health problems affect 10-20% of children and adolescents worldwide. Despite their relevance as a leading cause of the health-related disability in this age group and their long-lasting effects throughout life, the mental health needs of children and adolescents are often neglected. In this study we investigate the prevalence and associated sociodemographic factors of internalising/externalising mental health problems in children and adolescents receiving inpatient psychiatric care.

Materials and Methods

The study included patients admitted to the Children's Clinical University Hospital, Child psychiatry ward in the period of time from February to October 2019. The Strengths and Difficulties Questionnaire (SDQ) was used to screen for severity of internalizing/externalizing mental health difficulties.

Results

59 patients were included in the study, 33 of them girls (55,9%). Average age was 11,5 (SD-4,7) years. Average total SDQ difficulties score was 17,9 (SD-5,9), girls tended to score higher in total difficulties (mean difference = 1,5 points), and internalising (emotional) difficulties (mean difference = 1,8 points), but there was no major differences in externalising difficulties (mean difference = 0,3 points). Pre-pubescent children tended to score higher on externalising difficulties than adolescents (mean difference = 1,7 points). Max level of externalising difficulties was recorded in a 3 years old boy, who lived in a full family, and was hospitalised with the diagnoses of autism spectrum disorder and ADHD. Max level of internalising difficulties was recorded in 3 adolescents (2 girls and 1 boy) 14 to 17 years old. All of them lived in single-parent households, and were hospitalized with the diagnoses of mood and stress-related disorders.

Conclusions

Internalising and externalising mental health difficulties are highly prevalent in the inpatient child and adolescent psychiatric populations. There are substantial differences in the presenting pattern of internalising/externalising symptoms based on the gender, age and other sociodemographic and clinical factors, that have to be taken into account.

Socio-demographic and clinical characteristics of psychiatric inpatients of Children's Clinical University Hospital Child Psychiatry Clinic in H1 2020

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Objectives

In recent years, child and adolescent mental health have been an emerging concern throughout the world. The aim of this research project was to review the socio-demographic and clinical characteristics of the psychiatric inpatient population during the first half of 2020.

Materials and Methods

Retrospective chart review of all inpatients hospitalized in the Child psychiatry clinic, Children's Clinical University Hospital, Riga, Latvia from Jan 1st till Jun 30, 2020.

Socio-demographic characteristics and clinical factors such as duration of illness, diagnosis, type of treatment, and involved medical specialists were collected.

Results

In total 143 psychiatric admissions happened during the time of review. The gender distribution was equal, with 75 (52%) being boys. The mean age of the patients was 11 (SD 4.8), the mean duration of hospitalization -12.4 days (SD 10.1).

In more than half of the cases (54%) issues related to the social environment were identified, that significantly influenced the child's mental health state. A social worker was involved in 15% of cases. 23 children (16%) have attempted self-harm, and most of them (17 children) also had an additional diagnosis related to social-environmental problems.

During the time of review, children were hospitalized in similar parts in an acute (49%) and planned (51%) manner. The majority of cases- 111 (78%) were hospitalized for the first time.

The distribution by main primary diagnosis groups: 20% had developmental disorders, 15% emotional and behavioral disorders of childhood, 13% affective disorders, 12% stress-related disorders. 6% of patients received only pharmacological therapy, 36% received only non-pharmacological therapy, and the majority (53%) received combined treatments.

Conclusions

In the inpatient psychiatric child and adolescent population, social and environmental factors play a prominent role in the causation of mental distress. It is important to ensure that these factors are taken into account and purposefully addressed by appropriate psychosocial interventions.

Sociodemographic factors associated with self-reported suicidal attempts in the Latvian general population

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Objectives

To assess the prevalence and identify associated sociodemographic factors of self-reported suicide attempts in the Latvian general population.

Materials and Methods

The study is based on secondary data of the Health Behaviour Among Latvian Adult Population survey in years 2010, 2012, 2014, 2016, provided by the Centre for Disease Prevention and Control of Latvia. Questions on suicidal behaviour were included in the survey questionnaire. Interviews in the respondent's home/residence were carried out to gather information on a representative sample of the Latvian population aged 15-64 years old (in 2010, 2012, 2014) and 15-74 in 2016, (n=12,606). Stratified random sampling was used. Respondents were asked to report the occurrence of SA during the previous year. Sociodemographic information included gender, age (age groups 15-34, 35-54, 55-74 years), nationality (Latvian/non-Latvian), cohabitation (married/cohabiting, single/divorced/widowed), years of education (≤ 9 , 10-13, ≥ 14), employment (employed, unemployed, student/pupil, economically inactive), income (low, middle, high), habitat (urban/rural). Binary logistic regression was applied.

Results

The prevalence of the last year self-reported SA was 0.3% (n=43). Several sociodemographic factors showed significant associations with SA in adjusted odds ratio (OR), (adjusted for all independent variables mentioned above). Factor associated with SA were older (55-74 years) age (OR 0.11, p=0.006) in comparison with the youngest (15-34 years) age group. Higher odds for SA were identified for those with education 0-9 years (OR 12.69, p<0.001) and 10-13 years (OR 3.81, p=0.042) compared to the group of education higher than 14 years. Unemployment was associated with higher SA rates (OR 3.36, p=0.016) compared to respondents who are employed. Other factors did not show significant associations with SA.

Conclusions

Sociodemographic factors as older age, education 0-13 years, unemployment have been found to be significantly associated with SA. These findings might help to identify vulnerable groups in the Latvian general population in relation to suicidality and thus to develop targeted preventive measures.

The association of socio-psychological factors with depression and distress in Latvian population during the COVID-19 emergency state

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Objectives

There has been a widespread concern for mental health during the COVID-19 pandemic, driven by the multiple different psychological challenges caused by the pandemic, and a call for urgent mental health research. The evidence suggests increases in psychological distress and a rise in the proportion of people experiencing clinically significant levels of mental illness, including depression. The aim of the study was to investigate the association of various socio-psychological factors with clinical depression and distress during the COVID-19 emergency state.

Materials and Methods

The nationwide representative online study in the general population of Latvia was conducted in July 2020 during three week period. The Center for Epidemiologic Studies Depression Scale was used to determine the presence of distress/depression; for psychological factors, Psychological Resilience Scale, Social Problem-Solving Inventory, one-item Loneliness scale and Fear of COVID-19, and Domestic Violence scale were used. Based on a weighted study sample (N = 2533, men 40.4%, aged from 18 – 75) a series of hierarchical multiple regression analyses were performed to develop a model that included significant contributing variables for predicting the presence of depression or distress. In the final model socio-demographic factors were included in the first step, health-related factors – in the second step, social relationship factors – in the third step, and psychological factors were entered in the last step.

Results

The analysis revealed that socio-demographic factors (young age, being woman, unemployment, and financial problems) accounted for 24.0% of the variance, health factors (history of suicidality, poor health, mental health problems in general and depression in particular in the past) accounted for 12.6%, exposure to domestic violence added 4% and psychological factors (fear of COVID-19, low psychological resilience, negative problem orientation, and loneliness) explained additional 16.5%. All predictors together explained 40.2%.

Conclusions

Based on this study, policy suggestions regarding risk factor prevention will be created.

The effectiveness of Latvian Early intervention programme for first time schizophrenia spectrum psychosis patients

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Objectives

For almost two decades there has been wide discussion about prognosis and effective treatment for patient with psychosis. It is already known that pharmacotherapy can not be the exclusive treatment, but the most effective is patient tailored multiprofessional teamwork. We aimed to explore the effectiveness of first time adapted Early intervention programme in Latvia.

Materials and Methods

All consecutive patients with first psychosis episode (FEP), admitted in Daugavpils Psychoneurological hospital (catchment area of 254 000 inhabitants) from 2016-2019 were offered to participate in study. 104 patients met the inclusion criteria, 68 of them were in the control group and received standard treatment (Group-1), 35 of them enrolled early intervention programme and received 6-month specialized multiprofession team treatment and 27 finished the programme (Group-2). The effectiveness was evaluated as rate of rehospitalizations, rate of assigned disabilities and number of out-patient visits with psychiatrist.

Results

There were no differences between groups at baseline in assessments of Duration of untreated psychosis and Duration of untreated illness, education, living conditions and employment. The median patients' age in Group-1 were 32 (IQR=27-39) and in Group-2 29.85 (IQR=24-33), $p=0.042$. After the 12 months follow up period in the Group-1 36.1% of patients were rehospitalized vs 7.4% in Group-2, $p<0.05$. The disability was assigned to 34.4% of patients in Group-1 vs 7.4%, $p<0.05$, in 12 months follow up. The out-patient psychiatrist visits during first 12 months after FEP were as follows in Group-1 and Group-2: never visited psychiatrist or had a single visit- 19.6% vs 3.7%, had visited psychiatrist 2 to 10 times 53.5 vs 70.4%, had visited psychiatrist more than 11 times 26.8% vs 25.9%, $p>0.05$.

Conclusions

Latvian early intervention programme have promising results in decreasing the rates of rehospitalization and assigned disability after first episode of psychosis.

The prevalence of alcohol delirium, comorbidities and associated factors with duration of treatment in patients at Daugavpils Regional Hospital narcology section

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Objectives

Evaluate the prevalence of the alcohol delirium, assess the presence of the comorbidities, identify the factors affecting duration of hospitalization in patients with alcohol delirium at DRS narcology section.

Materials and Methods

Participants: the study included both sex patients who joined the DRS narcology section during the period from 1 June to 30 September 2020 with a diagnosis of Alcohol delirium. Data was analyzed with the IBM SPSS Statistics 26.0. The differences between groups were assessed by Mann-Whitney U test. The association between factors and duration of treatment was evaluated using Chi-squared test (Fisher's Exact Test). The statistical significance level in this study was accepted as 0,05.

Results

Alcohol delirium occurred in 46 patients, 43 men (93,5%), 3 women (6,5%). The prevalence of alcohol delirium was 3,38% (46 from 1363). Dementia was found in 4 patients (8,7%), organic personality disorder - 5 (10,9%), epilepsy – 8 (17,4%), polyneuropathy – 5 (10,9%), head injury in the anamnesis – 10 (21,7%), encephalopathy – 5 (10,9%), pancreatitis – 3 (6,5%), pneumonia – 4 (8,7%), metroragia – 1 (2,2%), toxic hepatitis – 1 (2,2%). The distribution of PLT, ALAT, CRO values in both groups differed statistically significantly, Mann-Whitney U test, $p < 0,05$. The association between the presence of dementia, epilepsy, pancreatitis, pneumonia, polyneuropathy, means of subsistence, disability pension and the duration of treatment was statistically significant, Fisher's Exact Test, $p < 0.05$.

Conclusions

The duration of treatment in patients with alcohol delirium is found to be associated with some comorbidities and social factors such as income. Most likely patients with dementia, epilepsy, polyneuropathy, pancreatitis, pneumonia and patients who have only disability pension are treated longer.

The results of screening of anxiety symptoms in Latvian general population in 2019–2020

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Objectives

To determine the point prevalence of at least mild anxiety symptoms and associated factors in Latvian general population.

Materials and Methods

Computer assisted face-to-face interviews were carried out between November 2019 and March 2020 to gather information on a representative sample of the Latvian adult population (n=2687). The study sample was selected using a stratified random sampling method. The participants were interviewed using the 7-item anxiety scale: Generalized Anxiety Disorder (GAD-7); a score of ≥ 5 was defined as indicating the presence of at least mild clinically relevant symptoms of anxiety. Binary logistic regression was applied to identify anxiety associated factors.

Results

There were 1238 males (46.1%) and 1449 females (53.9%) recruited. Mean age of respondents was 49.9 (SD 18.2). The point prevalence of at least mild anxiety symptoms in general population was 14.8 % with no statistically significant difference between genders. The point prevalence of generalized anxiety disorder in general population according to GAD-7 was 4.1%. Self-evaluation of health state as low or moderate ($p < 0.001$) (vs. high), unfinished primary education ($p = 0.002$) (vs. university degree) and age below 65 ($p < 0.001$) (vs. 65+) were statistically significantly associated factors for anxiety. The odds of having anxiety symptoms were lower in urban dwellers (but not in capital city; vs. rural) ($p = 0.01$) and married participants or those living with partner (vs. divorced, widowed) ($p = 0.04$).

Conclusions

Younger people, people with low self-rated health, those with low level of education, inhabitants of rural areas and divorced or widowed people are at particular significant risk of anxiety symptoms, which should be addressed in developing prevention strategy and screening programmes.

Use of clozapine treating refractory schizophrenia in adolescents

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Objectives

Schizophrenia often presents in adolescence but current treatment guidelines are based largely on studies of adults with psychosis. Clozapine is a second-generation antipsychotic typically used for refractory schizophrenia or otherwise psychotic pathology. There are no FDA or manufacturer guidelines for use of clozapine in pediatric population. Nevertheless clozapine is being used as a last line medication to treat refractory schizophrenia in children and adolescents.

Materials and Methods

Case study of 2 adolescent patients, that had been diagnosed with paranoid schizophrenia and were treated with a wide range of antipsychotic medications, both typical and atypical, including clozapine. The duration of untreated illness, of untreated psychosis, the duration of hospitalisation and medications have been analysed in this clinical case review.

Results

1-st case: DUI=6 months; DUP=3 months; 5 different antipsychotic drugs in 6 month period, before starting clozapine max 150 mg per day; has been hospitalised 2 times for 47 days in total. No rehospitalisations within 6 months after prescription of clozapine;

2-nd case: DUI=9 months; DUP=0.25 month; 2 different antipsychotic drugs in 1.5 month period before starting clozapine max 100 mg per day; has been hospitalised once for 75 days total. No rehospitalisation within 6 months after prescription of clozapine;

Conclusions

Clozapine is an effective antipsychotic agent in treating refractory schizophrenia in adolescents.

Neurology

Anti-Hu antibody-associated paraneoplastic sensory demyelinating polyneuropathy: case report

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Objectives

Up to 20% of oncological patients experience paraneoplastic syndrome that often predates the diagnosis of oncological disease. The pathogenesis is unclear and immunological response is believed to be the dominant factor. Unfortunately, these syndromes are often unrecognized, thus delaying early diagnosis and treatment. Case description: 65-years-old male first presented with burning pain in palms and soles, gait instability for the last month. Patient had smoked for 40 years but has now quit for the last 2 years. No other known comorbidities or medication use.

On neurological examination glove-sock-type hyperaesthesia, sensitive peripheral ataxia in the legs, mild instability in the Romberg position, atactic gait was observed. The examination according to the polyneuropathy protocol was performed: nerve conduction study showed sensory-demyelinating polyneuropathy, cytolysis in cerebrospinal fluid was 6mκL with elevated IgG antibodies, in blood positive Anti-Hu onconeural antibodies was detected.

Additional oncological screening was performed, but the only changes found were mediastinal lymphadenopathy in pulmonary CT scan.

The patient received intravenous corticosteroids and plasmapheresis therapy with mild improvement of symptoms.

Pulmonary CT scan was repeated: because of negative dynamics radiologists suspected a small-cell lung cancer. Additional examinations were performed, including video-assisted-thoracic surgery with lung segment resection and mediastinal biopsy, but no cytological and histological data on oncological disease were obtained. The patient was discharged from the hospital recommending outpatient PET/CT scan and pulmonary, abdominal CT scan after 3 months.

Conclusions

Regardless of negative diagnostic tests, neurologists remained highly suspicious of neurologic paraneoplastic syndrome. Anti-Hu antibodies are very specific in oncological diseases and may be positive at a very early stage, even before the primary oncological process can be identified.

Anti-NMDA receptor encephalitis: case report

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Objectives

Anti-NMDA receptor encephalitis is an autoimmune disease characterized by prodromal signs- malaise, fever, headache, followed by rapidly progressive psychiatric symptoms- delusional thoughts, hallucinations, psychosis, agitation, cognitive deterioration, and neurological signs- movement abnormalities, seizures, and autonomic dysfunction. Most commonly young women are affected.

Case report: We describe a case of a 21-year-old previously healthy woman who presents with a tingling sensation in the arms and legs. Later she has a generalized tonic-clonic seizure and develops hallucinations. The patient is hospitalized in a psychiatric facility where she experiences episodes of agitation, psychosis, later becomes unresponsive and has another generalized tonic-clonic seizure after which she is transferred to a neurology department. Her vital signs are stable, neurologic examination shows decreased level of consciousness, symmetric pupils, symmetrical limb movements and normal reflexes. Early blood work, CSF analysis and brain MRI shows normal findings. With a high suspicion of autoimmune encephalitis therapy with glucocorticoids and plasma exchange is started. A CSF analysis of autoimmune antibodies is done and confirms the diagnosis of Anti-NMDA receptor encephalitis. Further work-up shows no signs of oncology. After no changes in her status, she receives a five-day course of IVIG. One month after admission head MRI shows hyperintensity in the hippocampus and parahippocampal gyrus region. Her condition gradually stabilizes and after 2 months she is discharged to a rehabilitation facility.

Conclusions

The first symptoms are usually psychiatric and, the correct diagnosis is often overlooked. A female patient of reproductive age presenting with new-onset psychiatric symptoms alongside with neurological symptoms (e.g. seizures) and autonomic disturbances should be approached with a high suspicion of anti-NMDA receptor encephalitis.

Cavernous angioma in the medulla oblongata: case report

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Objectives

Cavernous angiomas are vascular malformations that occur throughout the central nervous system. Approximately 25% of cavernous angiomas are located in the brainstem. These lesions are more likely to present with an initial hemorrhage and are more likely to rebleed.

Case report: A 29-year-old female was admitted to Riga East Clinical University Hospital due to severe headache at the back of the head and numbness on the right side of the body. In emergency unit computed tomography (CT) scan of brain, CT angiography were performed, that showed spontaneous intracerebral hemorrhage in medulla oblongata. Patient was hospitalized to Stroke unit. Few days after hospitalization her condition worsened, patient developed bulbar palsy and right sided hemiparesis. Head magnetic resonance imaging (MRI) showed cavernous angioma localised in medulla oblongata. Patient was discharged from the hospital and continued therapy in multiple rehabilitation centres, her condition improved. After seventeen months due to progressive headaches and repeated numbness on the right side of the body another head MRI was performed. The test showed increased volume subacute bilateral ponto-medullary hemorrhage. Our neurologists communicated with neurosurgeons from Esene University Hospital in Germany, patient had indications for neurosurgical treatment. Extirpation of the medullary cavernoma in semi-sitting position was performed and patient had no complications after surgery. Her neurological status significantly improved and patient was discharged from hospital with recommendations to continue further rehabilitation in Latvia.

Keywords: Cavernous angioma, Intracerebral hemorrhage, Extirpation of a brainstem cavernoma.

Conclusions

Brainstem cavernous angiomas can manifest with severe neurological symptoms and even can be a life-threatening condition. Clinically manifested cavernous angiomas due to the risk of repeated hemorrhage and severe complications need surgical intervention. This case report presents a 29-year-old woman with repeated intracerebral hemorrhage due to medullary cavernous angioma, that was successfully managed by surgical extirpation of the cavernoma.

Dabigatran induced thrombocytopenia: case report

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Objectives

Dabigatran is direct thrombin inhibitor which is used for the prevention of embolic stroke in patients with nonvalvular atrial fibrillation. Thrombocytopenia is rare (from $\geq 1/10\,000$ to $< 1/1000$) complication of treatment with Dabigatran as only few cases have been reported.

Case report: A 74-year-old female, presenting to Pauls Stradins Clinical University Hospital with acute *arteria cerebri media dextra* and *arteria cerebri posterior dextraborder zone* ischemic stroke. On physical examination multiple hemorrhagic skin lesions in the trunk and extremities were seen. At the time of hospitalization patient in complete blood count had severe thrombocytopenia – platelet count was $39 \times 10^9/l$.

10 months prior to the recent hospitalization patient had cardioembolic stroke in the territory of *arteria cerebri media sinistra*, as secondary stroke prophylaxis Dabigatran therapy (110mg 2x a day) was prescribed. At the moment of the beginning Dabigatran therapy the platelet count was $240 \times 10^9/l$. In a control laboratory test 1 week after platelet level was $71 \times 10^9/l$, after 5 weeks – $43 \times 10^9/l$. Despite a significantly decreased platelet level Dabigatran therapy was not canceled. In the recent hospitalization Dabigatran therapy was discontinued because of the possible role of drug in thrombocytopenia development. Dabigatran was replaced with Nadroparin (low molecular weight heparin) subcutaneous injections and after 6 days a treatment with Xa factor inhibitor was initiated. After 5 days platelet count was $49 \times 10^9/l$, after 10 days – $125 \times 10^9/l$. In a hospital the patient had developed a pneumonia with the following sepsis with multiorgan dysfunction – patient died despite an adequate antimicrobial treatment.

Conclusions

Thrombocytopenia is rare life-threatening complication of treatment with direct thrombin inhibitor. Platelet count should be monitored during a therapy with direct thrombin inhibitor as the change to Xa factor inhibitor might be needed.

Demographics, characteristics and intrahospital mortality rate among ischemic stroke patients in Pauls Stradins Clinical University Hospital from 2016 to 2020

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Objectives

Ischemic stroke (IS) is the leading cause of disability, cognitive dysfunction and mortality worldwide. The aim of this study was to determine demographics, characteristics and intrahospital mortality among stroke patients in a tertiary university hospital during a five year period.

Materials and Methods

A retrospective study was conducted enrolling 4753 IS patients admitted to Pauls Stradins clinical university hospital, Riga, Latvia from 2016 to 2020. The IS diagnosis was confirmed by head computed tomography (CT). The pathogenetic IS subtypes were determined using Causative Classification System for IS (CCSIS). Patient demographic, characteristic and clinical outcome data were collected.

Results

56,24% (n=2673) of our study group were females. Mean age of the patients was 73,3 years. The two IS subtypes with the highest prevalence among our study population were atherothrombotic stroke (AS) and cardioembolic stroke (CS): AS – 27,44% (n=1394), CS – 47,38% (n=2252), respectively. Lacunar stroke (LS) was detected in 9,49% (n=451) patients. Other specified stroke (SS) types were noted in 2,42% (n=115) patients, meanwhile 13,28% (n=631) were cases of unspecified stroke (US). The intrahospital mortality rate among our study population was 11,99% (n=570) with the greatest rate observed among patients with CS: 16,79% (n=378). The intrahospital mortality rate among other IS subtypes were as follows: AS: 7,59% (n=99), LS: 0,67% (n=3), SS: 8,70% (n=10), US: 12,68% (n=80), respectively.

Conclusions

IS is a common entity with an immense public health importance. In our study population, IS was identified mostly among elderly patients with a slight female predominance. The most commonly observed IS subtype with the greatest mortality rate was CS. LS was the rarest IS subtype and was presented with the lowest intrahospital mortality rate.

Diagnostic challenges in hereditary peripheral neuropathy in Latvia

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Objectives

Charcot – Marie – Tooth (CMT) disease is the most common inherited disease of the peripheral nervous system. CMT is characterized by a chronic both motor and sensory polyneuropathy. CMT1A is the most common CMT type, followed by CMTX1 and other subtypes. CMT is often unrecognised leading to underdiagnosis in population and late diagnosis for patient. The goal of the study was to evaluate time till diagnosis for hereditary neuropathy patients in Latvia.

Materials and Methods

One hundred and one hereditary neuropathy patient were enrolled in the study. Patients responded to an sociodemographic questionnaire including questions about diagnosis confirmation.

Results

In our study group (n=101) the mean age was 37.9 ± 18.4 years. Majority of patients (42.6%, n=43) were diagnosed with CMT1A type, 10 patients (9.9%) had CMTX1 type, 3 patients (3%) had HNPP, 2 patients (2%) had CMT2A type and 2 patients (2%) had *HINT1* neuropathy with neuromyotonia, other (40.6%, n=41) remained without known genetic mutation. Mean age of first symptom development was 16.1 ± 14.0 years, it was earlier in *HINT1* neuropathy patients (9.0 ± 1.4 years) and later in genetically unknown mutation patients (20.6 ± 17.3 years). Mean age, when diagnosis was made, was 29.7 ± 17.6 years, earlier in CMT2A patients (13.5 ± 3.5 years) and later in CMT1A (30.9 ± 17.2 years). Mean time from first symptoms to diagnosis was 13.6 ± 14.7 years, earlier in CMT2A (3.0 ± 4.2 years) and later in CMT1A patients (18.0 ± 17.0 years).

Conclusions

Time from first symptoms till diagnosis in hereditary neuropathy patients is approximately 13.6 years. Patients with CMT1A type had the longest time from first symptom development till diagnosis. Awareness of hereditary peripheral neuropathy should be raised among doctors and society to ensure timely diagnosis since possible treatment is under development.

Headache before and after ischemic stroke, their relationship with the outcome of ischemic stroke

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Objectives

The aim of the study was to reveal the association between ischemic stroke and headache.

Materials and Methods

The prospective study design was used. The study randomized 65 Riga East Clinical University hospital inpatients, with diagnosis ischemic stroke from January to September 2020. The data was analyzed using SPSS.

Results

Of the patients included in the study 55% (n-35) were women, 45% (n-30) men. 32% (n-21, 76% women) reported headache associated with ischemic stroke (HAIS), of which 42,86% (n-9) sentinel headache, 47,62% (n-10) new onset, late-onset 9,52% (n-2). 28% (n-6) migraine like, 72% (n-15) tension type. Ischemic stroke localization 46,15% (n-30) middle cerebral artery (MCA), posterior cerebral artery (PCA) 15,38% (n-10), vertebrobasilar artery (VB) 35,38% (n-23), 3,08% (n-2) anterior cerebral artery (ACA). HAIS reported 20% (n-6) of patients with ischemic stroke MCA, 50% (n-5) PCA, VB 43% (n-10). 71,43% (n-15) posterior circulation stroke, 76% (n-16) headache persisted after 3 months. The mean age of patients with HAIS was 55.33 years old 95.23% (n-20). Functional status: patients with HAIS at time of discharge – mRS was 0-3 and NIHSS ≤3 80.95% (n-17). At time of discharge patients without HAIS 46 % (n-21) – mRS was 0-3 and NIHSS≤3 22.73% (n-10).

Conclusions

Our study data shows that 32% of patients with ischemic stroke have HAIS. HAIS is more common in women as well as young people, HAIS more commonly associated with posterior circulation stroke. HAIS had tension-type phenotype, less migraine like symptoms. New onset headache was associated with better outcomes after ischemic stroke.

Hearing and vestibular impairment in temporal lobe epilepsy

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Objectives

Objective of the study was to report a case of fluctuating hearing loss, dizziness as the presentation of temporal lobe epilepsy.

A 40-year-old woman presented with intermittent symptoms of right-side hearing loss and tinnitus, episodic vertigo accompanied by nausea and more intensive noise the day before the attack. Between vertigo attacks the dizziness remains. Pure tone audiometry revealed moderate sensorineural hearing loss from the affected site. Symptoms resembled Meniere's disease, while caloric response was symmetric but oculomotor tests showed contralateral hypofunction. Besides negative MRI and relatively benign evolution of signs, patient never experienced seizures. Based on founded dysfunctionality in the right fronto-temporal lobe in the electroencephalography (EEG) she was subsequently diagnosed with temporal lobe epilepsy by the neurologist. No family history of neurologic either otological diseases has presented, her other medical history is unremarkable.

Anticonvulsant therapy immediately resulted in the disappearance of dizziness and hearing loss and noise. However, after 3 years dizziness occurred but hearing impairment manifested in more severe pattern, moreover, a fluctuating speech recognition and hyperacusis were appeared, no seizures have been reported. As well, EEG showed more intense dysfunction in the right fronto-temporal-parietal lobe and it is spread to the contralateral temporal lobe, but hyperventilation provokes dysrhythmia in both occipital lobes.

Keywords: fluctuating hearing loss, vertigo, temporal epilepsy.

Conclusions

Hearing loss and vertigo as a presentation of temporal lobe epilepsy are infrequent in otolaryngological and neurological practice.

The case emphasizes the importance of environmental testing, in particular repeated electrophysiological tests, as well as an interdisciplinary approach to controlling the symptoms of the disease while maintaining the patient's quality of life.

The hearing rehabilitation in this case seems to be controversial as overstimulation of acoustic stimulus can increase the pathologic brain stimulation of the auditory pathways.

Impact of COVID-19 pandemic on stroke endovascular treatment in P. Stradins Clinical University Hospital

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Objectives

Patients with acute ischemic stroke (AIS) due to a large vessel occlusion in Latvia are delivered to the endovascular treatment (ET) in two pathways optimizing patient transport (*drip and ship* (DS) or *mothership* (MS)). DS pathway in P. Stradins CUH has been launched since 2018.

The World Health Organization declared a COVID19 pandemic in March 2020. In this study we evaluate endovascular treatment outcomes before and during the pandemic.

Materials and Methods

We included AIS patients admitted to P. Stradins CUH, Riga, Latvia that received ET between 2018 and 2020. We collected the data about transportation pathway, administration of intravenous thrombolysis (TL), onset-to-groin time and functional outcome on discharge. Satisfactory outcome was defined as patients that achieved functional independence (modified Rankin scale (mRS) 0-2). We compared the results between pre-pandemic (01.01.2018.-29.02.2020.) and during the pandemic (01.03.2020.-31.12.2020.) periods.

Results

Total patients included 414 (265 pre-pandemic and 149 pandemic).

Pre-pandemic:

MS- 215 patients, ET+TL 73.0% (157), average onset-to-groin 233.7 min, mRS 0-2 27.9% (60)

DS- 50 patients, ET+TL 70.0% (35), average onset-to-groin 292.7 min, mRS 0-2 24.0% (12)

During the pandemic:

MS- 103 patients, ET+TL 63.1% (65), average onset-to-groin 256.0 min, mRS 0-2 22.3% (23)

DS- 46 patients, ET+TL 78.3% (36), average onset-to-groin 311.0 min, mRS 0-2 23.9% (11)

Conclusions

During COVID19 pandemic average onset-to-groin time increased in both patient groups - ship and drip and mothership pathway. Combined reperfusion therapy (endovascular treatment plus intravenous thrombolysis) was performed less in the mothership group, presumably because of the higher rate of contraindications for intravenous thrombolysis. Satisfactory functional outcome (mRS 0-2) decreased in mothership group compared to pre-pandemic period.

Impact of SARS-CoV-2 (COVID-19) pandemic on acute stroke care in Latvia

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Objectives

In 2018 Pauls Stradins Clinical University hospital (PSCUH) joined a quality improvement initiative (*Angels Initiative*). We have achieved good results in optimizing the quality of treatment of patients diagnosed with acute ischemic stroke (AIS). The World Health Organization declared the outbreak of COVID-19 in January 2020 and a pandemic in March 2020. In Latvia, the first case of COVID-2019 was diagnosed on March 2, 2020, and the number of cases is still growing. Despite the measures, which were taken we observe changes in quality of treatment of patients diagnosed with AIS. Our aim of this study was to evaluate recanalization therapy for AIS patients done in PSCUH during of COVID-19 pandemic.

Materials and Methods

We included patients discharged from PSCUH with diagnosis of AIS in 2019 and 2020. We collected the data about recanalization therapy and what was the door-needle time. We compared the results between each quarter (Q1–Q4) in 2019 and 2020.

Results

2019:

Q1- 219 patients admitted, recanalization rate 33,59%, average door-needle time- 35 min

Q2- 260 patients admitted, recanalization rate 31,47%, average door-needle time- 40 min

Q3- 291 patients admitted, recanalization rate 36,47%, average door-needle time- 35 min

Q4- 300 patients admitted, recanalization rate 32,02%, average door-needle time- 28 min

2020:

Q1- 328 patients admitted, recanalization rate 35,35%, average door-needle time- 20 min

Q2- 222 patients admitted, recanalization rate 31,37%, average door-needle time- 41,5 min

Q3- 233 patients admitted, recanalization rate 32,08%, average door-needle time- 20 min

Q4- 180 patients admitted, recanalization rate 37,5%, average door-needle time- 20 min

Conclusions

The most impact was seen in Q2 of 2020, that is the start of the COVID-19 pandemic. Showing reduced recanalization rates and longer door-to-needle time. The results improved as the pandemic wore on. We observed less patients admitted during the time of pandemic.

Intravenous thrombolytic therapy and acute ischemic stroke outcomes at Riga East Clinical University Hospital

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Objectives

Intravenous thrombolytic therapy is the mainstay of treatment for acute ischemic stroke. Intravenous thrombolytic therapy reduce the functional disability and death, it is the main acute treatment method for ischemic stroke. It has to be done in 4.5 hours from symptom onset. Reducing the time every 15 minutes until the start of treatment, decreases mortality by 4%, increases the chance of survival from a stroke with minimal functional impairment by 4%.

Materials and Methods

Information was obtained from medical records of patients who were admitted at Riga East Clinical University Hospital from January 2019 to January 2020 and received thrombolytic therapy.

Results

Medical records of 328 patients were analyzed. Of all patients, 54.3% (n=178) were women, 45.7% (n=150) - men. The average age of thrombolised patients was 73.37. Mean DNT was 43.8 minutes. NIHSS from 1 to 6 at admission were 40% (N=131) of patients, from 7 to 16 - 44% (N=143), upon 16 – 16% (N=53), no data 0% (N=1) On discharge these results were accordingly 62% (N=204), 15% (N=50), 4% (N=14), no data 9% (N=30), but exitus letalis - 9% (N=30) of patients. In admission mRS one were 3% (N=11) of patients, two - 8% (N=25), three - 16% (N=54), four - 34% (N=110), five - 39% (N=127), no data 0% (N=1). On discharge results were accordingly zero til one mRS 22% (N=73), 16% (N=53), 15% (N=49), 17% (N=57), 11% (N=36), no data 9% (N=30) and exitus letalis - 9% (N=30) of patients.

Conclusions

More than 2/3 of patients had DTN time of 45 minutes. NIHSS and mRS results improved after thrombolytic therapy.

Ischemic stroke in a healthy young adult: case report

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The incidence of ischemic stroke (IS) in <35-year-old patient population ranges from 1,5-4,5 per 100'000. The cause of IS in young patients sometimes remains unknown as there is a lack of the traditional risk factors. We are presenting an uncommon case of a 28-year-old male IS patient.

The patient had an unknown onset of confusion, left gaze palsy, marked left central facial nerve palsy, severe hemiparesis on the left side, tendon reflexes sin > dx, moderate superficial and deep sensation impairment on the left side. On admission Glasgow Coma Scale (GCS)- 14, NIH Stroke Scale (NIHSS)- 13, modified Rankin's Scale (mRS)- 5. Brain computed tomography (CT) + CT angiogram was performed revealing proximal middle cerebral artery occlusion and malignant ischemia on the left hemisphere. Due to the unknown stroke onset and the CT finding acute revascularization treatment was contraindicated and patient was admitted to stroke unit for symptomatic treatment.

On the next day patient deteriorated – GCS- 7, NIHSS- 22. A control CT showed severe brain edema and brain herniation. An urgent decompressive craniectomy was performed and patient was transferred to intensive care unit (ICU). After 11 days in ICU patient was transferred to Neurology department and post stroke rehabilitation was initiated. During this time in the hospital patient underwent an etiopathogenetic examination that included Holter monitoring, transthoracic and transesophageal echocardiogram, screening for systematic disease, thrombophilia and *Fabry* disease. No plausible cause for IS was identified. The diagnosis was defined using Trial of Org 10172 in Acute Stroke Treatment (TOAST) criteria as IS of undetermined etiology. A secondary prevention with rivaroxaban and acetylsalicylic acid was initiated. After 22 days from admission patient was discharged from the hospital to rehabilitation center. GCS-15, NIHSS-12, mRS-5.

A follow-up by a neurologist and a neurosurgeon was planned in 3 months.

Leucocytosis and C-reactive protein as predictors of secondary cerebral vasospasm and delayed cerebral ischemia in patients with aneurysmal subarachnoid haemorrhage

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Objectives

Aneurysmal subarachnoid haemorrhage (SAH) stays a distorting pathology due to the late complications - secondary vasospasm (SV) and delayed cerebral ischemia (DCI). Up to 60% of patients develop systemic inflammatory response syndrome. Aim was to investigate association of white blood cell (WBC) count and C-reactive protein (CRP) values with occurrence of SV and DCI.

Materials and Methods

Retrospectively medical records of 201 patient admitted in Intensive Care Unit (ICU) of Riga East University Hospital with aneurysmal SAH in three-year period were reviewed. As a primary outcome we analysed association of WBC count and CRP values at admission and on the third day with the occurrence of SV and DCI. Secondary – correlation of WBC and CRP with Fisher score, length of stay in ICU and outcome. Significance $p < 0.05$.

Results

107 patients were divided into three groups: $n=25$ (SAH-SV), $n=25$ (SAH-DCI), $n=72$ (SAH). Mean WBC count at admission was $11.2 \pm 3.7 \times 10^9/L$ vs. $13.2 \pm 3.3 \times 10^9/L$ in SAH vs. SAH-SV ($p=0.01$). CRP levels were higher in SAH-SV 15.7 ± 17.1 mg/L vs. 5.5 ± 12.2 mg/L ($p < 0.005$). WBC and CRP values at admission not differed between SAH-DCI and SAH ($p=0.233$, $p=0.106$). On the third day, WBC count was not significantly higher in SAH-SV anymore ($p=0.112$). Although, CRP level increased to 31.5 ± 50 mg/L vs. 54.2 ± 88 mg/L (SAH vs. SAH-SV), significance was not found ($p=0.137$) like also between SAH-DCI and SAH. Correlation was detected between WBC count at admission and Fisher score ($r=0.218$, $p=0.032$) and higher CRP values at admission had higher mortality rates ($r=0.4$, $p < 0.05$) in SAH-SV. Patients with greater WBC count and CRP values at admission stayed longer in ICU - 13 ± 15 vs. 5 ± 5 days in SAH-SV vs. SAH, $p=0.002$ and $p=0.003$.

Conclusions

Aneurysmal SAH patients with higher values of WBC and CRP at admission have greater risk to develop SV and stay longer in ICU, but higher CRP values is associated with higher mortality.

Memory performance in Charcot–Marie–Tooth disease patients

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Objectives

Charcot–Marie–Tooth (CMT) disease is characterized by a chronic both motor and sensory polyneuropathy. This is the most common inherited disease of the peripheral nervous system, CMT1A is the most common CMT type, followed by CMTX1 and other subtypes. CMTX1 patients may exhibit CNS involvement during the disease course. There are controversial data about evidence of increased cognitive impairment prevalence and decreased volume of white matter in patients with hereditary neuropathy. The goal of the study was to determine and compare memory impairment in patients with different CMT types and evaluate possible associations with disease severity.

Materials and Methods

We recruited 21 CMT patients from geneticists', neurologists' and paediatric neurologists' clinical practices. Patients responded to a sociodemographic questionnaire and clinical severity was assessed using CMT Neuropathy Score version 2 (CMTNSv2). Assessment of memory cognitive abilities was performed using a computerized neuropsychological test battery, CNS Vital Signs (CNSVS), which provides age-adjusted standard scores for verbal memory (i.e. recognition memory for words) and visual memory (i.e. recognition memory for designs).

Results

Data from 21 CMT patients were analysed, from our group 42.9% (n=9) were CMT1A patients, 23.8% (n=5) were CMTX1 patients and 33.3% (n=7) other subtype CMT. Mean age in study group 37.3 ± 12.5 years. Clinical assessment revealed mean CMTNSv2 14.1 ± 8.0 , in CMT1A it was 14.2 ± 3.8 , in CMTX1 21.2 ± 7.6 and in other CMT type 9.0 ± 9.1 . All study group patients took CNSVS memory tests. Analyses showed no abnormalities on CNSVS memory domain scores in verbal and visual memory. All patients had mean scores that were within the average range, without differences in subgroups.

Conclusions

CMT patients did not have memory impairments assessed by CNSVS according to our study results, these findings were regardless of CMT subtype. Further research with larger patient cohorts are needed.

Most common in-hospital complications of stroke in Riga East University Hospital Neurovascular department

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Objectives

To investigate frequency and type of complications in patients with stroke during hospitalization in Riga East University Hospital Neurovascular department from 2016 to 2020 year.

Materials and Methods

Data were retrospectively obtained from Riga East University Hospital local registry from 2016 to 2020 year. 4915 patients with stroke were analyzed and compared with data from literature and researches from other countries.

Results

Median age of patients was around 76 (IQR 66-83) years. Median hospitalization time in patients with transient ischemic attack (TIA) was 5 (IQR 4-7) days, in patients with ischemic stroke (IS) – 8 (IQR 6-9) days, in patients with hemorrhagic stroke (HS) – 7 (IQR 5-9) days. Majority of patients had no complications (84.9%). Patients with TIA had less complications (3.9%) comparing to patients with IS and HS that had most complications (16.2% and 14.5% respectively). The most common complications were: pneumonia (5.1%), heart failure decompensation (4.9%), severe kidney failure (2.2%) and urinary tract infection (1.7%). No one patient with TIA had infectious complications. The total mortality rate among all patients was 13.7% (the mortality rate in patients with TIA was 0%, in patients with IS – 12.8%, in patients with HS – 30.9%).

Conclusions

HS accounting for a disproportionately large proportion of mortality among stroke patients and hospitalization time correlate with complications frequency which coincides with other research and literature data.

Outcome of spontaneous intracerebral hematoma associated with baseline troponin T-HS

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Objectives

Troponin T-HS I is a widely used and reliable marker of myocardial damage. It is studied in ischemic stroke and subarachnoid hemorrhage as independent prognostic factor for mortality. However, the significance of troponin T-HS elevation in spontaneous intracranial hemorrhage (sICH) is not well studied.

Materials and Methods

A retrospective medical record review from 01.01.2019 – 31.12.2019 was performed in the Pauls Stradins Clinical University Hospital and in Rīga East Clinical University Hospital Gailezers. Together we collected 200 records.

Results

A total of 200 patients were included, of whom 49% (n = 98) were women and 51% (n = 102) were men. Of these, 68% (n = 136) patients were alive at discharge (mean 6.81 days ± 5 days) and 32% (n = 64) were dead. In the living group, the mean troponin T-HS was 27.46 ± 61.54 ng / L, minimum 3 ng / L, maximum 521 ng / L. In the group of dead, troponin averaged 62.18 ± 112.7 ng / L, minimum 3 ng / L, maximum 464 ng / L (p = 0.002).

Conclusions

If a patient has an elevated blood level of troponin T-HS at the time of onset, the higher the risk of the patient dying during hospitalization.

Primary hyperaldosteronism with neurological manifestations

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Primary hyperaldosteronism (PHA) is one of the most common causes of secondary hypertension but its association with neurological manifestations are not as common. We report the case of a 68-year-old woman with sudden onset asymmetrical paresis and pain. Her laboratory results showed hypokalemia and an elevated aldosterone/renin ratio. An abdominal CT scan showed an adenoma in the left adrenal gland. The patient began pharmacological treatment and was further referred to surgical treatment. We recommend clinicians to maintain a high level of suspicion in patients with atypical neurological findings to consider endocrinological disorders.

PHA refers to disorders in which the production of aldosterone is abnormally high, that increases sodium reabsorption and loss of potassium and hydrogen ions. Most common causes of PHA include adrenal adenoma, unilateral or bilateral adrenal hyperplasia. Symptoms include headaches, hypertension, polyuria, weakness, paralysis and disturbances of cardiac rhythm. Exact prevalence of PHA is unclear, but some estimates suggest that 5-15%.

After start of specific treatment her neurological condition improved, on the discharge a proximal paresis in the left leg still persisted, pain significantly decreased and she was able to walk without support. The diagnosis based on investigational findings are consistent with PHA with intermittent hypokalemia with secondary intermittent asymmetrical proximal lower paraparesis. Patient is discharged for further endocrinological council to decide the operative treatment of adenoma.

Relationship between motor reserve, thalamus volume, working memory and information processing speed in older adults

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Objectives

This study aimed to investigate the relationship between the motor reserve, volume of the thalamus and working memory, as well as the role of information processing speed, in older adults.

Materials and Methods

44 participants, aged 65 to 85 ($M = 71.25$, $SD = 5.18$, 22.7% male), with no self-reported on-going neurological, oncological or psychiatric diseases, were included in the study. The data on physical activity was obtained with the Social Determinants of Health Behaviour questionnaire (FINBALT, 2008), and the motor reserve index was calculated. For working memory measures, the Numbers Reversed task was used (Woodcock et al., 2001). Information processing speed was assessed with Handball Goalie task (Molotanovs, 2013) and MRI data were obtained with Siemens 1.5T and analyzed with Freesurfer software.

Results

Data were analyzed with Spearman's rho and indicated a statistically significant relationship between the motor reserve index and thalamus ($r_s = .324$, $p = .038$), while thalamus positively correlated with working memory scores ($r_s = .347$, $p = .021$). There were no significant relationships between the rest of the variables. As the literature has indicated a role of information processing speed in such executive functions as working memory, a partial correlation analysis was conducted and the results indicated that the information processing speed significantly improved the association between both - working memory and thalamus, as well as motor reserve ($r_s = .425$, $p = .005$ and $r_s = .255$, $p = .099$).

Conclusions

The results indicate that greater thalamus volume could be related to better motor reserve, as well as better working memory results; however, the association between the variables could be modified by information processing speed. Further studies would be beneficial to better understand the role of motor reserve and information processing speed in cognitive functioning and brain health.

Reversible posterior leukoencephalopathy syndrome: case report

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Objectives

Posterior reversible encephalopathy syndrome (PRES) is a rare syndrome characterized by sudden onset of headache, altered consciousness, impaired vision, seizures. PRES pathogenesis is not entirely clear – it's believed, that main role is played by cerebral autoregulatory dysfunction caused by arterial hypertension.

Case report: a 32-year-old pregnant (17+4 weeks) female was hospitalized with headache, vision impairment and sensory disturbances on the left side of the body. On admission patient had left homonymous hemianopia, superficial hemi-type sensory disturbances on the left side of the body, positive Babinski sign. CT of the head showed formed ischemia with hemorrhagic imbibition in the territory supplied by the right MCA and PCA territory. Transcranial Doppler ultrasound showed fast blood flow rate in the right MCA M1, M2 and left MCA M1 segments, indicating vasospasm. T2 weighted and FLAIR MRI showed increased signal intensity in the right parietal and occipital lobe with transition to temporal lobe in cortical and subcortical layers, cortical gyral flattening due to edema, corpus callosum and rear portion of the midbrain edema. Treatment with nimodipine improved patient's health. After a week blood flow rate in the right MCA M1 segment normalized. In a few weeks all of the symptoms disappeared. One month later MRI showed residual signs of blood flow impairment in the territory supplied by the right MCA.

Conclusions

PRES is a rare syndrome, which resolves in a few days or weeks if diagnosed and treated properly. Usually there are no residual symptoms after prompt treatment, therefore MRI is indicated in patients with typical clinical manifestation and risk factors.

Risk factors for transient ischemic attack, hemorrhagic and ischemic stroke: single university hospital data

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Objectives

To evaluate the major modifiable risk factors among patients of all types of stroke.

Materials and Methods

A retrospective hospital-based study was conducted at Riga East University Hospital Clinical Centre "Gailezers". The data of 4915 patients from the Stroke register (2016-2020) of Neurology and Neurosurgery Clinic was analyzed in this study.

Results

Hypertension is a particularly important risk factor for all types of stroke, and it was found in 3602 (88,8%) patients with ischemic stroke (IS), in 302 (85,1%) - with transient ischemic attack (TIA) and in 461 (91,8%) - with hemorrhagic stroke (HS). Atrial fibrillation (AF), a risk factor for cardioembolic stroke, was discovered in 109 (30,7%) of the TIA patients, 1972 (48,6%) of the IS patients and 89 (17,8%) of the HS patients. Diabetes mellitus was found in 58(16,3%) TIA patients, 716 (17,6%) – IS, and 52 (10,4%) HS patients. Dyslipidemia was identified in 2015 (49,7%) patients with IS, in 193 (54,4%) patients with TIA. Previous ischemic stroke was diagnosed for 1200 (29,6%) patients with IS and in 95 (18,9%) patients with HS. Carotid artery stenosis is a more common risk factor for IS (37,6%) and TIA (38,6%) than for HS (8,8%), but alcohol abuse – for HS (7,8%). The percentage of overweight presence is approximately identical for patients with IS (20,6%), TIA (16,3%) and HS (14,5%).

Conclusions

On the basis of these data - the major modifiable risk factors for all types of stroke were hypertension, AF, and dyslipidemia.

Short term clinical outcomes of patients with non-traumatic subarachnoid haemorrhage: single centre database study

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Objectives

Acute non-traumatic subarachnoid haemorrhage is linked to high mortality rates and is common for cerebral aneurysm rupture.

Materials and Methods

Study included 529 patients hospitalized in Riga East University Hospital from January 2013 to June 2019 with diagnosis acute non-traumatic subarachnoid haemorrhage. From medical histories patients' age, gender, radiological findings during and clinical outcomes were evaluated.

Results

There was significant predominance in females for acute non-traumatic subarachnoid haemorrhage in 313 cases with mean age 62,04 years (27-94), male patients 216 with mean age 52,78 (22 – 90). Most of the patients in 77,31% were hospitalized with GKS 10 to 15 and Fisher scale 4 in 344 cases (65,02%). Most common cause of non-traumatic SAH was aneurysm rupture, found in 419 cases (79,20%), 104 patients had non-specific SAH without angiographic finding (19,65%) and 6 patients (1,13%) - AVM rupture. Overall mortality in this pathology group was 25% (133 patients). Clinical results were estimated by patient's independence, using modified Rankin scale. In the group of SAH due to an aneurysm rupture and endovascular or surgical treatment mRS score 0 -2 were estimated in 200 patients (56,65%), in aneurysm group without treatment -5 patients (7,57%) and in SAH group without aneurysm rupture 83 patients (75,45%). Moderate to severe disability with mRS scale 3-5 in first group was assayed in 89 cases (25,22%), in second group - 13 patients (11,81%) and in the last group in 6 patients (9,09%). mRS 6 in the first group was in 64 cases (18,13%), in the group without aneurysm treatment - 55 cases (83,33%) and in the last group - 14 patients (12,72%).

Conclusions

There is significant difference in clinical outcome between patients with aneurysm caused subarachnoid haemorrhage vs non-specific SAH causing lower independence rates. Study showed statistically significant higher mortality rates in patient group with aneurysm caused subarachnoid haemorrhage without surgical treatment.

The surgical approach for complete corpus callosotomy in mice

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Objectives

Corpus callosum is a major bundle of white matter fibers that connects both hemispheres by forming important interhemispheric commissures of brain. Complete callosotomy is interhemispheric commissures dissecting surgery. In clinical practice complete or partial callosotomy is performed to reduce frequency of generalized seizures of patients with pharmacologically untreatable epilepsy. In preclinical studies, animal corpus callosotomy is a long-term research topic with few numbers of studies. Furthermore, the most of studies lack the precise description of surgical technique and present some disadvantages. In this study, we describe a new approach for corpus callosotomy procedure by using electrocautery in mice.

Materials and Methods

For this study, we used C57BL/6 8-12-week-old male mice (20-24g) that underwent corpus callosotomy surgery. Anesthetized mouse was placed in stereotaxic frame and rostral-caudal skin incision was made along midline, to expose the skull. Cranial window was performed by drilling circular section of the skull. Dura mater and superior sinus was carefully pulled aside to reveal corpus callosum. Corpus callosum dissection was made by electrocautery and cranial window was closed by circular skull bone flap. Skin incision was stitched. Two weeks after surgery, animals were sacrificed and corpus callosum integrity was examined by Nissl staining.

Results

Two weeks of post-surgical observation did not showed any pathological behavioral changes, like locomotor and eating habits in mice. The obtained sections of callostomized mice brain revealed absence of corpus callosum integrity in midline, along all corpus callosum length.

Conclusions

Electrocautery can be used as additional tool for corpus callosotomy in mice. Therefore, further preclinical research is needed.

Acknowledgements

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Treatment of stroke risk factors prior to transient ischemic attack or stroke: a cross sectional survey in Riga East Clinical University Hospital "Gailezers"

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Objectives

The aim of the study is to determine medications used for management of stroke risk factors before hospitalization due to a transient ischemic attack (TIA), an ischemic (IS) or hemorrhagic (HS) stroke at Riga East Clinical University Hospital (RECUH).

Materials and Methods

A retrospective study included 4915 patients that were admitted to RECUH Department of Neurology with TIA, IS or HS between December 2016 and January 2020. Data about presence of stroke risk factors and previous use of prescription drugs was obtained from patients' medical reports and analysed with MS Excel and IBM SPSS, using descriptive statistical methods.

Results

Study included 355 (7,2%) patients with TIA, 4058 (82,6%) patients with IS and 502 (10,2%) patients with HS. 61,8% patients were women, 38,2% were men. The average age was 74 (SD ± 12,3).

88,8% of admitted patients had arterial hypertension, 46,7% had dyslipidemia, 44,2% had atrial fibrillation and 16,8% had *diabetes mellitus*.

71,0% of patients prior to hospitalization for TIA, IS and HS used antihypertensive medications - 68,7%, 72,3% and 62,7% respectively. Lipid lowering drugs were used by 11,7% of patients: 18,9% with TIA, 11,8% with IS, and 5,8% with HS. 20,7% of patients used antiplatelets before admission: 29,6%, 21,3% and 9,0% in subgroups respectively. For management of *diabetes mellitus* 6,8% of patients used oral antidiabetic drugs and 2,6% insulin: 7,9% and 2,8% with TIA, 7,1% and 2,7% with IS, 3,4% and 1,4% with HS. Oral anticoagulants were used by 7,7% of patients hospitalized for TIA, IS and HS: 11,3%, 7,7% and 5,6% respectively.

Conclusions

Prior to hospitalization for TIA and stroke 80% of patients were treated for hypertension, 52,9% received treatment for *diabetes mellitus* and 25% of patients with dyslipidemia received lipid lowering medications. Only 17,6% of patients with atrial fibrillation received oral anticoagulant therapy prior to admission to hospital.

Pediatric Neurology

Tick-borne encephalitis complicated by Guillain-Barré syndrome in a 17 year old patient: case report

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Guillain-Barré syndrome (GBS) presents as acute, monophasic, non febrile, ascending weakness with or without hyporeflexia, usually follows after acute illness. But Tick-borne encephalitis (TBE) presents with variety of neurological symptoms from mild to severe neurological disease.

We describe a case report of a 17 year old patient with atypical presentation of recurrent GBS mimicking TBE although the patient had undergone full TBE vaccination.

Diagnostic test showed positive IgG and IgM antibodies to TBE in the cerebrospinal fluid and positive IgG and border -line IgM antibody values in the serum.

The recurrent episode of GBS in the patient presented with a more severe limb weakness with progressive hyporeflexia.

The patient underwent repeated course of intra-venous immunoglobulin (IVIg) therapy during 40 days, full course of rehabilitation therapy.

Underlying conditions and atypical presentation of the disease could need a reevaluation of the blood tests especially in the pediatric patients.

Neuroradiology

Acute stroke outcome potential risk stratification based on imaging criteria

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Objectives

More strict imaging based patients selection could decrease mortality and severe neurological deficit after EVT treatment.

The aim of our study was to analyze imaging-based criteria—computed tomography perfusion (CTP) core ASPECTS score and CT angiography collaterals pattern – before patient selection for reperfusion treatment (EVT) and evaluate three months functional outcome (modified Rankin scale -mRS) after treatment.

Materials and Methods

We analyzed 208 patients in the mixed retrospective/prospective study (2015-2018) with large artery occlusion - 90 (43%) men and 118 (57%) women, and the median age was 72± 10.55 years. Two comparative initial CTP ASPECTS scoring groups were defined (≥ 7 and ≥ 6) and collaterals (good and poor) were used for patient evaluation in comparison with functional outcome (mRS).

Results

Majority of patients had MCA M1 segment occlusion 157 (75%) and 51 (25%) had ICA occlusion. Successful recanalization after EVT was 90% (TICI 2b-3) with mRS 0-2 after discharge and 3 months 62 (30%) vs 83 (40%), $p < 0.001$, respectively. Small size CTP core (ASPECTS ≥ 7) with good collateral pattern showed higher potential risk OR 4.651 times, CI 95% (2.3 - 9.2) for good outcome (mRS 0-2) compared with CTP -core ASPECTS < 7 , $p < 0.001$. After re-categorization of patients groups by ASPECTS ≥ 6 with good collaterals we revealed OR 4.738 times higher potential risk for 3 months good outcome (CI 95% (2.4-9.5), $p < 0.001$) compared with CTP core ASPECTS < 6 , $p < 0.001$. We found that CTP - core ASPECTS lower score at admission by each single point increases mortality rate 1.3 times (OR 1.346 times CI 95% [1.06-1.7]).

Conclusions

Good clinical outcome in acute ischemic stroke shows significantly higher rate if initial imaging - based biomarkers are applied in patient selection for EVT: CTP core ASPECTS ≥ 6 with presence of good collaterals in contrary with ASPECTS < 6 has significant impact of each score point on mortality regardless collaterals.

Clinical outcome based on central vs. peripheral ASPECTS regions in evaluation of acute ischemic stroke

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Objectives

The aim of the study is to analyse clinical outcome based on whether central or peripheral regions are affected according to Alberts Stroke Programme Early CT Score (ASPECTS) division.

Materials and Methods

A retrospective analysis of 51 patients with acute middle cerebral artery ischemic stroke was done. Patient evaluation was done by using NIHSS scale (The National Institutes of Health Stroke Scale) and non-contrast CT scan was done at the time of admission and on follow-up after 24 to 48 hours. ASPECTS value was measured for each CT scan. Patients were divided in two groups based on the affected ASPECTS region- central lesions (Nucleus caudatus, Nucleus lentiformis, Capsula interna, Insula) and peripheral lesions (M1- M6).

Results

The mean ASPECTS score of initial CT scan in central lesion group was 9.452 ± 1.090 and in peripheral lesion group 9.750 ± 0.638 ; follow-up scan mean ASPECTS score in central lesion group was 7.000 ± 1.291 and in peripheral lesion group 8.200 ± 1.239 . NIHSS scores were higher at the admission and on follow-up in patients that had central regions affected comparing to patients with no central regions affected - initial mean NIHSS scores in central lesion group was 12.290 ± 4.755 and in peripheral lesion group 7.750 ± 6.068 ; follow-up mean NIHSS scores in central lesion group was 6.097 ± 4.206 and in peripheral lesion group was 3.400 ± 2.927 . NIHSS score differences between groups were statistically significant on initial evaluation (Mann-Whitney U test, $n=51$, $u=139.500$, $p<0.01$) and on follow-up (Mann-Whitney U test, $n=51$, $u=182.000$, $p<0.02$).

Conclusions

It is important to analyse affected ASPECTS regions by taking into account that centrally located regions have higher impact on sustaining brain connectivity.

Relaying on ASPECTS value alone can lead to unjustified prediction of clinical outcome. Furthermore, stroke occurring in peripheral regions demonstrates the same ASPECTS value as stroke in central regions, but the clinical outcome prognosis could differ significantly.

Does endovascular treatment of cerebral vasospasm improve short term clinical outcome? Single centre experience

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Objectives

Cerebral vasospasm after subarachnoid haemorrhage (SAH) is a major complication causing cerebral ischemia and infarction. Mainly it is common from 4th to 14th day after SAH and neurological deficit severity depends on early treatment.

Materials and Methods

Study included 529 patients hospitalized in Rīga East University Hospital from January 2013 to June 2019 with diagnosis acute non-traumatic subarachnoid haemorrhage. From medical histories patients with clinical and radiological signs of cerebral vasospasm was identified, clinical outcomes were evaluated.

Results

Clinically significant cerebral vasospasm was identified as complication in 87 (16,44%) patients after non-traumatic subarachnoid haemorrhage with predominance in aneurysm rupture group 21,47% vs non-specific SAH group without angiographic finding - 2,72%. There were 47 females with cerebral vasospasm with mean age 59,24 years (38-87), male patients 40 with mean age 50,15 years (22 – 90). Most of the patients in 70,96% were hospitalized with GKS 10 to 15 and Fisher scale 4 in 67 cases (72,04%). Mortality after cerebral vasospasm was determined in 34,48% (30 patients). There were 46 patients of cerebral vasospasm treated by endovascular approach and 41 patients with conservative treatment. Clinical results were estimated by patient's independence, using modified Rankin scale. In the group of endovascularly treated cerebral vasospasm mRS score 0 -2 were estimated in 22 patients (54,34%), in group of vasospasm conservative treatment - 3 patients (7,31%). Moderate to severe disability with mRS scale 3-5 in first group was detected in 14 cases (30,43%), in second group - 14 patients (34,14%). mRS 6 in the first group was in 7 cases (15,21%), in the group with conservative treatment - 24 cases (58,53%).

Conclusions

Clinically significant cerebral vasospasm has higher rate of mortality comparing to general population of subarachnoid haemorrhage patients. Endovascular treatment of cerebral vasospasm is linked to higher rate of patients' independence and lower mortality.

MRI whole-brain connectometry analysis in patients with mild cognitive impairment and dementia

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Objectives

To determine MRI whole-brain connectometry differences in patients with no cognitive impairment, mild cognitive impairment (MCI), and dementia.

Materials and Methods

All patients were scanned on a 3T MRI scanner and diffusion images were acquired using DTI sequences. Connectometry analysis was performed and FreeSurferDKT was used as the brain parcellation, and the connectivity matrix was calculated by using the count of the connecting tracks. The connectivity matrix and graph theoretical analysis was conducted using DSI Studio (available at <http://dsi-studio.labsolver.org>).

All patients underwent Montreal Cognitive Assessment (MoCA) and were divided into 3 groups - no cognitive impairment, mild cognitive impairment, and dementia.

Whole-brain network measures that were compared between groups were - density, clustering coefficient, transitivity, path length, small worldness, global efficiency, the diameter of the graph, the radius of a graph, assortativity coefficient, and rich club (with k values 5, 10, 15, 20, and 25).

Results

Patients with no cognitive impairment had higher connectome density, shorter path lengths, higher small world-ness, better global efficiency, and higher rich club concentration compared with MCI patients and patients with dementia.

On the contrary patients with cognitive impairment had higher values of clustering coefficient and transitivity.

Conclusions

MRI connectometry analysis could be used to aid in the diagnosis of MCI and dementia as well as to differentiate patients with no cognitive impairment, MCI, and dementia.

Spectrum of CT findings in patients with suspected acute traumatic brain injury. One year experience in Riga East Clinical University Hospital

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Objectives

Traumatic brain injury (TBI) is one of the most significant public health problems worldwide based on high incidence, prevalence, healthcare resource utilization, resulting death, disability and total economic cost. Emergency CT is method of choice in detecting treatable TBI before secondary neurological damage occurs. Aim of study was to assess spectrum and incidence of CT symptoms in patients with suspected TBI and correlate them with mechanism of injury, demographics, intoxication, and outcome.

Materials and Methods

Retrospective study included 570 consecutive patients transported to Emergency department Riga Eastern University Hospital with suspected acute TBI between Jan 1 2019 and Dec 31 2019. All patients received emergency non-contrast head CT. Patients have been grouped according to obtained demographic, clinical, radiological data: gender, age, trauma mechanism, comorbidities, substance intoxication, hospitalization, surgery, outcome; CT signs of TBI: craniofacial, calvarias, skull base fractures; intracranial hemorrhage; contusions, secondary brain damage. Descriptive and analytical statistics was performed by SPSS software. Significance was considered with $p < 0.05$.

Results

Patient's age ranged from 18 to 101. There was predominance of men (M: F=3:2). CT signs of TBI (positive findings) were found in 175 cases (31%). TBI was most commonly found in middle-aged men, people with low socioeconomic status, alcohol users. Most common TBI mechanisms were falls (42%) and beatings (23%). 44 (26%) patients were hospitalized, 11 (6,3%) had surgery, 4 (2,3%) died. CT signs of TBI were extracranial soft tissue damage 133 (76%), bone fractures 47 (27%), craniofacial fractures -43, skull base fractures -10, calvarias fractures -6; hemorrhagic brain contusions -18, SAH -17, SDH -16, IVH -3; secondary brain damage -8.

Conclusions

Head CT in acute TBI is an indispensable tool of Emergency radiology department for verifying injury, need for surgery, predicting outcome. Still, the rational use of head CT scans to minimize unnecessary harm should be taken into consideration.

Pain Medicine

Approach to acute low back pain in the emergency unit for treatment decision making

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Objectives

To differentiate neuropathic and nonspecific low back pain by clinical examination, determine correlation of radiological lesions with clinical signs and impact treatment decisions.

Materials and Methods

A 4 month prospective ongoing study was carried out in the Emergency unit at Pauls Stradins Clinical University Hospital. Patients presented with LBP were included. Patients filled questionnaires and were assessed clinically. Standardized Evaluation of Pain (StEP). was used to distinguish neuropathic and non-neuropathic low back pain. Patients were categorised into neuropathic/non-neuropathic and specific pain groups. After up to 90 days patients were followed up.

Results

A total of 37 patients were evaluated: 16 females (43,2%) and 21 males (56,8%), median age - 47 years (27-78 ± 13). After a detailed examination 27 patients (73%) were determined to have non-neuropathic pain, 6 patients (16,2%) - neuropathic pain, 3 patients (8,1%) had a specific disease. In 19 patients (51,4%) visual diagnostics were done in the emergency unit, but more patients received additional radiological investigations later. Overall 75% (n=28) of study participants received radiological imaging. Radiologic examination impacted treatment for only 2 patients. One patient developed spondylodiscitis. One patient with non specific low back pain was found to have a fracture of sacrum. StEP scale confirmed radicular pain in 6 out of 11 patients and correlated with radiological lesions.

Conclusions

Our study demonstrates non-specific LBP as a leading cause of emergency admission due to back pain. Even in the absence of red flags, careful follow up is important in patients with non remitting back pain. Further investigation is needed to determine impact of radiological investigations on patient's outcomes.

Conquering misdiagnosed pudendal neuralgia for years: case study

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The aim of the study: to present the diagnostic and clinical features of pudendal nerve neuralgia and create awareness among clinicians of this rare and painful condition.

Case: A generally healthy 40-year old female with constant, disabling and for a long-time misdiagnosed pain in perineum. Perineal pain appeared gradually in 2004, without obvious reason, at first interpreted as urethritis, but after urological investigations and treatment there was no pain relief. Besides gynecologist, proctologist, psychiatrist and spine surgeon consulted patient and no reason for pain was found. Patient has chronic constipation history due to inner rectal prolapse. Patient complained of stabbing, burning, intolerable pain (maximal NRS 10) in vulva, vagina, rectum and urethra, urination hesitancy, needed to void several times per hour, sexual dysfunction. Pain aggravated with sitting and often worsened throughout the day, but did not wake her at night. After 10 years of suffering untreated perineal pain patient had to quit her job. At last pudendal neuralgia was diagnosed in 2019, pain specialist examination revealed thermal hyperalgesia and mechanical allodynia in perineum. Pudendal neuralgia was confirmed by diagnostic pudendal nerve block on both sides, afterwards bilateral cryodestruction was performed. Patient became 100% painless for 1 month, but after 3rd month pain started to return. At that time ganglion impar diagnostic block was performed (Lidocaine 40 mg with Dexamethasone 8 mg) with consequent pain reduction for 50%, one week later ganglion impar neurolysis (Phenol 6% 3ml) was done. Unfortunately, perineal pain still persisted, so pudendal nerve cryodestruction was repeated on the 4th month after first cryoablation procedure, afterwards pain 80% reduction was achieved. Patient continue prescribed medicine therapy and started CBT with psychotherapist, she reported daily pain in perineum NRS 2, but her quality of life crucially improved.

Dorsal root ganglion pulsed radiofrequency vs. transforaminal epidural steroid injection: prospective randomized study

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Objectives

Pulsed Radiofrequency (PRF) procedures are a minimally invasive and target-selective modality procedure. PRF procedure becoming an increasingly used treatment for chronic radicular pain and competitive with Transforaminal Epidural Steroid Injection (TFESI).

Materials and Methods

A prospective randomized, blind control study was performed to evaluate the therapeutic effect of lumbar Dorsal Root Ganglion (DRG) PRF treatment and lumbar TFESI. The study included a total of 72 patients, 35 were randomized to PRF group, 35 patients - to TFESI group. The outcome of the treatment either by PRF or TFESI was evaluated by Global Perceiving Effect (GPE) and decrease in NRS and Oswestry Disability Questionnaire (ODQ) at day 30, 60 and 180. After 30th day follow-up, patients with Likert scores ≤ 5 had received the identical procedure.

Results

Global perceived effect (GPE) increased with time for both PRF and TFESI groups, reached at day 180 follow-up 6.2 for PRF and 6.3 for TFESI. Statistical comparison of improvements, caused by PRF and TFESI does not revealed significant difference in the treatment outcomes. Generally values of GPE, decrease of NRS and decrease of ODQ was similar for PRF and TFESI groups. The only exception was decrease in ODQ scale at the day 30 that was higher for PRF treatment (P-value 0.02). Alongside, in PRF group there was only 9% of patients with less than 20% improvement in disability, as compared with 29% in TFESI group. But at the day 180, the proportion of patient with pain reduction more than 60% in TFESI group exceeded one for PRF group.

Conclusions

The effectiveness of DRG PRF and TFESI by evaluation of GPE, NRS and ODQ demonstrates the efficiency of the PRF in short-term response, despite of similar GPE and NRS scores in both groups. TFESI procedure is more effective in long-term perspective, proved by higher proportion of patients with pain reduction.

Efficacy of myofascial trigger points infiltration injections and dry needling in patients with upper quadrant myofascial pain syndrome

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Objectives

To investigate the efficacy of myofascial trigger points injections (TPI) with local anaesthetics and myofascial trigger points dry needling (DN) in patients with upper quadrant myofascial pain syndrome (MPS)

Materials and Methods

216 patients with upper quadrant MPS (according to Simons, 1999, International Consensus on Diagnostic Criteria and Clinical Considerations of Myofascial Trigger Points, 2018) included in this prospective comparative study. Group 1 comprised 72 patients who were given TPI, a group 2 comprised 72 patients who were treated with a DN and a group 3 comprised 72 patients who were treated with oral medications and physiotherapy. The patients demographic data, Oswestry Disability Index (ODI) scores, q-DASH and Visual Analog Scale (VAS) scores were recorded, these data were evaluated at 2nd day, 14th day, 28 day and 3rd-month follow-ups.

Results

No significant differences were observed in age, sex, or baseline VAS score between the all groups ($p>0.005$). The VAS scores at 2nd day, 14th day and 28 day were significantly ($p<0.05$) lower in the group 1 and 2 versus the control group 3 and significantly ($p<0.05$) lower than baseline values in all groups. There were no significant differences ($p>0.005$) in baseline ODI and q-DASH scores between groups, and the ODI and Quick-DASH scores at 2nd, 14th day were significantly ($p<0.05$) lower in the 1 and 2 group than group 3 and significantly ($p<0.05$) lower than the baseline values in both groups. No statistically significant efficacy was observed between group 1 and group 2 in assessing VAS, ODI, and q-DASH at 28 day.

Conclusions

We obtained better results with TPI and DN than only physiotherapy and oral medications in patients with upper quadrant MPS. Thus, both methods have proven to be equally effective in the short term treatment and can be used if there are contraindications to a particular method in patients with upper quadrant MPS.

Estimation of patients' pain intensity by primary healthcare practitioners

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Objectives

The aim of the current study was to analyze how strongly primary healthcare practitioners trust a patient's pain complaints.

Materials and Methods

The study was performed through a survey. Along with with questions about geodemographic data, modified KnowPain-50 questionnaire was used. The survey assessed PHP knowledge, attitudes and beliefs in: 1) initial pain assessment; 2) defining goals and expectations; 3) development of a treatment plan; 4) implementation of a treatment plan; 5) reassessment and management of longitudinal care; 6) management of environmental issues. IBM SPSSv23 was applied for the statistical analysis.

Results

In total, 100 participants (mean age 46.2 years, SD±14.1) were included in the analysis, predominantly females (89.0% vs. 11.0%). Work experience as a doctor ranged from several months to 45 years. Most of the patients of the interviewed PHP were adults (71.0%). At least 83.0% of PHP feel comfortable taking a pain history and writing orders for pain medications and 88.0% agreed that can assess patient function and activity status in their office with careful questioning of the patient. More than a half (53.0%) of PHP agreed to varying degrees with the statement that consistently high score on pain rating scales in the face of minimal or moderate pathology, means that the patient is exaggerating his pain and up to 42.0% were more or less confident that pain complaints and degree of disability always correlate well in patients with chronic pain. Two thirds (73.0%) of PHP thought that if the patient can be distracted from his pain, it usually means that he does not have high pain intensity. Changes in vital signs as reliable indicators of pain severity considered 53.0% of PHP.

Conclusions

Professionals showed distrust of patient complaints and belief in unproven effectiveness of changes in vital signs in an objective assessment of pain. Aforesaid can lead to patient pain undertreatment.

Health care professionals' and low back pain patients' beliefs about the vulnerability of the back

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Objectives

The aim of the study was to compare health care professionals' (HCP) and low back pain (LBP) patients' beliefs about the vulnerability of the back.

Materials and Methods

A cross-sectional study was performed. HCP and LBP patients were asked to fill the Back-Pain Attitudes Questionnaire developed by *Darlow et al.* (2014). Together 267 questionnaires were obtained. Participants who had LBP during the survey or any previous LBP episodes were included in the study. Nine items from the questionnaire (1-6;9;12;14) regarding the vulnerability of the back were analyzed.

Results

In the current study, 210 surveys were valid. Participants' mean age was 47.2 years (SD 13.4). Most participants were females (79.5% vs 20.5% males). In HCP group was 65 (31.0%) participants and in LBP patients' group was 145 (69.0%) participants. From the analyzed items, a statistically significant difference between the groups ($p=0.004$) was found in one: "It is easy to injure your back". More LBP patients (70.3%) than HCP (59,9%) agreed with this statement and more HCP (29.2%) than LBP patients (14,4%) did not agree with it. There were no statistically significant differences between HCP and LBP patients in other items (1-5;9;12;14) regarding attitudes and beliefs toward vulnerability of the back (questions related to strength of the back; bending; sitting; lifting; overuse).

Conclusions

Both HCP and LBP patients had unhealthy attitudes and beliefs about vulnerability of the back regarding to the strength of the back; sitting; lifting; overuse. The only exception was thoughts about how easy it is to injure your back. As HCP have medical education, it was expected that they would have a more positive attitude towards the vulnerability of the back, but we did not find such a pattern. This finding suggests that both HCP and LBP patients do not have enough education about the vulnerability of the back.

Health care professionals' and patients' attitudes towards the special nature of low back pain: is there a difference?

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Objectives

The aim of the study was to identify what are the attitudes towards the special nature of low back pain (LBP) among health care professionals (HCP) and LBP patients and if there is a difference between.

Materials and Methods

Surveys from 145 LBP patients and 65 HCP were obtained during the cross-sectional study. Questions included demographics, professional data, personal history of back pain, the Brief Pain Inventory (BPI) and the Back Pain Attitudes Questionnaire (Back-PAQ). Items 19; 20; 23; 24 from Back-PAQ regarding special nature of LBP were analysed. Statistical data was processed by IBM SPSS 26.

Results

Majority of HCP (90.7%; N=59) considered that it is necessary to know exact including morphological diagnosis to treat LBP effectively. Accordingly 86.9% (N=126) of LBP patients agreed with that.

Vast majority of HCP (92.3%; N=60) considered it is important to visit physician in any case of LBP (in group of LBP patients as follows – 91.1% (N=132)).

Most of HCP (69.2%; N=45) considered that it is difficult to understand what LBP is like if you never had experienced it (in group of LBP patients as follows – 70.4% (N=102)).

41.6% (N=27) of HCP considered that it is worse to have pain in your back than your arms or legs (in group of LBP patients as follows – 59% (N=86)).

No statistically significant difference was found between groups of HCP and LBP patients regarding any of items described above ($p>0.05$).

Conclusions

Majority of HCP and LBP patients consider that LBP has its special nature and are more important and complex than pain in other locations. The study reveals that HCP have similar attitudes towards the special nature of LBP as patients. This implies that both HCP and LBP patients are not educated enough and have poor knowledge about non-specific LBP.

Regimens of pain control in children with acute uncomplicated appendicitis receiving nonoperative treatment: literature review

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Objectives

Acute appendicitis is the common cause of emergency surgery in children and appendectomy remains the treatment of choice for most paediatric patients. Last decade showed evidence of nonoperative treatment of acute uncomplicated appendicitis cases. It may be safe and effective in selected children, however, there is a lack in clinical guidance of nonoperative management, especially in selection of analgesic agent and pain control. The objective of this study was to search, identify and review clinical studies related to selected topic.

Materials and Methods

The search in on-line medical data bases PubMed and Medline was performed, using further mentioned key phrases in different combinations: "pain control", "pain assessment", "analgesia", "uncomplicated acute appendicitis", "nonoperative treatment", "nonsurgical treatment", "conservative treatment", "nonoperative management", "children".

Results

As a result of search 15 articles were identified. 7 of 15 studies were related to selected topic of pain control regimens as a part of nonoperative management of uncomplicated acute appendicitis in children. Only in 2 out of 7 studies pain control regimen was reported and specified. But only in one (Paudel GR, Agrawal CS, Agrawal S. Conservative treatment in acute appendicitis. J Nepal Med Assoc. 2010;50(180):295-299.) of two last studies pain assessment, control regimen and extent of analgesia were reported and specified.

Conclusions

Despite growing popularity in nonoperative management of uncomplicated acute appendicitis in children, there is still a huge lack of evidence-based studies on pain assessment, control and extent of analgesia. Authors has proposed the clinical trial in Children's clinical university hospital to find a correlation between pain syndrome and inflammatory parameters in 7 to 17 years old paediatric patients with acute uncomplicated appendicitis receiving nonoperative treatment. Expected results of this study may help decision-making in choice of analgesia for children with nonoperative management of acute uncomplicated appendicitis.

The influence of chronic use of opioids on the intensity of the pain after knee and hip replacement surgery

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Objectives

During the last years, has increased significantly the number of patients who take opioids for long time in order to treat pain caused by the severe osteoarthritis. Taking the opioids for long time with the purpose to treat the pain may provoke the risk of addiction as well as possibly change pain perception after surgery.

Materials and Methods

Prospective observational study conducted. Patients aged from 30 to 85, with BMI 20 – 40 prepared for an elective total knee or hip replacement in the case of osteoarthritis, were included. Their habits of medicament use and the impact of various medications on the postsurgical pain intensity were studied. The surgeries were performed under spinal anaesthesia. Postoperatively, patients received multimodal analgesia with NSAIDs, opioids and Morphine as a saviour drug in the case of severe pain, where Visual Analogue Scale (VAS) > 4. Intensity of pain and satisfaction with pain relief were measured in various periods after the surgery applying the VAS score. A telephone survey took a place after the surgeries, not earlier than 30 days after the discharge.

Results

48 patients, 6 in the Opioid User (OPU) group and 42 in the control (CG) group. Total amount of Morphine used for both groups of the study: for the OPU group – 12 mg, for the CG group – 32 mg (P=0,01).

Conclusions

There are no significant statistical differences between groups. However, there is a tendency that the OPU group had slightly less pain and had almost three times less consumption of Morphine equivalents in the postsurgical period than the CG group. The results of our study did not confirm the fact that use of opioids before a surgery would make an impact to the more intensive pain and chronification in the postoperative period.

Psychotherapy/ Psychosomatics

Association between family relationship satisfaction and symptoms of depression and anxiety among health care workers during the first emergency situation of COVID-19 in Latvia

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Objectives

Symptoms of depression and anxiety are increasing among health care workers (HCW) during the COVID-19 pandemic. Social support is an important protective factor for mental health. The aim of the study was to assess the association between relationship satisfaction and symptoms of depression and anxiety among HCW during the first emergency situation of Covid-19 in Latvia.

Materials and Methods

A quantitative cross-sectional study in the population of HCW in Latvia was made in April-June 2020. In the study participated 864 HCW. Depression symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9) scale, anxiety symptoms- using General Anxiety Disorder (GAD-7) scale. Participants were asked about the family relationship status- married, unmarried with a partner, single- and feeling of satisfaction in it. Data was analyzed using SPSS- Chi-Square tests, Mann-Whitney U test, Kruskal Wallis test.

Results

The status of the relationship was obtained from 838 participants: 43% (n=360)- married, 33.5% (n=281)- unmarried with a partner, 23.5% (n=197)- single. The satisfaction of the relationship was obtained from 790 participants: 90,5% married (N=338), 84,3% unmarried with a partner (N=268) and 68,5% singles (N=184) were satisfied. There wasn't statistically significant differences between depression and anxiety symptoms and relationship status (p=0,348; p=0,375).

Dissatisfied married HCW noted more severe anxiety symptoms (p=0.010) in comparison with satisfied married HCW, whereas the statistically significant difference between marital satisfaction and depression symptoms was not found (p=0.158).

Dissatisfied unmarried HCW with a partner (p=0,006; p=0,033) and dissatisfied single HCW (p<0,001; p=0,001) had more severe depression and anxiety symptoms in comparison with corresponding satisfied groups.

Conclusions

There is a statistically significant association between family relationship dissatisfaction and anxiety symptoms among married, unmarried with a partner and single HCW. There is a statistically significant association between family relationship dissatisfaction and depression symptoms among unmarried with a partner and a single HCW.

Gender matters during the COVID pandemic

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Objectives

The aim of this presentation is to summarise what has become evident in terms of gender differences during the current covid 19 pandemic.

The hypothesis is that both at biological and social levels men and women on the whole will react differently

Materials and Methods

The authors reviewed the most recent literature and statistics in different countries to assess gender differences in face of the covid 19 pandemic

Results

it appears that worldwide more women than men are being infected, but the mortality among men is significantly higher than in women. There is a converging evidence as to suggest that women (especially in the first wave when no clear treatment strategy was in place, suffered far less from the fatal cytokine storm that proved lethal in so many cases.

on the other hand from a social point of view there is in countries all of the world an increase of domestic violence affecting women and the burn-out risk for women is far higher as they are compelled to combine the care for the household and their work at distance often under difficult circumstance (small housing, high domestic stress).

Conclusions

There are obvious gender differences during a viral pandemic as is currently the case. On the somatic front awareness should be raised for the biological vulnerability of men in the acute phases of the multi organ infection. From a psycho-social point of view the vulnerability of women during lockdown for domestic (sexual) violence and the extra burden put on them to combine household, family and work at distance, is a matter of great concern that needs to be addressed adequately

Infectious Diseases

Association of clinical indicators of pulmonary tuberculosis with expression of ORAI1 and STIM1 genes in blood

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Objectives

The aim of this study is to measure levels of expression of store-operated Ca²⁺ entry essential genes (ORAI1, STIM1) in blood of patients with pulmonary tuberculosis and to detect a relationship between changes in these genes expression and clinical indicators – sputum culture and chest radiography (CXR).

Materials and Methods

From Lung Disease and Tuberculosis Ward of Daugavpils Regional Hospital 53 patients were included from October 2017 to January 2020, aged between 18 and 85 (mean age 51, 30 % females). All patients received the first line treatment. The level of expression of ORAI1 and STIM1 (mRNA) genes were detected by real-time quantitative reverse transcription polymerase chain reaction (RT-qPCR). Dynamic measurements were conducted after 4 months of controlled therapy. Evaluation of sputum culture and CXR dynamic (decrease of consolidations, cavities, hilar lymphadenopathy) were performed at the outset of therapy, repeated every 2 months. IBM SPSS 22.0 was used for the statistical analyses.

Results

Positive CXR dynamic and sputum culture conversion during 4th months were detected in 32% and in 34% of patients, respectively. In group with sputum culture conversion, ORAI1 decrease was statistically significant ($p=0,003$). Significant decrease of ORAI1 expression was detected independently of CXR changes, in group with positive CXR dynamic ($p=0,043$) and in group without positive CXR dynamic ($p=0,006$). No statistical significance in dynamic changes of STIM1 was identified.

Conclusions

Regardless no convincing association between clinical improvement and ORAI1, STIM1 expression, significant changes of ORAI1 were detected. Assumed that decline of SOCE proteins expression indicates decrease of immune reactivity by eradication of primary infection and itself may be a mark of positive dynamic.

Detection and genotyping of human papillomavirus in hypopharyngeal carcinoma samples

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Objectives

To compare several HPV detection methods in nucleic acid material extracted from FFPE samples.

Materials and Methods

Extracted DNA was analyzed with different molecular biology methods to assess DNA quality and analyze it for presence of HPV DNA with various HPV detection systems.

Used HPV detection methods - GP5+/6+ and My09/11 consensus primers, Anyplex II HPV28 multiplex RT PCR, Sacace HPV High-Risk Screen Real-TM Quant, HPV16 and HPV18 specific primers.

Results were compared and statistically analyzed.

Results

There was good agreement between two real-time PCR methods – Anyplex II HPV28 and Sacace HPV High-Risk Screen Real-TM Quant. We failed to conclude upon agreement between real-time PCR methods and HPV16 type-specific primers' PCR. There was a moderate positive correlation between Anyplex II HPV28 semiquantitative results and Sacace quantitative results.

Conclusions

We suggest real-time PCR assays detecting smaller DNA amplicons are good and reliable methods for detecting HPV genetic material in FFPE samples.

Echinococcosis: typical patient in Latvia

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Objectives

Although Latvia is geographically relatively closely located to known endemic regions of echinococcosis, so far there was no recent large-scale data on the incidence, diagnosis and treatment of this disease our country.

Materials and Methods

During study data was analysed from 116 patients with echinococcosis diagnosed in the period between 1999 and 2015.

Results

Geographically, we identified two regions in Latvia where echinococcosis is more common. The typical echinococcosis patient is female and aged between 56 and 65 years. The majority of patients lives in a rural household and owns dogs or livestock. The most frequent complaints at the moment of admission were abdominal discomfort or tightness, abdominal pain, malaise, jaundice and skin itching. Ultrasound analyses showed that echinococcosis manifested more often as solitary lesion in the right hepatic lobe in an otherwise unchanged liver, the size of lesion was < 5cm in 40.5 % of cases. Analyzing the relationship between the stage of echinococcosis at the time of diagnosis and the end of the observation period, it can be concluded that the stages increase on average by 0.2 points. A correlation was observed in the treatment stage of cystic echinococcosis in treated patients. If criteria for treatment efficacy was antibodies then it was more likely that effect was positive if treatment has been within 1 year of diagnosis, has ever been a 6-month course of therapy, treatment was given every year and if duration of treatment and the number of courses increase, the likelihood of antibody clearance increases.

Conclusions

As echinococcosis is relatively common in Latvia, the diagnostic and treatment algorithm should be improved in order to increase effectiveness of available resources and thus to improve respective control strategies.

Fournier gangrene – 10 years' single centre experience

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Objectives

Fourniers gangrene (FG) is a severe form of soft tissue infection with a high mortality, that requires aggressive treatment and a long recovery. Aim of the study is to identify factors that determine FG patient mortality.

Materials and Methods

24 patients treated with FG from 2010 to 2020 in Riga East University Hospital were included in this retrospective cohort study. Data was collected on presenting signs, origin of infection, and serum markers of inflammation at time of admission. From this data Fournier gangrene severity index (FGSI) and Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) was calculated for each patient. Secondary points of interest were patient age, time from admission to surgery, number of known risk factors, and treatment outcome. Point-Biserial correlation coefficient was used to determine correlation.

Results

Average number of admissions was 2,2 per year. The mean age of presentation was 63 ±12 years, and mortality rate for hospitalisation period was 21%. Age ($r = 0.09724$, $p = 0.65124$), FGSI ($r = 0.28871$, $p = 0.18153$) and LRINEC ($r = 0.07834$, $p = 0.72894$) scores showed no statistically significant correlation with mortality. Two or more risk factors was the only predictor of mortality (OR= 34; CI=3.53 - 474.57; $p < 0.005$).

Conclusions

Main prognostic factor for mortality in FG patients is presence of two or more risk factors at presentation. Mortality has significantly decreased in recent years, possibly due to a higher standard of intensive care. Known FG severity scores were not predictive of higher mortality in our patients.

Machine learning: a brief description and application in infectious disease research

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Objectives

Machine learning (ML) is an umbrella term that encompasses many algorithms used to help people understand large amounts of data. Over the last five years, ML has been increasingly used in many areas of life sciences, including health care. ML is based on the idea that machines need to be able to learn and adapt through experience, while artificial intelligence (AI) refers to a broader idea where machines can execute tasks "smartly". AI applies ML, deep learning and other methods to solve real problems in different fields of research, but general AI could be considered as a physical manifestation using ML to perform a task. For infectious diseases, the use of ML has great potential to help physicians make optimal clinical decisions by supporting diagnosis, prognosis, and selection of appropriate antimicrobial therapies, as well as to elucidate and understand the highly complex molecular mechanisms underlying these diseases. The authors offer a brief overview of this topic.

Materials and Methods

Of the 596 publications on the usage of the ML in the research of infection published just in 2020, more than 50 publications on the use of ML as a research tool for infection diseases were reviewed.

Results

The main ML algorithms used in infectious disease research were identified. It could be concluded that ML has two main approaches - unsupervised and supervised learning and each has its own set of analytical tools. Most unsupervised learning techniques comprises cluster analysis and its algorithms fall into two main groups - hard clustering and soft clustering, whereas all supervised learning techniques are a form of classification and regression utilizing such an algorithms like logistic regression, support vector machine, neural network, decision tree, random forest, discriminant analysis and other analytical approaches.

Conclusions

As a more objective ML approach in infectious disease research, supervised learning using appropriate algorithms is recommended.

Mapping the potential of pharmaco-metabolomics for personalized antituberculosis therapy

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Objectives

The concept of personalized medicine aims to improve therapeutic response and to minimize adverse drug reactions. Polymorphic enzymes involved in drug metabolism may influence the systemic concentration of the drug. The aim of this study was to explore possible associations between the kinetics of isoniazid (INH) metabolism and genetic polymorphisms of isoniazid-metabolizing enzymes in Latvian tuberculosis patients.

Materials and Methods

Samples were obtained from patients at 2 h after the intake of antituberculosis drugs. Plasma levels of INH, acetylisoniazid (AcINH) and isonicotinic acid (INA) were detected using Liquid Chromatography-Tandem Mass Spectrometry. Genotyping of *N-acetyltransferase 2* (*NAT2*) gene was performed by 7-SNP panel identification. *NAT2* phenotype (slow acetylator, SA; intermediate acetylator, IA) was assigned based on the obtained genotyping data. *Glutation-S-transferase M1* class (*GSTM1*) class null/plus genotype assay was carried out by a comparative duplex PCR. The impact of the genotype on the metabolic INH ratios was determined using multivariate ANOVA. All statistical analyses were performed using XLSTAT analysis package.

Results

Data comprises 33 patients (23 males and 10 females); age range 19 - 82 years. The *NAT2/GSTM1* genotype significantly influenced the metabolic ratio of AcINH/INH ($P=0.0001$, $R^2 = 0.637$); mean AcINH/INH ratios were 1.206 (SD 0.714), 1.191 (SD 0.390), 0.266 (SD 0.135), and 0.322 (SD 0.250) for *NAT2_IA/GSTM1_null*, *NAT2_IA/GSTM1_plus*, *NAT2_SA/GSTM1_null*, and *NAT2_SA/GSTM1_plus* genotype, respectively. Also, *NAT2/GSTM1* genotype significantly influenced the INA/INH metabolic ratio ($P=0.002$, $R^2=0.395$): mean INA/INH ratios were 0.250 (SD 0.157), 0.223 (SD 0.092), 0.079 (SD 0.061) and 0.109 (SD 0.081) for *NAT2_IA/GSTM1_null*, *NAT2_IA/GSTM1_plus*, *NAT2_SA/GSTM1_null* and *NAT2_SA/GSTM1_plus* genotypes, respectively.

Conclusions

In order to increase the capacity of therapeutic drug monitoring and to assess the merits of genotyping and dose adjustment in isoniazid treatment more research is needed in a larger cohort.

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Novel mechanism of HIV-1 driven carcinogenicity affecting epithelial cells

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Objectives

HIV-1 infected people are characterized by high prevalence of cancers affecting epithelial cells despite successful antiretroviral treatment. We hypothesize that this is due to the direct carcinogenic properties of HIV-1 Tat, Nef, gp120, p17 and reverse transcriptase (HIVRT). This study aimed at characterizing carcinogenicity of HIVRT.

Materials and Methods

DNA encoding HIVRT, rat telomerase reverse transcriptase and its telomerase domain (rtTERT) were synthesized and cloned into lentiviral vector (Addgene). Resulting lentiviruses were used to transduce murine mammary gland adenocarcinoma 4T1luc2 cells (Caliper) generating subclones expressing rtTERT (n=8) and HIVRT (n=2). RtTERT and HIVRT genomic inserts were quantified by ddPCR. Subclones were ectopically implanted into BALB/c mice; tumor growth was monitored by in vivo, and metastatic activity, by ex vivo bioluminescent imaging (Spectrum, PerkinElmer). Mouse organs were formalin-fixed, paraffin-embedded, sectioned, hematoxylin-eosin-stained, and examined by light microscopy with computer-assisted morphometry using specialized NIS-Elements (Nikon). Data was analyzed using nonparametrical statistics (Statistica AXA 11).

Results

4T1luc2 cells expressing HIVRT and rtTERT were obtained. Expression of HIVRT led to increased production of ROS, lipid peroxidation, enhanced cell motility, and overexpression of Twist mRNA, dependent on the levels of HIVRT expression. Implanted into syngeneic BALB/C mice, HIVRT-expressing cells caused enhanced, and rtTERT-expressing, reduced tumor growth and metastasis formation compared to parental cells (p<0.05). Activities of rtTERT-expressing cells inversely and of HIVRT-expressing cells directly correlated with the number of respective genomic inserts, and for HIVRT were proportional to HIVRT expression and levels of ROS (p<0.05).

Conclusions

We present a novel mechanism of HIV-associated malignant transformation of epithelial cells by HIVRT, analogous to the effects exerted by HIV-1 proteins Tat, gp120, Nef and p17. HIV-1 RT as other carcinogenic HIV-1 proteins triggers malignant transformation of normal epithelial cells, causes propagation of precancerous and cancer cells and thus promotes HIV-1 associated carcinogenesis aggravated by HBV, HCV, EBV and HPV-coinfections. Acknowledgements: LZP-2018/2-0308, RFBR 20-04-01034.

Patients survey as helpful tool for adjusting hepatitis C virus infection elimination strategy

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Objectives

Survey of patients previously or currently infected with hepatitis C virus (HCV) aiming to determine profile, opinions, co-morbidities and other factors that may facilitate further developing local strategy and tactics to reach the goal of World Health Organization - eliminate hepatitis C as a public health threat by 2030.

Materials and Methods

The written self-administered hepatitis C patients survey have been performed from January till July of 2020 by healthcare professionals in hospitals of Riga, Daugavpils, Liepaja and analysed by Marketing and Public Opinion Research Centre SKDS. The questionnaire included demographic information and 20 questions on personal experience, opinions and knowledge about HCV infection.

Results

Total number of respondents were 624 including 54.8% males and 44.2% females. Most patients were above 40 years old and 27% of respondents indicated having concomitant chronic illness. Only 6% of hepatitis C patients surveyed currently use or have used intravenous drugs in the past. The majority believe that untreated chronic hepatitis C progresses to cirrhosis (84%) and liver cancer (32%) although patients living in Riga are better informed comparing to those living in countryside. Most of surveyed patients (90%) are unaware of the symptoms of acute and chronic hepatitis C.

Conclusions

The patient survey provides valuable data for adjusting hepatitis C elimination strategy in Latvia. The focus should move from classical risk groups such as intravenous drug users to groups suggested by the survey results. When planning targeted patient information campaigns and population screenings - target groups with potential to yield higher percentage of positive HCV antibody tests would probably be males with basic or secondary education performing manual work for example builders. Regular alcohol users and obese patients should be targeted not only due to higher probability of HCV infection but also due to risk of developing other chronic liver diseases.

Predictive role of glutathione reductase and other RedOx markers in septic shock patients on continuous veno-venous hemofiltration treatment

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Objectives

At the current time there are contradictive data about a role of continuous veno-venous hemofiltration (CVVH) in treatment of the septic shock patients. The discrepancies could be explained by the various Reduction-Oxidation (RedOx) phenotypes among septic shock patients.

The aim of the study was to check if RedOx markers are associated with the outcome of septic shock patients on CVVH treatment.

Materials and Methods

Prospective study included 65 patients with septic shock (Sepsis-3 criteria) who was started on CVVH during the 12 hours after admission to ICU from January 2019 to August 2020. Blood samples were taken from each patient prior start of CVVH. The following RedOx markers were measured: total antioxidant state (TAS), glutathione peroxidase (GPx) superoxide dismutase (SOD), nitric oxide (NO), malondialdehyde (MDA), glutathione reductase (GR) and 4-hydroxynonenal (4-HNE). SPSS 23.0 software was used for the data analysis, odds ratio (OR) were calculated by using binary logistic regression and stepwise multivariable regression.

Results

Among study patients were 39/65 males, median of age 66 years (IQR 54-76,5), median of ICU stay 6 days (3-11). Based on the outcome all patients were divided into two groups: non-survivors 29/65 and survivors 39/65. Thereafter RedOx markers were compared among the groups. In non-survivors GR concentration is higher 100,3 U/L (IQR 71,8-149,9) in comparison to survivors – 60,5 U/L (IQR 45,0-93,4), OR 1,027 (95%CI 1,010-1,044). There were no associations with TAS (p=0,080), GPx (p=0,445), SOD (p=0,448), NO (p=0,119), MDA (p=0,567) and 4-HNE (p=0,079).

Conclusions

Among septic shock patients on CVVH treatment high GR concentration is a strong predictor of fatal outcome. In septic shock patients high GR concentration represent hyperinflammatory host response.

Retrospective analysis of full-thickness penetrating keratoplasty in herpetic keratitis patients

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Objectives

Analyze patients with severe herpetic keratitis, where anterior segment reconstructive surgery - full-thickness penetrating keratoplasty was performed.

Materials and Methods

Retrospective case summary analysis and interpretation of patients with severe herpetic keratitis treated with full-thickness keratoplasty in Pauls Stradins Clinical University Hospital from year 2016 to 2020. Patients were divided in two groups according to the clinical manifestation of herpetic keratitis.

Results

During 4 years from 2016 to 2020 total 117 full-thickness penetrating keratoplasty surgeries were performed. Together 8 patients (6.8%) with active or previously diagnosed herpetic keratitis were included in the study. Severe, active herpetic keratitis with corneal ulcer perforation was diagnosed in 4 cases, whereas other 4 patients have had herpetic keratitis in medical history. Distinctive complication of herpetic keratitis is corneal sensitivity loss, which more often results in neurotrophic corneal ulcer. Neurotrophic ulcer perforation and previous herpes zoster keratitis in medical history was the main reason of full-thickness corneal transplantation in other half of patients in the study group. Noteworthy fact is the difference in post-surgical treatment, where anti-viral drugs play general role in active herpetic keratitis, in the same time ocular surface lubrication in neurotrophic keratitis.

Conclusions

Acute herpetic keratitis as well as neurotrophic keratitis induced by previous herpes virus corneal infection are challenging cases in ophthalmology, which demands special approach in order to achieve satisfying outcome.

Specific protection status against diphtheria and measles in adults living in Latvia

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Objectives

Evaluate the specific immune status against epidemic infections (measles, diphtheria) and clarify its connection with immunogenetic characteristics, age and gender, to find out the need for vaccination against those diseases.

Materials and Methods

The study group consisted of 200 people, of whom 172 were women (86%). The average age in the group was 50±14 years (min. – 18 years, max. – 89 years). Study participants were tested for IgG antibodies to Diphtheria and Measles (ELISA), Interferon gamma inducer - IRF5 level (ELISA) and HLA-B27 (PCR).

Results

Anti-Diphtheria IgG level <0,01IU/ml was found in 4% of the group, level 0,01-0,1IU/ml–33% and >0,1IU/ml was found in 63% of the group.

Anti-Rubeola IgG level <13,5AU/ml was discovered in 22%, level 13,5-16,5AU/ml–1% and >16,5AU/ml–77% of participants.

Older people had higher levels of IgG against measles ($r=0,54$, $p<0,001$) and lower IgG level against diphtheria ($r=-0,36$, $p<0,001$) compared to younger people.

Men had higher IgG levels against diphtheria (median 0.15IU/ml) than women (median 0.14IU/ml), $r=0,16$, $p<0,05$. Positive HLA-B27 was detected in 25 people (12.5%). Positive HLA-B27 showed no association with antibody levels against diphtheria, $\chi^2(2)=2,09$, $p=0,35$, and against measles $\chi^2(2)=0,36$, $p=0,83$. Antibody levels against diphtheria were independent of IRF5 levels, Kruskal-Wallis $H(2)=3,14$, $p=0,21$. Similarly, IRF5 levels showed no association with anti-Rubella IgG, $H(2)=1,80$, $p=0,41$.

Conclusions

1. Only 63% of study participants have a good resistance against diphtheria, 33% of participants require re-vaccination, but 4% of study participants have an insufficient vaccination status and basic immunization is recommended. The results show that 37% of study participants should revaccinate against diphtheria.
2. Measles vaccination has a protective effect in 77% of study participants. 22% of study participants have a protective vaccination status and 1% of participants have a vaccination effect at the cut-off value.
3. The characteristics of specific infectious protection for both infections are age-related.
4. Antibody levels against diphtheria and measles are independent of immunogenetic characteristics such as HLA-B27 and IRF5.

The first records of *Spirometra erinaceieuropaei* (Cestoda : Diphyllbothriidae) in Latvian wildlife – biological diversity or potential source for zoonosis?

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Objectives

To acquire additional data on the occurrence of *Spirometra erinaceieuropaei* in Europe, with particular focus on Latvia, where a pilot screening of the tapeworm in definitive hosts was performed by molecular genotyping.

Materials and Methods

The material of the parasites originated from the helminthological collection at the Latvian State Forest Research Institute "Silava". Tapeworms morphologically identified as diphyllbothriid species were isolated from grey wolves *Canis lupus* and Eurasian lynxes *Lynx lynx* during the hunting seasons from 2013 to 2019. The animals were hunted within the national legal framework according to the quota allocated by the Latvian Hunting Regulations. The parasites were subjected to molecular genotyping using sequences of the partial large (LSU rDNA; 640 bp) and small (SSU rDNA; 720 bp) subunits of the nuclear ribosomal RNA gene and complete (1566 bp) cytochrome oxidase subunit I gene of the mitochondrial DNA (*cox1* mtDNA).

Results

Diphyllbothriidean tapeworms successfully genotyped were molecularly identified as *S. erinaceieuropaei*, providing the first record of this species in Latvia. The parasites were recorded in both carnivore species. It is not possible to conclude if these results represent a recent introduction of *S. erinaceieuropaei* to Latvia, or if this tapeworm has been present in the Latvian environment for a prolonged period.

Conclusions

Further studies are needed in order to acquire complex data on *S. erinaceieuropaei* geographic distribution and transmission in the natural environment of Latvia, as well as on the spectrum of its intermediate, paratenic and definitive hosts.

The hidden face of scabies

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Objectives

Globally, scabies affects more than 200 million people at any time. Prevalence estimates in the recent scabies-related literature range from 0.2% to 71%.

The treatment of scabies is now neglected in Latvia and there is a possibility, that self-treatment with 4% permethrin (5% permethrin elsewhere in the world) is present. Scabies diagnosis and treatment has a number of unresolved weaknesses, which consequences are not always evaluated.

The aim of this study is Scabies related issue update and validity of Scabies excluded from "Reportable Sexually Transmitted Diseases (STDs)" in Latvia.

Materials and Methods

As of today available literature in databases, epidemiological data, regulatory documents and guidelines were gathered and clinic's experience in scabies care was evaluated.

Results

Is scabies really familiar to us - problems are caused by pure human scabies, coincidence with itchy and papulo-skvamous dermatoses and treated scabies.

There is no understanding in new "2020 IACS Criteria for the Diagnosis of Scabies" about necessity for microscopic diagnosis and the use of dermatoscope for visualisation.

Immunohistochemical, confocal examination, biopsy are not used.

For the treatment is used a product with 20% lower active ingredient content – 4% permethrin, that is longer enough and should be used longer than 5% permethrin. Therapy mainly is symptomatic, and is done without diagnosis.

There is no epidemiological observation performed in closely populated groups of people.

Consequences: irritated skin becomes the entrance gate for infection (streptococci etc.) allergens. Sensitization occurs with the following auto-aggressive reaction, including eczema, psoriasis, glomerulonephritis, chronic renal failure and rheumatic fever.

Conclusions

Previous low cases of scabies can be explained by: the direct unavailability of a dermatologist, the absence of epidemiological reports and the replacement of diagnosis of scabies with "dermatitis". The increase of allergic conditions can also be associated with ignored scabies.

The role of infections in oral health and dentistry

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Objectives

The oral cavity is the main site through which pathogens enter the human body from the external environment. The human oral cavity is rich in microbial flora, housing a variety of microbes, including bacteria, fungi but is also known to be inhabited by a truly diverse viral community. All this together forms a complex ecological community that affects both oral and systemic health. Herpes viruses, papilloma viruses, picornaviruses/enteroviruses, retroviruses and recently identified redondoviridae can cause a variety of oral infections. The aim of the study was to provide currently known information on the role of viruses in causing oral diseases.

Materials and Methods

Online databases (PubMed, Scopus, Web of Science) were searched, and the literature of the last 10 years (2010-2020) was analysed and compiled. The articles included studies performed by researchers of European and American Continents.

Results

Herpes viruses are the most widely involved in causing infectious diseases of the oral cavity. However, in addition to the classically known clinical manifestations of Human herpes viruses, studies have found presence of HSV, EBV and CMS in pulp and periapical inflammation, acute, chronic periodontitis and periimplantitis. A causal relationship between chronic periodontitis and EBV as well as periodontopathic bacteria has been found. Studies are carried out to determine whether EBV is involved in oral lichen planus, Sjogren's syndrome and aphthous stomatitis pathogenesis as well as ongoing studies on the involvement of EBV and HPV in the pathogenesis of squamous cell carcinoma. New studies are emerging on the involvement of HHV-7 in the origin of periodontitis and oral lichen planus.

Conclusions

Studies show that human herpes viruses play an important role in various inflammatory diseases of the tissues and structures of oral cavity, often in interaction with oral bacteria, their products of metabolism and the head and neck immune system.

TOXOSOURCES-project: what are the relative contributions of the different sources of *Toxoplasma gondii* infection?

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The protozoan parasite *Toxoplasma gondii* is a highly prioritized zoonotic foodborne pathogen in Europe and globally. The infection can be acquired by ingesting oocysts (in food, water, or the environment contaminated with feces of infected, shedding felids; environmental pathway) or tissue cysts (in meat of infected animals; meatborne pathway). The relative contribution to infection and disease of the different transmissible stages and transmission pathways remain unknown, partly due to lack of appropriate methods.

TOXOSOURCES is a 2.5-year Joint Research Project of the One Health EJP. The TOXOSOURCES research question - What are the relative contributions of the different sources of *Toxoplasma gondii* infection? - is addressed using several multidisciplinary approaches and novel and improved methods. The main outcomes of TOXOSOURCES include quantitative estimates of the contribution of the main sources and transmission routes of *T. gondii* infection, based on improved source attribution models covering both meatborne and environmental exposure, and new data filling the knowledge gap regarding role of ready-to-eat fresh produce as a potential source. Moreover, improved approaches for detecting infections caused by oocysts using serology and for tracing the infection sources in outbreaks are developed. The results of TOXOSOURCES will contribute to developing efficient interventions at national, regional, European and global levels.

TOXOSOURCES has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 773830.

Verocytotoxin-producing and pathogenic *E. coli* molecular diagnostic in Latvia from 2014–2019

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Objectives

Pathogenic *E. coli* are enterohemorrhagic, enteropathogenic, enteroaggregative, enteroinvasive, diffusely adherent. In September 2019 was registred VTEC O157:H7 outbreak mostly among children with 18 confirmed cases.

Materials and Methods

In 2014-2019 1341 samples were tested in National Reference Laboratory to detect pathogenenic *E.coli* by RT-PCR AmpliSens®Escherichioses-FRT. Multiplex Seeplex® Diarrhea-B2 ACE Detection was used to detect O157:H7 in case of VTEC outbreak. Identification of three *vtx1* and seven *vtx2* subtypes of Verocytotoxin encoding genes of *E.coli* by conventional PCR amplification method was used for *vtx* genes typing in 2015-2019.

Results

Using AmpliSens® Escherichioses- FRT kit we obtained 165/1341 positive pathogenic *E.coli* (89/165 materials are from females, 76/165 - males, 61/165 - children, 104/165 - adults). The analysis of data showed that 40/165 was EHEC, 64/165 EPEC, 26/165 EAgEC, 12/165 EIEC, 9/165 ETEC, also mixes of *E.coli* were found: 6/165 EPEC/EAgEC, 4/165 EAgEC/EIEC, 3/165 EPEC/EIEC, 1/165 ETEC/EIEC. EHEC cases were found from children - 23/40, from adults - 17/40; EPEC: 26/64 - children, 38/64 - adults; ETEC: 9/9 from adults; EAgEC: 4/26 - children, 22/26 - adults; EIEC 12/12 from adults. Mixes of pathogenic *E.coli* were found: EPEC/EAgEC - 3/6 from children, 3/6 from adults; EAgEC/EIEC - 1/4 from child and 3/4 from adults; EPEC/EIEC - 1/3 from child and 2/3 from adults; ETEC/EIEC - 1/1 from child. In October 2019 VTEC O157:H7 outbreak in Latvia showed that 14/18 person were VTEC O157:H7, 3/18 VTEC non O157:H7, 1/18 not tested for O157 by PCR. In 2015-2019 *vtx* typing was performed for 39 (24/39 are from children, 15/39 are from adults) from 48 registered cases. *Vtx* subtyping results: 21/39 - *vtx2a*, 9/39 *vtx1a*, *vtx2g-2* and one case by each subtype *vtx1a/vtx2a*, *vtx1c/2b*, *vtx2a/2c*, *vtx1c*, *vtx1d*, *vtx2c*, *vtx2b*.

Conclusions

PCR presents high sensitivity to detect and to differentiate pathogenic *E.coli* DNA. From detected pathogenic *E.coli* prevail EPEC (39%) and EHEC (24%).

Whether parvoviruses are significant players in meningitis/meningoencephalitis?

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Objectives

Meningitis and meningoencephalitis are neurological inflammatory diseases. Although routine diagnostics include testing of a wide range of pathogens, still in many cases, no causative agent is detected. Human parvovirus B19 (B19V), human bocaviruses 1–4 (HBoV1–4), and human parvovirus 4 (hPARV4) are members of the *Parvoviridae* family associated with a wide range of clinical manifestations including neurological disorders. The aim of this study was to determine whether human parvovirus infection markers are present among patients with meningitis/meningoencephalitis in Latvia as well as to clarify if these viruses affect the clinical course of the diseases.

Materials and Methods

In total, 42 cases of confirmed or unknown etiology of meningitis (n = 31; 73.81%) or meningoencephalitis (n = 11; 26.19%) were evaluated. Of all the patients, 20 (47.6%) were males and 22 (52.4%) were females, with the mean age 50 and 58.9 years, respectively. In all cases, whole blood and cerebrospinal fluid (CSF) samples were obtained on admission. Total DNA was extracted from peripheral blood, cell-free blood plasma, and CSF samples using a phenol-chloroform extraction method. The presence of parvovirus genomic sequences in DNA samples was determined using nested PCRs. All calculations and statistical analysis were performed using the program Prism 7.04 (GraphPad, San Diego, USA).

Results

Our study revealed HBoV1–4 and B19V genomic sequences in 52.38% and 16.67% of patients, respectively. Presence of hPARV4 genomic sequences was not detected. Furthermore, symptoms such as the presence of a headache and its severity, fatigue, disorientation, and difficulties to concentrate were significantly frequently present in patients with active parvovirus infection in comparison with parvovirus negative patients.

Conclusions

Study results shows that the infection markers of human parvoviruses are present among patients with meningitis/meningoencephalitis in Latvia. Furthermore, we suggest that HBoV1–4 and B19V infection should be included in the diagnostics to reduce the number of meningitis/meningoencephalitis with unknown/unexplained etiology.

Whole genome sequencing-based prediction of recurrent tuberculosis etiology for patients involved in a local outbreak

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Objectives

Whole-genome sequencing (WGS) of *Mycobacterium tuberculosis* (Mtb) is a modern approach in studying tuberculosis (TB) recurrence, which is essential for disease control. Although WGS-based SNP-distance analysis is a current standard in recurrent TB etiology determination, recent studies demonstrated the importance of detailed epidemiological cluster investigation to correctly discriminate between endogenous reactivation and exogenous reinfection. The aim of this research was to delineate the transmission network in the local TB outbreak and predict the cause of clinically confirmed recurrent TB cases.

Materials and Methods

10 Mtb isolates from 8 epidemiologically linked TB patients diagnosed in 2006-2016 were included in this study; two patients had a recurrent TB episode. WGS of Mtb DNA samples was conducted using Ion Torrent technologies. Bioinformatic analysis of WGS data was performed on the Galaxy web platform, and the median-joining network was constructed using PopArt software. Recurrent TB cases were analysed by determination of pairwise SNP- and network distances between the episodes.

Results

All isolates had identical spoligotyping (SIT53) and IS6110 RFLP pattern. The genetic relatedness was confirmed by WGS data, revealing 0-6 SNP distance. Data of specimen collection dates and SNP analysis allowed to predict Mtb transmission chain in the outbreak. Although exhibiting a small difference of 2 SNPs, in the median-joining network, two episodes of the first recurrent TB case showed different clustering mode and were connected via an intermediate node. A 5 SNP-distance was found in the second recurrent case, and the shortest path between the two nodes included a negative step followed by three positive steps. Thus, for both cases, reinfection is thought to be a cause of TB recurrence.

Conclusions

This study highlighted the necessity of analysing recurrent TB cases as a part of a cluster investigation for more accurate identification of relapse etiology. This study was supported by RSU grant No. 23030103.

Clinical Microbiology

Altered B-cell populations in IgA nephropathy

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Objectives

B-cells are centrally implicated in the pathogenesis of IgA nephropathy (IgAN) as the source of galactose-deficient IgA1 and autoantibodies against it. Nevertheless, little is known about the B-cell compartment in IgAN. We aimed to compare the frequencies of major peripheral blood B-cell subsets in patients with IgAN and healthy controls (HC) to identify novel B-cell signatures of disease.

Materials and Methods

Peripheral blood mononuclear cells were isolated by density gradient centrifugation. B-cell phenotype was determined by flow cytometry (Navios EX, Beckman Coulter) using monoclonal antibodies against CD19, CD1d, CD24, CD27, CD38, CD43, IgD, and IgA. Serum IgA, IgG, IgM and IgE were measured by nephelometry (Atellica NEPH 630 System, Siemens).

Results

The frequency of B-1-like cells (CD27⁺CD43⁺) was significantly reduced in patients with IgAN compared to HC. We observed a correlation between renal function and B-1-like cell frequency in patients with IgAN. The frequencies of naïve B-cells, double negative, switched and unswitched memory B-cell populations were comparable in IgAN patients and HC. In IgAN patients B-1-like cells inversely correlated with renal IgA deposits and total serum IgA, but not with IgM, IgG or IgE. We found that up to 25% of CD27⁺CD43⁺ B-cells had undergone class-switching to IgA, and that the frequency of IgA⁺ cells among B-1-like lymphocytes was higher in IgAN patients than in HC.

Conclusions

There is a significant decrease of B-1-like cells in the peripheral blood of IgAN patients. Serum IgA and renal impairment correlate with reduction in B-1-like cell frequency. B-1-like cells have been implicated in the production of IgA, and their presence at mucosal sites has been associated with the pathogenesis of IgAN. Therefore, it is conceivable that in IgAN patients B-1-like cells migrate to mucosal sites where they initiate IgA production and thus contribute to renal decline.

Antibacterial effect of autologous fibrin matrices

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Objectives

Tissue engineering has emerged as a new treatment approach for bone repair and regeneration seeking to address limitations associated with current therapies. Local drug delivery is alternative solution to increase local drug concentrations and decreased systemic toxicity. Aim of the study was to determine antibacterial efficiency of autologous Platelet -rich fibrin (PRF) derived from a patient blood with and without vancomycin-containing microcapsules.

Materials and Methods

Antibacterial efficiency was tested via the disk diffusion test. Bacterial suspension with optical density 0.5 was prepared according to the McFarland standard and were inoculated on Mueller hinton (MH) agar. Hydrogels were placed on the plates and incubated for 24 hours at 37 °C. Antibacterial properties were detected by measuring a sterile zone (diameter) around the hydrogels. Samples were transferred on fresh MH plates with bacterial inoculum, and were incubated for an additional 24 hours. In this study 3 types of Hydrogels were used: Fibrin/MK_Vancomycin (Vanc), Fibrin/MK_Blank (Blank micro) and Fibrin Blank_Blank (Blank O). For drug release Vancomycin hydrochloride and poly(lactic-co-glycolic acid) (PLGA) microcapsules were used as drug delivery system. Antibacterial efficiency was tested using *Staphylococcus aureus* (ATCC 25923) reference culture.

Results

The maximum duration of antibacterial effect in Fibrin/MK_Vancomycin samples was observed for 48 h. For the first 24 h, the mean diameter of the sterile area around the samples is 30 mm. For the next 24 h, the diameter of the sterile area is reduced by 50%. No antibacterial properties were observed for MK_Blank and Blank_Blank samples.

Conclusions

The major release of vancomycin from the samples occurs in the first 24 h. Further work is needed to improve the method to ensure the release of all antibiotics from the samples.

Acknowledgment

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Bacteriological isolation of *Cutibacterium acne* in clinical isolates from *Acne vulgaris* patients

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Objectives

Acne vulgaris is one of the most common inflammatory skin conditions and it is clinically characterized by the formation of comedones, papules, pustules, cysts in facial T-zone, sometimes on the back and neck. *Cutibacterium acne* (*C. acne*) plays an important role in the pathogenesis of *Acne vulgaris*, therefore, antibacterial and anti-inflammatory therapies are widely used to relieve the symptoms of the disease. The aim of the study is to compare the antibacterial susceptibility of *C. acnes* against clindamycin and erythromycin.

Materials and Methods

The patient's skin condition was assessed by a dermatovenerologist. Clinical specimen in the *Acne vulgaris* (A) group was obtained by squeezing the contents of the pustule and were transported in AMIES transport medium to the laboratory within 2 hours. Acquisition of material in the control (K) group was performed similarly, comedone content is obtained, AMIES medium was used to transport sample to the laboratory. Samples were cultivated on a combined Mueller - Hinton solid medium under anaerobic conditions for 5 days at 37°C and after cultivation identified by Vitek2 ANC ID cards. Antibacterial susceptibility was determined using commercial e-tests of clindamycin and erythromycin.

Results

Pustular samples were obtained from 56 patients with *acne vulgaris* and 10 control patients, of whom 49 were female and 17 were male. In group A group, 28 *C. acnes* samples were isolated. In the control group, *C. acnes* were isolated in 10 samples. Study participants used topical antibacterial agents: clindamycin 5 (7.6%), erythromycin 3 (4.5%), none 14 (21.2%), or 44 (66.7%). Resistance to clindamycin was observed in 8 cases (12.1%), erythromycin 9 (13.6%), tetracycline 2 (3.0%).

Conclusions

More *C. acnes* were found in the control patient samples than in the *Acne vulgaris* group.

Acnes vulgaris patients show higher resistance to clindamycin and erythromycin than the control group.

Determination of antibacterial effect of CuO and ZnO containing sol-gel surface coatings

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Objectives

It is desirable that surface coatings, such as hospital furniture, walls, food equipment and many others, have antibacterial properties.

The aim of the research was to determine the antibacterial effect of a sol-gel derived coatings on stainless steel containing CuO and ZnO.

Materials and Methods

A total of 68 different sol-gel surface coatings on AISI 304 steel (10x3 mm) were examined. 36 containing CuO, and 32 ZnO containing sol-gel compositions were deposited onto polished and phosphated stainless steel (SS) surfaces.

Coatings contained 0,5, 1, 3, 5 weight % CuO or 5 and 10 weight % ZnO. Single and multilayered coatings were analyzed. A number of deposited layers were 1, 3, 5 for CuO containing coatings, and 1, 5 for ZnO containing coatings. Differentially aged sol-gel coating solutions were used to obtain dip-coating compositions. The antibacterial effect was determined to all samples with novel dried droplet method using *E.coli* 25922 and *S.aureus* 6538 strains.

Results

Only a few of CuO containing materials had an antibacterial effect more than 50% against *S.aureus* and *E.coli*. None of the materials containing ZnO showed more than 50% effect against *S.aureus*.

ZnO containing coatings deposited onto phosphated SS surface showed effect more than 99% against *E.coli* and more than 95% against *S.aureus*.

Conclusions

Dried droplet method is appropriate to determine the antibacterial effect of small-sized materials. It offers a quick and simple way to ascertain antibacterial effects against prospected surfaces samples.

CuO sol-gel surface coatings don't have a noteworthy antibacterial effect. A few of ZnO coatings showed a significant antibacterial effect only against *E.coli* but not *S.aureus*.

Coatings deposited onto phosphated SS surfaces show much higher antibacterial effect than coatings deposited onto polished SS with some reaching almost 100% effect.

Sol-gel surface coatings show potential to be studied in future to determine optimal concentration and preparation for antibacterial surface coating.

Evaluation of microbiota in children with acute appendicitis

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Objectives

Treatment strategies for acute uncomplicated appendicitis has evolved that conservative antibacterial treatment is now recommended over surgical treatment, especially in pediatric patients. The aim of this research was to evaluate microbiota in pediatric patients surgically treated with acute uncomplicated and complicated appendicitis, and antibacterial susceptibility of the causative microorganisms.

Materials and Methods

This prospective cohort study included children with suspected AA (7-17 year age). Bacteriological examination was performed on swab samples from the distal and proximal ends of the appendiceal lumen, submucosa of the appendix, and peritoneal cavity. Bacteriological identification was realized using the VITEK2 analyser. Antibacterial susceptibility tests were performed in accordance with the recommendations of the European Committee on Antimicrobial Susceptibility Testing (EUCAST). Serodiagnosis of *Yersenia enterocolitica* was performed using indirect haemagglutination. Microsoft Excel 2016 and IBM SPSS Statistics 22 were used for statistical analysis. This study was performed in accordance with the ethical standards of the institutional committee.

Results

The results revealed differences in microbiota in cases of acute complicated and acute uncomplicated appendicitis. *Pseudomonas aeruginosa* was identified more frequently in cases of acute complicated appendicitis. Mixed culture was prevalent in cases of acute complicated and acute uncomplicated appendicitis. Only a couple positive extended spectrum beta-lactamase (ESBL) *E. Coli* cultures were identified. Most of the strains of *Pseudomonas aeruginosa* were resistant to amoxicillin and clavulanic acid, ertapenem, ampicillin and cefotaxime. *E. Coli* isolates were resistant to ampicillin and to amoxicillin with clavulanic acid.

Conclusions

In cases of acute complicated appendicitis, *P. aeruginosa* is the prevalent microorganism, whereas *E. Coli* is the most commonly isolated microorganism in acute uncomplicated appendicitis. Treatment strategies for AA should include antibiotics with different mechanisms of action to achieve a synergistic effect and prevent the development of antibiotic resistance. Guidelines for empiric antibiotic therapy should be reviewed periodically to ensure compliance with current antibacterial susceptibility patterns.

Management of biomaterial-associated infections: is it time for bacteriophages?

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Objectives

Current strategies to combat biomaterial-associated infections extensively employ the use of antibiotics. Due to increased rates of antibiotic-resistant strains of bacteria, search for other viable options is essential. Bacteriophages have been proposed as an alternative to commonly used antibiotics. One of potential advantages of bacteriophage-impregnated biomaterials is prevention of development of resistance. However, preserving stability of bacteriophages in biomaterial can be challenging. The purpose of this study was to determine changes in stability of bacteriophages impregnated in biomaterial films.

Materials and Methods

The sample of study included *Pseudomonas aeruginosa* reference strain ATCC 27853, commercial bacteriophage cocktail produced by *Microgen, Ltd. (Pyobacteriophag)*, stock solution of sodium alginate with aforementioned bacteriophage and bacteriophage-impregnated sodium alginate films. Phage suspension alone and in combination with sodium alginate were incubated at 37°C in dynamic conditions for different incubation periods. To display phage titer, the plaque assay was executed and stability of released bacteriophage from biomaterial was registered. All experiments were conducted in triplicate.

Results

Pyobacteriophag (Microgen, Ltd.) had an initial titer of 10⁷ PFU/mL. By 48 hr of incubation, *Pyobacteriophag* stock alone demonstrated preserved titer of 10⁷ PFU/mL. The indicated bacteriophage impregnated in sodium alginate films showed a three-fold reduction in titer (10⁴ PFU/mL) after 8 hr of incubation with further lowering to a four-fold decrease (10³ PFU/mL) after 48 hr. Conversely, there was no reduction in titer (10⁷ PFU/mL) evident in stock solution of sodium alginate with bacteriophage.

Conclusions

Data obtained indicates that there was no reduction in titer in suspension of *Pyobacteriophag* and stock solution of sodium alginate with bacteriophage. Contrarily, decline of titer of phage impregnated in sodium alginate films was observed. Maintaining stability of bacteriophage impregnated in biomaterial films and evaluation of bactericidal activity of it is of potential clinical interest for effective management of biomaterial-associated infections in both prophylactic and therapeutic interventions.

Prevalence of *Aeromonas* spp. infection in pediatric patients hospitalized with gastroenteritis during the COVID-19 pandemic

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Objectives

Aeromonas spp. are gram-negative rods, which are isolated in different aquatic environments, soil, animals and food products. They are responsible for causing acute and prolonged diarrhea, skin, soft tissue and wound infections, peritonitis, pneumonias and severe bacteraemia. Risk groups are kids under the age of five, elderly and immunocompromised patients. Even though *Aeromonas* are scientifically proven to be important in pediatric practice, the research in Latvia is not widespread.

Materials and Methods

During the period of 01.03.2020. – 01.12.2020. stool samples (n=491) were collected from paediatric patients admitted to Children's Clinical University Hospital EAOD and Infectious Diseases departments' with gastroenteritis symptoms. Clinical material sampling and incubation were performed according to standard recommendations and additional in-house procedure. Oxidase positive colonies were selected for further identification with Bruker Maldi-TOF biotyper. Antimicrobial susceptibility test was performed with Vitek 2 system.

Results

Aeromonas spp. were identified in 26 stool samples. In 15 samples *Aeromonas* was the only positive finding, but in the rest it was combined with other clinically significant pathogens. All patients with a positive result were aged between 9 months and 17 years old, 57% were less than five years old, gender ratio (male : female) was 1.6 (16/10). The average length of hospital stay was 3.3 days, antibacterial therapy was prescribed in 16 cases, the rest were provided only with symptomatic therapy and self-limited. Compared to the same period in 2019 the number of patients admitted to Children's Clinical University Hospital with gastroenteritis has significantly decreased due to COVID-19 pandemic restrictions but in contrast, the proportion of positive bacterial findings has increased.

Conclusions

Relying on our data *Aeromonas* spp. is a potential agent of foodborne infections in children.

Retrospective analysis of results of full-thickness corneal grafts after infectious keratitis treated in P. Stradins Clinical University Hospital between 2016 and 2020

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Objectives

Analyse the results of full-thickness corneal grafts in patients with and without systemic antibacterial treatment, that were performed after infectious keratitis in P. Stradins Clinical University Hospital from 2016 to 2020.

Materials and Methods

Retrospective case summary analysis and interpretation of case history from 2016-2020.

Results

During this period 117 full-thickness corneal grafts were performed. In 24 cases the main cause was infectious keratitis. The most common cause of infections were bacteria (*Streptococcus Epidermidis* - 3, *Pseudomonas Aeruginosa* - 2) and single-cell organisms (*Acanthamoeba* spp - 5), followed by fungal infections (*Candida Albicans* - 2, *Aspergillus* spp - 2) and viral infections (*Herpes* spp. - 3). 13 Patients received systemic antibiotics before and after corneal transplantation and 11 patients received only topical antibiotics. All the patients were treated with topical antimicrobial treatment before receiving the graft. We analysed conjunctival injection, swelling and inflammation after surgery. In the group treated with systemic antibiotics conjunctival redness was 11 (+/- 7) days after surgery, but in the group with only topical antibiotics - 21 days (+/- 8) days after surgery. One patient had a fungal *Acremonium* spp keratitis which resulted in a full-thickness graft. 6 months after the operation the patient was hospitalised with a rare bacterial *Stenotrophomonas Maltophilia* keratitis which led to reoperation.

Conclusions

Subsequent and immediate antimicrobial systemic treatment either for viruses or bacteria can lead to good results when treating infectious keratitis. Corneal grafts are the last resort treatment for patients suffering from corneal lesions.

Risk factor detection for biofilm formation in *E. coli*

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Objectives

Escherichia coli (*E. coli*) is the most common causative agent of urinary tract infection. UTI is commonly associated with biofilm formation that acts as defense mechanism against host immune system, yet bacterial or host risk factors for biofilm formation are unclear.

Materials and Methods

Bacterial strains isolated from patients with urinary tract infection were used. Strain antimicrobial susceptibility according to EUCAST standard, biofilm formation capability using Chrystal violet assay and strain molecular typing were performed and analyzed in accordance with patient clinical parameters.

Results

In total 175 *E. coli* strains were analyzed, ESBL expression and clinically relevant biofilm formation was detected commonly. Longer incubation period was associated with greater biofilm biomass. Several clinical factors as presence of urinary catheters were associated with greater biofilm production.

Conclusions

E. coli biofilm formation is a serious and common bacterial mechanism to gain better resistance towards the host and antimicrobial treatment. Certain bacterial and host risk factors for strong biofilm producing *E. coli* phenotype can be identified and used for risk stratification to select proper treatment.

Smokeless tobacco product consumption strategies among students: pilot study

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Objectives

Although smokeless tobacco (snus) sales are prohibited in Latvia, there are young people who are using them daily. Snus is sold as sachets in small containers. During last year a new form of sachets were available in Latvian selling markets- nicotine sachets. New forms of tobacco raise an interest in young adults and become more and more attractive and easier to get. There is no information about consumption strategies in smokeless tobacco from users - where they place the product, how much it costs, how many sachets they are using etc.

Materials and Methods

An online survey (51 questions) was made about tobacco consumption strategies among students. They were asked to answer questions about their oral care habits, tobacco consumption frequency, costs, storage options and reasons why, when and how they are using them. An online survey is still in the process.

Results

At the moment 31 respondents have completed the survey. 51% of students use some form of tobacco products. 32% of participants are using snus, but 13% - nicotine sachets. 42% of smokeless tobacco users use 5 sachets per day, but 58% use 5-10 sachets per day. 66 % of smokeless tobacco users reuse tobacco sachets. 33% use more than 1 sachet at a time. 33% are using it during the night. 25% use sachets during their training or sports activities. Only 6% place smokeless tobacco in the refrigerator.

Conclusions

Smokeless tobacco is frequently used among students. Few snus users know that product should be placed in the refrigerator. It is possible to think that incorrect storage could have an impact on tobacco specific nitrosamines. Results give us thinking about harmful effects on oral health especially if the product is used during the night when salivary flow is reduced. Sachets could stimulate training performance and may possibly affect results.

Staphylococcus aureus colonisation in patients with recurrent tonsillitis

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Objectives

S.aureus is frequently isolated from throat cultures, it can be a part of patients oral microbiome or a causative agent of recurrent tonsillitis (RT) and produce multilayered biofilms. The antimicrobial effect within the biofilm is insufficient due to lowered bacterial metabolic activity and reduced penetration. Research objectives are to evaluate clinical importance of *S. aureus* colonization in patients with RT using microbiological testing of samples from tonsillar crypts, throat, nasal cavity and armpits.

Materials and Methods

Samples from tonsillar crypts were obtained during tonsillectomy from 16 patients. Samples from throat, nasal cavity and armpit were obtained approximately a year later to assess *S.aureus* carriage. Bacteriological examination methods were used. Biofilm producer strains were evaluated. Microtitre-plate method was used for the in vitro cultivation and quantification of bacterial biofilms.

Results

From tonsillar crypts of 16 patients with RT 16 strains of *S.aureus* were isolated. From tonsillar crypts 1/16 were strong biofilm producers, 6/16 were moderate, 8/16 were weak, 1/16 strains of *S.aureus* did not produce a biofilm. A year after tonsillectomy 4/16 strains of *S.aureus* were isolated from throat culture, 4/16 from nasal samples, 1/16 from armpit samples. From throat samples 1/4 were strong biofilm producers, 3/4 strains of *S.aureus* were weak. From nasal samples 1/4 were moderate, 1/4 weak biofilm producers, 2/4 strains of *S.aureus* did not produce a biofilm. From armpit samples 1 strain of *S.aureus* did not produce a biofilm.

Conclusions

From obtained data we can conclude that in 9/16 cases *S.aureus* was the causative agent of RT, in 5/16 cases patients had a predisposition to colonization of *S.aureus*, in 2/16 cases *S.aureus* were a part of patients oral microbiome. 9 strains of *S.aureus* were isolated in the late postoperative period and in 5/9 cases they were biofilm producing strains.

The associations between bacteria, fungi and biofilm production in patients with recurrent tonsillitis and healthy controls

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Objectives

Microorganisms within biofilms are resistant to host defenses and antibiotics. The presence of bacterial biofilms within the tissue and crypts of inflamed tonsils may explain the chronic and recurrent characteristics of some forms of tonsillitis. Research objectives are to establish possible associations between identified bacteria, fungi and biofilm production in patients diagnosed with recurrent tonsillitis (RT) as well as in healthy individuals.

Materials and Methods

During prospective controlled study material from tonsillar crypts was obtained for microbiological testing from healthy individuals and patients with RT. Identification of microorganisms was performed using MALDI-TOF mass spectrometry. Microtiter-plate method was used for the in vitro cultivation and quantification of bacterial biofilms. The optical density of the adherent biofilm layer formed in microtiter-plate was measured using microtiter-plate reader. Pearson Chi-Square (χ^2) and Fisher's exact test was used to determine associations between the variables.

Results

There was a significant association between Gr + bacteria and biofilm formation in healthy controls (n=91) (Pearson χ^2 test, $\chi = 61.733$, $p < 0.001$), patients with RT (n=99) (Pearson χ^2 test, $\chi = 40.932$, $p < 0.001$), patients with exacerbated RT (n=29) (Fisher's exact test, $p < 0.001$). There was no significant association between Gr - bacteria and biofilm formation in healthy controls (n=91) (Pearson χ^2 test, $p = 0.808$), patients with RT (n=99) (Pearson χ^2 test, $p = 0.227$), patients with exacerbated RT (n=29) (Fisher's exact test, $p > 0.999$). There was no significant association between fungi and biofilm formation in healthy controls (n=91) (Fisher's exact test, $p = 0.473$), patients with RT (n=99) (Fisher's exact test, $p > 0.999$), patients with exacerbated RT (n=29) (Fisher's exact test, $p = 0.215$).

Conclusions

If Gr + bacteria had been detected in tonsillar crypts of healthy individuals or patients with RT most likely a biofilm was present. On the other hand, if Gr- bacteria or fungi had been detected in the same patient group, most likely a biofilm was not present.

The effect of bacterial growth conditions on biofilm formation

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Objectives

Escherichia coli is known as one of the predominant species among facultative anaerobic bacteria found in gastrointestinal tract and it is known as most common causative agent of urinary tract infections. In most cases, these infections are associated with biofilm formation.

The aim of this study was to analyse biofilm formation by clinical *Escherichia coli* isolates under different growth conditions and determine how these conditions affect the formation of biofilm.

Materials and Methods

A total of 177 clinical *Escherichia coli* isolates were obtained from biobank at RSU that were isolated from chronic kidney disease patients with UTI with several antimicrobial resistance patterns (including ESBL).

Bacterial cultures were grown in LB medium for 24 h at 37°C, than transferred into 96-well plates and incubated in different conditions to obtain biofilm production.

Grow conditions that were changed was temperature (39°C, 37°C, 32°C, 28°C), incubation time (24 h, 36 h, 48 h, 60 h, 72 h) and glucose concentration in media (2%, 3%, 4%). Detection of biofilm formation of the bacterial strains was carried out in 96-well microtiter plate using crystal violet assay. Results were obtained measuring optical density at 570 nm wavelength. All experiments were done in triplicate.

Results

35% of tested samples showed biofilm formation under standard conditions (48h, 37°C). Addition of glucose to the medium reduced biofilm formation activity by ca. 20%. Culturing bacteria at reduced temperature (28°C) increased the number of biofilm producers by 30%, while cultivation at elevated temperature, reduced the number of biofilm producers. At 28°C 73% of the samples showed biofilm forming activity, while at 39°C only 9% were biofilm positives.

Conclusions

The optimal cultivation time for biofilm formation was 48 hours. If the cultivation time was shortened or extended, the biofilm formation activity decreased. Bacterial culturing conditions affect their ability to form biofilm.

Epidemiology

Occurrence of important foodborne zoonotic pathogens in Latvia – *Cryptosporidium* spp. and *Giardia duodenalis*

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Objectives

Cryptosporidium spp. and *Giardia duodenalis* are an important food borne parasites which cause gastrointestinal disease in animals and humans. Globally, they are ranked high among the most important foodborne pathogens by FAO and WHO. The overall objective of the present study is to use a multi-disciplinary, One Health approach to tackle issues associated with foodborne parasites, addressing existing gaps in our knowledge regarding occurrence, transmission, epidemiology, harmonization of methods, and prevention.

Materials and Methods

Within present study we aimed to characterise the epidemiology of *Cryptosporidium* spp. and *G. duodenalis* and potential transmission routes by summarizing the available data about human cases of cryptosporidiosis and giardiasis in Latvia data from studies regarding *Cryptosporidium* spp. and *G. duodenalis* prevalence and molecular diversity in food producing and companion animals.

Results

Cryptosporidiosis cases in humans have only been reported since 2009, with a total of 71 cases being reported from then until 2020 (mean: 6 cases per year, range: 2–23 cases per year). Meanwhile, from 2000 to 2020, a total of 1,000 cases of giardiasis were reported (mean: 48 cases per year, range: 3–172 cases per year).

Cryptosporidium spp. were shed by 33.8% of the investigated cattle and 15.2% of companion dogs, while *G. duodenalis* were shed by 5.9% of the investigated cattle and 11.9% of companion dogs. Findings of *C. parvum* species and most common subtype IIaA15G2R1 and presence of *G. duodenalis* assemblage A in animals highlights the zoonotic potential of those pathogens in Latvia.

Conclusions

The zoonotic aspects of *Cryptosporidium* spp. and *G. duodenalis* needs to be taken into account, and need to be addressed in future studies.

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Seroprevalence among risk group persons and control group to *Coxiella burnetii* in Latvia

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Objectives

The Q-fever is worldwide zoonotic disease. An inhalation of aerosols and exposition to infected materials during cattle parturition or slaughtering containing *Coxiella burnetii* bacteria play the major role in transmission of the infection. We present a pilot study of risk group human seroprevalence to *C. burnetii* in Latvia in comparison to the control group.

Materials and Methods

The study was approved by the Ethics Committee of the Institute "BIOR". A total 240 sera samples, including 190 from the risk groups and 50 from the control group were studied. Samples were tested with *Coxiella burnetii* (Q-Fever) Phase 1 and 2 IgG ELISA kits (NovaTec Immundiagnostica). Statistical analyses were performed using the Chi-square test. The 95% confidence interval for disease prevalence and odds ratio were calculated using the open access program EpiTools.

Results

All sera from the control group were negative (95% CI: 0 – 7.13). The seroprevalence among risk group persons was 8.04 – 11.54 % (95% CI: 4.29 – 20.50). Statistically significant differences were not observed between genders. The highest percentage (25 %) of seropositive and equivocal sera samples were detected in age of 39 – 48 years and 49 – 58 years. Working as practicing veterinarian or former veterinarian was the only risk factor identified as statistically significant ($P = 0.03$), and belonging to the risk group in general ($P = 0.01$). The geographical distribution of seropositive risk group participants indicated that they are more located in the Northern, Central and Eastern part of the country.

Conclusions

More than 10% of the representatives of risk groups have been exposed to the disease-causing agent or have had the Q-fever, confirming relatively wide distribution of the disease among Latvian dairy farms. Particular attention has to be paid to education of risk group persons as well as implementation of biosecurity measures.

The zoonotic parasite *dirofilaria repens* emerged in the Baltic countries Estonia, Latvia, and Lithuania in 2008–2012 and became established and endemic in a decade

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Objectives

Dirofilariosis, a vector-borne disease caused by nematode parasites of the genus *Dirofilaria*, is an emerging zoonosis in northern Europe. We aimed to review and summarize the available data on emergence and presence of *Dirofilaria repens* in Estonia, Latvia, and Lithuania.

Materials and Methods

We reviewed epidemiological studies and descriptions of *D. repens* infections in humans and domestic dogs in the three Baltic countries.

Results

Based on the available literature and reports, the first *D. repens* finding in Latvia was made in 2008, the first in Lithuania in 2010, and the first in Estonia in 2012. Further findings were reported soon after the first reports. By the end of 2019, autochthonous human *D. repens* infections had been described from Latvia and Lithuania, and autochthonous canine *D. repens* infections from all three Baltic countries. No epidemiological studies estimating prevalence or incidence in humans were identified to be published from any of the three countries. In studies performed in Latvia and Lithuania, a substantial proportion of investigated dogs were reported positive for the parasite.

Conclusions

Dirofilariosis is an emerging zoonosis in northern Europe, and the summarized data confirm that *D. repens* has become established and endemic in all three Baltic countries. Awareness about this should be increased among medical doctors, veterinarians, and the general public. Managing this zoonotic disease is a public health challenge that requires a One Health approach, communication across the sectors, and international collaboration. Reference: Deksnē G, Jokelainen P, Oborina V, Lassen B, Akota I, Kutanovaite O, Zaleckas L, Cīrule D, Tupīts A, Pimanovs V, Talijunas A, Krūmiņa A. The Zoonotic Parasite *Dirofilaria repens* Emerged in the Baltic Countries Estonia, Latvia, and Lithuania in 2008-2012 and Became Established and Endemic in a Decade. Vector Borne Zoonotic Dis. 2021 Jan;21(1):1-5. doi: 10.1089/vbz.2020.2651.

COVID-19

Abnormal liver function in patients hospitalized with COVID-19 in Latvia

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Objectives

Abnormal liver function (LF) is one of the processes registered during acute SARS-CoV-2 infection. This study aimed at investigating liver function in patients with COVID-19 on admission to the hospital.

Materials and Methods

A retrospective study has been conducted within the framework of the National Research Program VPP-COVID-2020/1-0023. COVID-19 patients hospitalized in Riga East Clinical University hospital (March-November 2020) were included. Abnormal LF was defined as ALT>40 U/l, AST>40 U/l, GGT>45 U/l, or total bilirubin (TBIL) >21 µmol/l. Liver injury was defined at the level of ALT three times greater than 40 U/l. Autopsies were performed on thirty patients who died. Liver samples of nine patients without severe comorbidities were analyzed.

Results

Among the 184 patients 68 (37%) had abnormal LF and 6 (3%) had the liver injury. Abnormal LF and liver injury were found in 13% and 17% of mild, 63% and 33% of moderate and in 24% and 50% of severe COVID-19 patients. Age, gender, presence of hypertension, coronary heart disease, diabetes, leucocytes, erythrocytes, platelets, and TBIL on admission had no significant differences in LF groups. Chronic liver diseases were previously diagnosed in 2% of patients with normal LF, 4% of patients with abnormal LF, and 50% of patients with liver injury. All liver samples showed fibrosis. Macrovesicular steatosis was observed in 78%, centrilobular necrosis in 22% (1-rare areas, 1-several areas in the field of vision), inflammation with predominantly lymphocytic infiltration in 89% (2-mild and 1-moderate inflammation in the portal fields, 5-mild inflammation in the portal fields and lobularly) of cases.

Conclusions

The abnormal liver function is observed in one-third of patients hospitalized with COVID-19. LF abnormality and liver injury are related to the COVID-19 severity. Investigation on admission allows hypothesizing that the abnormal function is a result of direct SARS-CoV-2 effect on the liver. Chronic liver diseases may interact with COVID-19 severity.

Analysis of hospitalized adult COVID-19 patients in Riga East Clinical University Hospital in Latvia

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Objectives

The aim of the study was to analyze hospitalized COVID-19 patients in the Riga East Clinical University Hospital.

Materials and Methods

This study was analysis of retrospective data of patients (n = 100) hospitalized in the Riga East Clinical University Hospital with a diagnosis of COVID-19 from March 2020 – July 2020.

Results

Study revealed that the mean age of the affected person was 57 years (\pm 18 years) (18 to 99 years) and 57% were male.

Comorbidities were found in 74% of patients, most frequent were arterial hypertension - 44%, chronic heart failure - 14%, atherosclerosis - 15%, arrhythmias - 12%, diabetes - 11%. Chronic kidney disease in 6%, adiposity in 8%, cerebrovascular disease in 8%, oncological disease in 5%, fatty liver disease in 2%, chronic viral hepatitis and cirrhosis in 1%.

The most common complaint at the moment of hospitalization was cough - in 74% of patients. Of these, dry cough was found in 52%, productive - in 15%, paroxysmal - in 6%. Fatigue was present in 35% of patients. 20% of patients reported varying degrees of shortness of breath.. Headaches were reported in 10% of patients, muscle pain in 2%. Sore throat was noted in 3% of patients and scratching in the throat in 12%. Gastrointestinal symptoms such as diarrhea, nausea, vomiting, loss of appetite was reported in 6% of patients. Loss of smell or taste was seen in 1% of patients. On average, 6% of patients had dizziness, and 4% of patients had anxiety and fear. The mean body temperature at the moment of hospitalization was 37.9 ± 0.9 °C.

Conclusions

Taking into account that many symptoms are different then described in other studies further research in Latvian patients can be useful for the specification of significant trends and correction of clinical guidelines.

Chest CT pulmonary findings in clinically recovered patients with RT-PCR confirmed SARS-CoV2 infection and COVID-19 pneumonia

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Objectives

Outbreak of SARS-CoV 2, a new coronavirus, has rapidly spread worldwide since the end of 2019. Novel coronavirus induces lung damage leading to pneumonia of different severity. It's hypothesized that COVID-19 pneumonia may result in stable or progressive pulmonary fibrosis after disease, which may lead to significant functional impairment. Computed tomography (CT) is proved as a highly informative method in assessing lung changes. Aim of study was to assess frequency and type of pulmonary CT symptoms in patients recovered after COVID-19 infection.

Materials and Methods

Patients with history of RT-PCR confirmed COVID-19 infection and acute COVID-19 pneumonia, moderate or severe stage, hospitalized in Riga Eastern University Hospital and later discharged were included in this study. Patients gender, age, comorbidities, clinical course, received pneumonia treatment, lowest blood oxygen saturation level, time spent on non-invasive oxygen therapy were compared with CT findings. Lung CT scan was performed on day 14 after discharge or later. Following symptoms were assessed using originally created protocol: lesion's location, multiplicity, signs of interlobular septal thickening, parenchyma fibrotic changes, ground glass opacities, parenchyma bands, infiltrative consolidation, mediastinal lymphadenopathy, pleural effusion size, bronchial tree changes. Descriptive and analytical statistics was performed by SPSS software. Significance was considered with $p < 0.05$.

Results

Among 24 studied patients CT early symptoms of lung fibrosis were found in 16,5% cases [CI: 4,1–33,3%]. Typical CT signs suggesting development of early pulmonary fibrosis were ground glass opacification, parenchyma fibrotic bands, interlobular septal thickening. There was no positive correlation between clinical course or comorbidities and early pulmonary fibrosis signs on CT.

Conclusions

Our preliminary results show, that significant part of COVID-19 pneumonia patients develops lung fibrotic changes with typical distribution months after discharge. It's necessary to continue this ongoing research to determine relationship between radiological findings and clinic in follow-up studies for planning adequate treatment, and predict outcome of disease.

Clinical features of paediatric post-acute COVID-19 in Latvia: descriptive retrospective cohort study

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Objectives

To identify long-term post-acute Covid-19 symptoms and sequelae in children after severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection.

Materials and Methods

This was a retrospective cohort study. From March 2020 to December 2020 ninety two paediatric Covid-19 patients (age ≤ 18 years) and their parents were enrolled in the study. To identify the long-term consequences of SARS-CoV-2 infection, we defined post-acute covid-19 as extending beyond three weeks from onset of first symptoms. All patients were evaluated in a face-to-face visit according to specially designed post-COVID-19 symptom assessment protocol 1 to 3 months after COVID-19 onset. The protocol consisted of following domains: physical health, mental health, cognitive functions, social and emotional well-being. Descriptive statistics were used to present the data.

Results

The median interval from SARS-CoV-2 PCR test to the first follow-up visit was 55 days (IQR = 30–104 days). During the first follow up visit 49% (n=45) of all patients were asymptomatic and had returned to their previous level of health, but 51% (n=47) had persistent symptoms after SARS-CoV-2 infection. In the symptomatic patient group 20% (n=18) had only one long-term symptom, 10% (n=9) had 2 symptoms, while 22% (n=20) of all patients complained about three or more prolonged symptoms. The most common complaints were about constant fatigue (18%) and tiredness after good night sleep (20%), as well as anosmia/ageusia (16%) and periodic, recurrent headaches (15%).

Conclusions

The long-term symptoms of SARS-CoV-2 infection are evident in paediatric population and affect children's physical and emotional health. There are only few limited studies about post-acute covid-19 in adult population. The further research is needed in paediatric patient group.

Construction of SARS-CoV-2 E gene plasmids for development of an in-house method for quantification of viral RNA in patient samples

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Objectives

Started as a local outbreak in December 2019, SARS-CoV-2 infection has risen into the global pandemic with over 65 million cases of infection and 1.5 million deaths. Although timely set diagnosis allows preventing further transmission of the infection, increasing demand for high-throughput COVID-19 diagnostic testing has resulted in reagent shortage.

The aim of the study: To contribute to research for developing COVID-19 testing, we aimed to construct SARS-CoV-2 E gene artificial plasmids and to use plasmid constructs in the development of an in-house RT-PCR assay for quantification of SARS-CoV-2 RNA in patient samples.

Materials and Methods

The RNA isolated from nasal swabs of patients (n=5) with confirmed SARS-CoV-2 infection were received from the national biobank and used as a template for plasmid construction. The cDNA synthesis followed by E gene PCR was used to prepare amplicons for plasmid construction and cloning into *E.coli*XL-1 Blue cells. The colony PCR and subsequent product sequencing were performed to confirm plasmid inserts. The recombinant plasmids were purified, serially diluted, and used to evaluate the linearity and efficiency of the RT-PCR assay. The analytical sensitivity of the assay was determined by analysis of replicate samples (n=20) containing 3, 5, and 10 gene copies/per well.

Results

The 200 bp long E gene amplicons were obtained from 4/5 clinical samples. The colony PCR followed by product sequencing enabled the selection of 15 bacterial colonies containing valid plasmid constructs. The E gene-based RT-PCR assay was tested within the range 10-1000000 gene copies/per well and exhibited acceptable linearity ($r^2 \geq 0.997$) and efficiency (95.8-104.9%). The lower limit of quantification (LLOQ) was 5 gene copies/per reaction.

Conclusions

A time- and cost-effective solution was found in response to reference material supply shortage and applied in the development of the in-house SARS-CoV-2 RT-PCR assay.

COVID-19 clinical and epidemiological characteristics in children in Latvia: descriptive retrospective cohort study

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Objectives

To characterise the clinical and epidemiological features of acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection of children in Latvia at the outpatient and hospital setting.

Materials and Methods

The retrospective cohort study was conducted from March to December 2020 and totally 123 SARS-CoV-2 positive children (0-18 years of age) were enrolled in the study. All patients were evaluated in a face-to-face visit according to a specially designed study protocol which consisted of 95 questions divided into 8 sections. Descriptive statistics were used to present the data.

Results

The mean age of patients included in the study was 10.2 years. Boys get infected more often than girls – gender distribution was – boys 57% (n=80) and girls – 43% (n=53). 61% (n=70) of all patients were adolescents, aged 10 – 18 years.

74% (n=92) of patients were in contact with a known Covid-19 patient, e.g. in their household or educational institution. Children are most likely to get infected by known Covid-19 positive patients, at home (30%) and in educational establishments (17%).

The most common symptom of SARS-CoV-2 infection in our paediatric population in Latvia was increased temperature 83% (n=96). Most frequently – febrile temperature in 46% (n=57) cases; subfebrile temperature 34% (n=42). Tiredness 46% (n=53), cough 35% (n=40), rhinorrhoea 35%(n=40) and headache 33% (n=38) were also other prominent symptoms.

Conclusions

Symptoms of SARS-CoV-2 infection in children overlap with seasonal infectious diseases. It is difficult for children to detect symptoms like fatigue, headache and anosmia/ageusia themselves and therefore caregivers should pay attention to these signs when evaluating children with febrile illness.

Cytokine storm and COVID-19 severity

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Objectives

Cytokine storm in case of COVID-19 is considered to be one of the major causes of acute respiratory distress syndrome (ARDS) and multiple organ failure. It plays an important role in the process of disease aggravation. Aim of the study was to characterize the effect of SARS-CoV-2 on the production of cytokines in patients with severe clinical symptoms and selected sets of samples from patients with mild or no clinical symptoms.

Materials and Methods

Based on the analysis of the topical scientific literature on the peculiarities of the clinical course of COVID-19, a cytokine panel (GM-CSF, IFN- γ , IL-1 β , IL-6, IL-8, IL-17A, IL-18, IP-10, MCP-1, MIP-1 α , MIP-1 β , PDGF-AB/BB, TNF- α , VEGF-A) was created to determine the differences in cytokine levels in both hospitalized and non-hospitalized patients using the Luminex200 system. To date, we have analysed 104 plasma samples of which 61 [24 (39%) male, median age 40 years; 37 (61%) female, median age 44.5 years] were from outpatients and 43 [17 (40%) male, median age 61 years; 26 (60%) female, median age 71 years] from hospitalized COVID-19 patients. The obtained results were analysed using GraphPad Prism 9.0.

Results

Comparing hospitalized patients against outpatients results clearly shows that most patients with severe COVID-19 exhibit markedly increased plasma levels of pro-inflammatory cytokines and the statistically significant correlation between hospitalized patients and outpatient for multiple cytokines: IFN- γ , IL-6, IL-8, IL-18, IP-10, MCP-1, TNF- α and VEGF-A.

Conclusions

Our results confirm the previously published that a sudden increase in cytokine levels provoked by systemic stimuli, like a generalized viral disease may easily escape the regulation and trigger systemic responses within the definition of 'cytokine storm', systemic inflammatory response syndrome or ARDS.

Distribution of HLA class II allelic variants in patients with COVID-19 in Latvia

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Objectives

This study assessed the distribution of HLA Class II allelic variants in patients with COVID-19 in the Latvian population.

Materials and Methods

The study has been conducted within the framework of the National Research Program VPP-COVID-2020/1-0023. The study included 68 patients with Covid-19 (mean age 56±16 years, 51% females). HLA typing was performed in HLA-DRB1, -DQA1, and -DQB1 loci by PCR with low-resolution sequence-specific primers (DNA-technology). The distribution of HLA alleles in patients with COVID-19 was compared to the distribution of frequency of alleles in a reference group of 100 Latvian individuals, previously typed in our laboratory. The effect of each allele was assessed by calculation of the odds ratio.

Results

In patients with COVID-19, HLA-DRB1*07:01, HLA-DRB1*13:01, HLA-DRB1*15:01, and HLA-DQA1*01:03 alleles were found more frequently than in the reference group. These alleles can be candidates associated with a higher susceptibility to the SARS-CoV-2 virus in our population and can be considered as risk alleles. HLA-DRB1*15:01 was identified as a risk allele in patients with COVID-19 in a recent study in Italy. Three alleles were found rarely than in the reference group. There were HLA-DRB1*12:01, HLA-DRB1*16:01, and HLA-DQB1*03:03. These alleles can be associated with a protective effect on SARS-CoV-2 infection.

Conclusions

The preliminary data of HLA typing of patients with COVID-19 reveal some allelic variants of HLA Class II genes responsible for susceptibility or protection to SARS-CoV-2 infection in the Latvian population. In the further stage of the project, we plan to perform HLA typing of about 120 patients with COVID-19 to confirm the results and to identify haplotypes associated with susceptibility and protection.

Emotional well-being of reproductive age women during COVID-19 pandemic

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Objectives

The public crisis related to COVID-19 have altered individuals daily functioning – the impact on social, psychological and emotional well-being remain relatively unknown. Pregnant women are vulnerable population - pandemics can increase the risks of psycho-emotional stress. The aim of the study was to evaluate COVID-19 impact on emotional status of reproductive age women in pregnancy and beyond.

Materials and Methods

The analysis was done by obtaining data from behavioral cross-sectional online survey that was conducted as a part of international multi-country study I-SHARE and the State research project "Impact of COVID-19 on health care system and public health in Latvia; ways in preparing health sector for future epidemic" (VPP-COVID-2020/1-0011). Data regarding reproductive age women (18-50 years old) residing in Latvia were used and divided in two groups – pregnant women (Group 1) and non-pregnant women (Group 2). Data were analyzed with MS Excel and IBM SPSS 26.0.

Results

In total information about 70 pregnant and 662 non-pregnant women was received. Pregnant women more often thought their mental health is good (91.4% vs. 75.1%, $p=0.002$). Group 2 (83.7%) felt more tension with their partners than Group 1 (61.4%) [$p<0.001$]. Both groups marked that the tension increased during COVID-19 restrictions. Group 1 felt more support before (97.1% vs. 91.6%, $p=0.102$) and during COVID-19 restrictions (90.5% vs. 70.4%, $p=0.052$). Frustration (25.5% vs. 51.9%, $p<0.001$) was more evident in Group 2 while fear of becoming infected (75.0% vs. 65.5%), confusion about restrictions (36.1% vs. 29.9%), obsession with washing hands (31.5% vs. 32.6%) was similar in both groups ($p>0.05$).

Conclusions

The results indicate that pregnant women in Latvia felt more support and had less tension with their partners during COVID-19 when compared with non-pregnant. Pregnant women considered their mental health as good more often.

Evaluation of possible SARS-CoV-2 fecal-oral transmission route in Latvian COVID-19 patients

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Objectives

The novel coronavirus SARS-CoV-2 poses a great public health crisis. Since December 2019, it has spread all over the world and still causing huge damage and disruption of everyday life. The understanding of all transmission pathways of this virus is very important to implement appropriate pandemic regulation strategies. The aim of this study was to evaluate possibility of SARS-CoV-2 fecal-oral transmission route.

Materials and Methods

Nasopharyngeal swab, urine and fecal samples from 79 COVID-19 patients (38 men [median age 59] and 41 women [median age 68]) were analyzed in this study.

SARS-CoV-2 genomic sequence was detected using commercially available qualitative real-time polymerase chain reaction (PCR) kit in nasopharyngeal swab, urine and fecal samples' total RNA.

All positive samples were additionally tested for SARS-CoV-2 load using commercially available quantitative real-time PCR kit.

All PCR kits used various SARS-CoV-2 target genes to exclude non-specific results and internal control.

Results

SARS-CoV-2 genomic sequence was found in 70 out of 79 (87%) nasopharyngeal swabs, 43 out of 79 (54%) fecal samples and 4 out of 79 (5%) urine samples.

Analyzing SARS-CoV-2 load values, the highest median viral load was found in fecal samples - 46204 (p=0.0009 [IQR: 5424.0-3919660.0]) viral copies/ml in comparison to nasopharyngeal swabs, where median 6004 (IQR: 468.3- 32859.0) viral copies/ml was found. The lowest viral load values were found in urine samples (range: 40 - 5000 viral copies/ml).

No significant differences were found between men and women in SARS-CoV-2 distribution and viral load.

Conclusions

Frequent presence of SARS-CoV-2 genomic sequence and significantly higher viral load values in fecal samples indicate on the possibility of existence of fecal-oral transmission route for this virus.

Formation of SARS-CoV-2 specific antibodies in dynamics

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Objectives

The coronavirus disease 2019 (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Antibody testing plays a big role in understanding virus's epidemiology and it reveals whether a patient's immune system has developed antibodies against the virus. The main goal of this study was to evaluate antibody response to SARS-CoV-2 in dynamics.

Materials and Methods

178 plasma samples from 154 patients (both hospitalized and outpatients) were analysed for the presence of virus-specific (IgG NCP, IgG S1 and IgA) antibodies using EUROIMMUN semi-quantitative ELISA. Plasmas samples positive for virus-specific antibodies were quantified using quantitative ELISA (ANTIBODIES) for anti-SARS-CoV-2 IgG and IgM class antibodies.

Results

In 131 COVID-19 patients' plasma samples anti-SARS-CoV-2 IgG NCP, in 135 - anti-SARS-CoV-2 IgG S1 and in 117- anti-SARS-CoV-2 IgA class antibodies were detected. 24 patients had been tested for antibodies in dynamics (at various times after the first sampling). 7 patients' samples were positive for IgG (7/24, 29.2%), 15 patients' samples – for both IgM and IgG class antibodies (15/24, 62.5%). IgM level at first time point was higher than at second time point. 2 patients were SARS-CoV-2 IgM, IgA and IgG negative at first and second time point. IgA antibodies begin to appear on day 8 or 9. Approximately two weeks after infection, IgA and IgG antibodies had reached equal levels (8/24, 33.33%) and subsequently, IgA titres decreased (15/24, 62.5%), but IgG showed a tendency to decrease after two months. In one sample collected after two months, IgM antibodies had reappeared.

Conclusions

Tendency of IgG titres to decrease after two months could indicate on an un-sustained long-term antibody response. Repeated IgM production can indicate a possible COVID-19 reinfection in some patients.

Identification of bacterial lung infections and pre-existing persistent/chronic viral infections in COVID-19 patients

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Objectives

To date, there is no information about co-existing bacterial lung infections and chronic/persistent virus infections of COVID-19 patients in Latvia so the aim of this study was to identify such co-infections.

Materials and Methods

In total 112 [51 (45.5%) male, median age 61 years; 60 (53.6%) female, median age 65 years; the gender of one 79 years old patient was unknown] hospitalized COVID-19 patients were included in this study. Presence of 7 respiratory bacteria (*Chlamydomphila pneumoniae*, *Mycoplasma pneumoniae*, *Legionella pneumophila*, *Bordetella pertussis*, *Bordetella parapertussis*, *Streptococcus pneumoniae* and *Haemophilus influenzae*) was tested in 112 DNA samples isolated from oropharyngeal swabs and presence of 12 viruses (herpes simplex virus 1 and 2, varicella zoster virus, Epstein-Barr virus, cytomegalovirus, human herpes virus 6 and 7, human adenovirus, human parechovirus, human enterovirus, mumps virus and parvovirus B19) in 81 DNA samples isolated from peripheral blood mononuclear cells (PBMC) and cell-free blood plasma was tested by multiplex PCR (Allplex Respiratory Panel 4, Allplex Meningitis-V1 Assay and Allplex Meningitis-V2 Assay, Seegene Inc., Republic of Korea).

Results

In total 5 out of 112 (4.5%) oropharyngeal swabs were *Haemophilus influenzae* positive, while 2 out of 112 (1.8%) – were *Streptococcus pneumoniae* positive. 30 out of 81 (37%) PBMC samples were Epstein-Barr virus positive, 17 out of 81 (21%) samples were human herpes virus 7 positive and one sample – human herpes virus 6 positive. No plasma samples were positive for any of viruses tested. For 6 (7.4%) patients co-infection of Epstein-Barr virus and human herpes virus 7 was detected, and for one patient – Epstein-Barr virus and human herpes virus 6 was detected.

Conclusions

Co-infections with respiratory bacteria are not common among hospitalized COVID-19 patients in Latvia. Chronic/persistent Epstein-Barr virus infection is the most common co-infection present among hospitalized COVID-19 patients in Latvia, followed by human herpes virus 7 infection.

Long-term health effects of COVID-19 in Latvia

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Objectives

After the onset of acute COVID-19 some patients, especially those who were treated in Intensive care unit, experience symptoms for weeks or months. These patients are referred as "post-COVID-19 long haulers". There is a lack of information on the long-term health outcomes of COVID-19. The aim of this study is to evaluate long-term health problems associated with Covid-19.

Materials and Methods

A prospective study has been conducted within the framework of the National Research Program VPP-COVID-2020/1-0023. The sample included 51 patients of COVID-19 (27 inpatients and 24 outpatients) with no less than 3 months in the post-infection period. The mean age was 41 years (20-66 years), 51% were males. We have analyzed their symptoms, objective information, and blood markers.

Results

Overall, 75% of participants reported complaints. Symptoms reported by patients were fatigue (n=14), exercise intolerance (n=17), weight changes (n= 9), hair loss (n=12), respiratory complications (n=15). Most of patients noted neurological consequences (n=20) such as memory problems (n=9), difficulty remembering new information (n=8), sleep disorders (n=7), dizziness (n=7), headaches (n=4) and some patients noted panic attacks (n=4) or feeling of depression (n=4). Many patients marked cardiovascular complications (n=17) such as arrhythmias (n=9), palpitations (n=14), high blood pressure (n=3). No association was found between long-term health effects and age or sex. There were no differences in the incidence of complaints between outpatients and hospitalized patients. The laboratory results showed that about 20% of patients in the post-infection period had changes in CD4+, CD8+ T cells' count and immunoregulatory index (CD4/CD8) despite the normal range of C-reactive protein and interleukin-6 level. About 6% of patients can be classified as patients with immunodeficiency.

Conclusions

Most of the COVID-19 patients (even without the critical disease) have different long-term effects. The significance of these symptoms is not well investigated, and further research is needed.

Multiparametric ultrasound evaluation of post-SARS-CoV-2 liver parenchymal changes

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Objectives

To evaluate and quantify changes in the liver parenchyma of patients who have had Covid-19 and provide insight into possible correlations between liver damage and the course and sequelae of Covid-19 infection.

Materials and Methods

Prospective cross-sectional study enrolled 90 patients: 56 of these had proved Covid-19 disease within a time period of 3-9 months before enrolment and 34 patients were a clinically healthy control group. A thorough clinical history and patient data (BMI, laboratory data) were acquired and all patients underwent a multiparametric ultrasound evaluation of the liver parenchyma, including quantitative elastography measurements of fibrosis, attenuation imaging for steatosis grade and dispersion imaging for liver viscosity. Abdominal magnetic resonance and thoracic computed tomography scans were performed on 76 patients, who were also screened for biochemical markers of liver impairment and inflammation.

Results

Covid-19 patients were found to have significantly different fibrosis, steatosis and viscosity scores when compared to the control group ($p < 0.001$), but no direct correlation was observed. Fibrosis scores were higher in Covid-19 patients (F2,F3) vs. the control group ($p < 0.001$). Dispersion measurements were higher in patients who had a thicker subcutaneous fat layer ($F = 4.7; p = 0.035$). 33 Covid-19 patients were hospitalized (59%), and more severe disease course was found to have significantly higher US steatosis grade ($F = 9.1; p < 0.01$). US increased liver echogenicity correlated with decreased liver density on CT ($r = 0.46; p = 0.01$). Common liver markers (GGT, LDH, ALAT) had a statistically significant correlation ($p < 0.05$) to changes observed by ultrasound in Covid-19 patients, however no such correlations were found in the control group between liver markers and changes in liver CT and MRI.

Conclusions

Post SARS-CoV-2 patients had significant parenchymal liver changes – fibrosis, steatosis and viscosity. Increased liver steatosis correlated to a more severe disease course in patients with Covid-19. Multiparametric liver ultrasound may be more specific in evaluating parenchymal liver alterations in Covid-19 patients than MRI or CT.

Potential biomarkers associated with severity of coronavirus disease 2019

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Objectives

Potential biomarkers for the Coronavirus disease 2019 (COVID-19) are not well established. This study aimed to analyze available data on the association between the severity of COVID-19 and common demographical and laboratory parameters in Intensive Care Unit (ICU) patients.

Materials and Methods

38 ICU patients of Riga East University Hospital with COVID-19 pneumonia were included from 1th of November 2020 till 10th of January 2021. Patient's demographical data (age, sex, co-morbidities), respiratory support, COVID-19 severity based on blood gas analysis (pO₂, lactates) and lung involvement (CT lungs) parallel with laboratory data (leucocytosis (leu), C-reactive protein (CRP), Procalcitonin (PC), Interleukin 6 (Il6), thrombocyte count (Tr), ferritin, fibrinogen, d-dimer plasma levels) were evaluated at admission in ICU (T1) and at the fourth (T4[AO1]).

Correlation of demographical and laboratory data with Covid-19 severity was analyzed. Significance p<0.05.

Results

A total of 38 ICU patients were analysed with mean age 63.92 ± 10.78 years (63.15% men, 36.85% woman). Majority (89.47%) of patients had at least one co-morbidity, most often arterial hypertension (47.37%), adiposities I-III (44.73%), diabetes mellitus (34.42%). At T1 respiratory support were provided for all patients: with high flow oxygen mask 15 l/min (14.42%), HFNC (36.84%), NIV (23.68%), invasive ventilation (21.05%) At T4 respiratory support was provided for also all patients: with high flow oxygen mask 10-15 l/min (15.38%), HFNC (34.61%), NIV (26.92%), invasive ventilation (26.92%). The strongest correlation was shown between pO₂ and ferritin (0.570 p=0.009) and PC (0.498 p=0.016) at T4 day. We found that higher lactate level at T1 day indicates higher incidence of intubation and mechanical ventilation at T4 day (0.738 p=0.042).

Conclusions

Some laboratory parameters (ferritin, PC, lactate) are significantly associated with severity and potential outcomes of COVID-19. These biomarkers might help in prognostic risk stratification of patients with COVID-19.

Progressive tetraparesis with severe hyponatremia: challenging case of SARS-CoV-2 associated Guillain-Barre syndrome

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Guillain-Barre syndrome (GBS) also known as acute polyradiculoneuritis is an autoimmune disorder characterised by rapidly progressive paralysis and areflexia which can lead to respiratory failure. One of the main etiologic factors remains cross-reactive antibodies affecting peripheral nerves provoked by gastrointestinal or upper respiratory tract infections.

63-years-old male patient was admitted to the emergency department (ED) complaining about progressive shortness of breath, fatigue, weakness and numbness in legs. Previous medical history revealed febrile temperature, dry cough and dyspnoea 3 weeks ago, when the patient and his spouse were diagnosed with SARS-CoV-2 infection. His respiratory symptoms improved over the next 10 days, but a new onset progressive weakness and tingling sensation in legs occurred. As a result, the patient fell and was admitted to the ED. A chest CT showed bilateral typical COVID-19 pneumonia, blood tests revealed severe hyponatremia (111 mmol/L), that early was suspected to be a reason for the patient complaints. The clinical condition rapidly deteriorated during the hospitalisation - subsequent neurologic evaluation displayed a severe asymmetric tetraparesis, areflexia and sensory impairment, indicating a possible diagnosis of GBS. Cerebrospinal fluid analysis showed increased protein (2,187 g/L) and normal cell count. The contrast enhancement in conus medullaris and cauda equina nerve roots were observed in an MRI of the lumbar spine. The patient underwent treatment with intravenous immunoglobulins (0.4g/kg for 5 days) and hypertonic saline infusions. 3 weeks later he was discharged with a significant improvement of motor symptoms to continue an acute rehabilitation.

Muscle weakness and fatigue are frequently seen in both - electrolyte disbalance and post-viral syndromes, resulting in a delay of the main diagnosis. SARS-CoV-2 infection can provoke autoimmune complications, which have to be suspected if the new clinical signs develop. We described the first case of SARS-CoV-2 associated acute polyradiculoneuritis in our hospital.

Relationship between chest CT pulmonary symptoms, clinical findings and outcomes in patients with RT-PCR confirmed SARS-CoV2 infection and COVID-19 pneumonia upon hospitalisation

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Objectives

COVID-19 pandemic brought additional patient load to emergency departments in many European hospitals. Several studies showed significant clinical heterogeneity in patients with a need of hospitalisation. Thus, World health organisation suggests using diagnostic imaging to enhance decision making. In this study we analyse COVID-19 patients in one of the Latvian university hospital emergency departments.

Materials and Methods

Hospitalised patients with history of RT-PCR confirmed COVID-19 infection before or upon hospitalisation in Riga Eastern University Hospital (REUH), clinical symptoms of acute COVID-19 pneumonia and performed lung CT scan in Emergency department were enrolled in this study for retrospective analysis. Patient's gender, age, comorbidities, clinical course, complains before hospitalisation, hospital outcomes were compared with initial CT findings. Lung CT scan was performed with the same machine in REAH Gailezers Emergency department. Following symptoms were assessed using originally created protocol: signs of interlobular septal thickening, ground glass opacities, parenchyma bands, infiltrative consolidation, mediastinal and hilar lymphadenopathy, pleural effusion size. Descriptive and analytical statistics was performed by SPSS software. Significance was considered with $p < 0.05$.

Results

Study group comprised 71 patient: men 51.5% [Confidence interval: 33.7-63.2%], women 48.5% [36.8-60.3%]. Median age was 64.0 [61.0-68.5]. 36.6% of patients had no comorbidities. Hospital death outcome was in 16.9% [8.5-26.8]. Ground glass opacities were found in all patients: 45.7% had lung damage <10%, 20.0% with damage of 10-25%. There was significant correlation between CT severity of initial lung damage and hospital outcome ($p=0.002$). No correlation was found between CT severity of initial lung damage and number of comorbidities (0.895) or patient clinical symptoms (cough $p=0.391$, fever $p=0.389$, shortness of breath $p=0.188$).

Conclusions

In our study group severe initial lung damage seen on CT was a significant factor of negative outcome. There was no relationship between severity of lung damage and patient clinical symptoms upon hospitalisation.

Spectrum of chest CT findings in COVID-19 positive patient with pneumonia: experience from the Center of Tuberculosis and Lung Diseases

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Objectives

COVID – 19 is by far the most important topic in the world of healthcare at the moment. The purpose of this study is to overview chest CT findings and clinical records of patient with a positive real-time polymerase chain reaction (RT-PCR).

Materials and Methods

For this retrospective study we analyzed chest CT of 118 symptomatic patients with positive RT-PCR tests result in nasal or throat swabs and suspected pneumonia. All patients had undergone chest CT at the Centre of Tuberculosis and Lung Diseases between October 1, 2020, and December 31, 2020.

Results

There were 118 patients, median age was 54 years (range: 22 to 89), 57 men and 61 women. Out of them 104 was discharged, 3 died and 11 patients were treated in hospital at the time of study.

Among presented CT findings, bilateral involvement was found in 95%. All 5 lung lobes were involved in 76%. The predominant peripheral distribution was presented in 44% ; both central and peripheral localization in 55%.

The most prevalent pattern was ground glass opacity (GGO), found isolated and in combination with consolidations in 87% (N=103). Isolated GGO was observed in 42% (N=50), 5% (N = 5) had isolated consolidations, and 45% had both GGO and consolidations (N=53). Crazy-paving pattern was presented in 14%, linear consolidation in 30% and reversed halo in 3%.

Chest X-ray at admission was taken for 81 patients (69%), and signs of pneumonia was found in 77% (N=63).

Conclusions

The research revealed that typical CT finding in Covid-19 pneumonia was ground glass opacity (GGO), isolated or in combination with consolidations. Despite the geographical difference CT features are quite similar with statistics presented in most up to date researches available in PubMed platform. CT can give more detailed information, while chest X-rays alone are not accurate enough in detection of pneumonia.

Vaccination

Attitude towards influenza vaccine among the general population of Latvia during the COVID-19 pandemic

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Objectives

Annual influenza epidemics are associated with substantial morbidity and mortality, especially in elderly and in those with underlying diseases. During the global COVID-19 pandemic WHO and CDC have emphasized the importance of reducing risk of influenza virus spread and protecting high risk patient groups from complications caused by the influenza virus. Influenza vaccine may also reduce the burden on healthcare systems while we wait for a COVID-19 vaccine. Although the influenza vaccine has been around for a while, there are still many who question the efficiency, safety and usefulness of it.

The aim of this research is to study the attitude of the Latvian adult population towards influenza vaccine during the COVID-19 pandemic.

Materials and Methods

A quantitative, cross-sectional study based on an anonymous online survey consisting of 12 questions. Data was analysed by using t-test and Pearson correlation.

Results

From the 522 respondents, 51.9% were 26 to 35 years old, more than a half of them (55%) live in Riga and its surroundings, 68.4% have higher education. 53.4% have had an influenza virus infection during their lifetime, 50.4% have never received an influenza vaccine. 36% have already received or are planning to receive a vaccine against influenza this season, 64% do not plan to vaccinate. 13.4% of the respondents decided to get the influenza vaccine, due to COVID-19. Main reasons for not wanting to be vaccinated are lack of trust in the effectiveness of the vaccine, fear of vaccine side effects and the fact that the influenza vaccine is optional.

Conclusions

Major part of the respondents do not support influenza vaccination, but almost a half support the vaccination or have changed their attitude towards it during the COVID-19 pandemic. Data shows lack of knowledge about influenza infection, influenza vaccine and vaccine side effects, therefore further educational campaigns should be developed for the general population.

Influenza vaccination's rate and proportion of affected children in the age group from 6–23 months in general practitioner's practices

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Objectives

There is a tendency that part of parents refuses vaccinate their infants against influenzae

The Aim was to study and analyze information about infants' influenzae vaccination rate and estimate proportion of affected children in GP's practices in Riga.

Keywords: Influenzae, vaccination, immunization rate.

Materials and Methods

Altogether were studied 192 infants' case-records in general practitioners' practices in Riga. There were studied infants who born in the period from 1.October 2017 till 1.October 2019. After were studied how many children were affected with influenza after vaccination. Descriptive statistical analysis was performed using IBM SPSS v.22 software and Microsoft Excel 2016.

Results

In general practitioners' practices 100 parents (52,08%) refused to vaccinate their children against influenza. Half vaccinated or who made one vaccine were 13 infants (6,77%). Complete vaccination or two vaccines against flu were made to 79 infants (41,15%). From children who were vaccinated by one or two vaccines, together it is 92 infants, fall ill with influenzae 8 (8,70%) persons. From them 7 (87,5%) cases were approved by laboratory tests. 1 case (12,5%) was diagnosed by clinical manifestation and epidemiological anamnesis.

Conclusions

1. In general practitioners' practices only 41,15 % of infants is vaccinated against influenzae, and it means, that immunization rate does not reach WHO recommended rate.
2. 52,08% of studied parents refused to vaccinate children against flu.
3. 6,77 % of respondents were vaccinated partly.
4. From vaccinated infants fall ill 8 persons (8,70%).
5. Further research is needed to study more infants in more general practitioners' practices both in Riga and outside Riga.

Tick-borne encephalitis vaccine failures – review of the literature and 12 years population based data

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Objectives

The aim of the study was to access clinical features and laboratory characteristics of Tick-borne encephalitis (TBE) vaccine failures.

Materials and Methods

This study was a retrospective, intensive search for TBE cases from all hospitals in Latvia. TBE cases of any age were identified as reported to the Centre of Disease Prevention and Control of Latvia from 2007 through to 2018 and combined with additional data derived from patient's case histories/medical records in Latvian hospitals. These cases were categorized by TBE vaccination history (i.e. vaccinated vs non-vaccinated).

Additional PubMed search was conducted to identify published cases of TBE vaccine failures through to December 2019.

Results

A total of 3,106 TBEV-infections were identified in Latvia during the 12 study years. A total of 58 cases (1.8%) had received at least one prior TBE vaccine dose. The mean age of vaccinated TBE cases (34 years) was significantly lower than in non-vaccinated cases (50 years). When comparing TBE disease severity in vaccinated and non-vaccinated groups: mild cases (non-CNS TBE) were relatively more frequent among TBE vaccinated cases (23/58; 39%) than non-TBE-vaccinated cases (782/3027; 25%).

Additional literature review identified 534 TBE cases with prior vaccination history. Mostly, TBE cases with central nervous system disease were reported. Results of TBEV specific IgM and/or IgG antibodies of initial serum were reported in 93/534 patients (17.4%), of them 7.5% were detected as vaccine non-responders and 62.4% with absent/low initial specific TBEV IgM antibody response.

Conclusions

The population-based analysis and data presented here indicate that TBE vaccination is highly effective. Our findings suggest that nevertheless vaccine failure, TBE vaccination has the potential to reduce overall disease severity after infection.

Possible immunological and clinical factors in vaccinated TBE patients that may negatively influence vaccine effectiveness and lead to vaccine failure are not well investigated, but extremely needed.

Infections In The Development Of Non-Communicable Diseases

Activation of microglia in cortical lobes and possible associations with human herpesvirus 6 and 7 infection

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Objectives

During persistent human beta-herpesvirus (HHV) infection, clinical manifestations may not appear. However, the lifelong influence of HHV is often associated with pathological changes in the central nervous system. Herein, we evaluated possible associations between immunoeexpression of HHV-6, -7, and cellular immune response across different brain regions.

The study aimed to explore HHV-6, -7 infection within the cortical lobes in cases of unspecified encephalopathy (UEP) and nonpathological conditions. We confirmed the presence of viral DNA by nPCR and viral antigens by immunohistochemistry.

Materials and Methods

Human brain tissue autopsy samples from the frontal and temporal lobes of 24 elderly subjects with UEP and 24 age-matched controls were used in this study. Brain tissue samples were assayed for HHV-6,-7 using nested PCR. Conventional immunohistochemistry using anti-HHV-6, -7 and anti-CD68 antibodies and confocal microscopy was applied. Immunostaining intensity was assessed with an additional quantitative estimation of immunopositive cells. GraphPad Prism 9 program was used for statistical analysis.

Results

Overall, we have shown a significant increase ($p < 0.001$) of HHV antigen expression, especially HHV-7 in the temporal gray matter. Although HHV-infected neurons were found notably in the case of HHV-7, our observations suggest that higher ($p < 0.001$) cell tropism is associated with glial and endothelial cells in both UEP group and controls. HHV-6, predominantly detected in oligodendrocytes ($p < 0.001$), and HHV-7, predominantly detected in both astrocytes and oligodendrocytes ($p < 0.001$), exhibit varying effects on neural homeostasis. This indicates a high number ($p < 0.001$) of activated microglia observed in the temporal lobe in the UEP group.

Conclusions

The question remains of whether human HHV contributes to neurological diseases or are markers for some aspect of the disease process.

Clinical manifestation of HSV-1, HSV-2 or VHZ/HHV-3 in cervical cancer patients after treatment

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Objectives

Treatment of cervical cancer is associated with stress and cellular immune suppression. Our aim was to figure out relationships between reactivation of alpha-herpes virus infection based on clinical manifestation of HSV-1, HSV-2 or VHZ/HHV-3 after receiving anticancer treatment and peripheral blood lymphocyte count in cervical cancer patients.

Materials and Methods

64 cervical cancer patients (age 24-53) with clinical manifestation of alpha-herpes viruses were included in retrospective analysis. All patients had received anticancer treatment and were followed-up 24 months after the end of the treatment. Patients had pretreatment, one month after treatment and every three month follow-up blood counts (TNL and CD4+ cells) at the year 1st after the treatment and every six month at the year 2nd after the therapy. Baseline TNL were classified as normal (≥ 1200 cells/mm³) or abnormal (< 1200 cells/mm³) as well as CD4+ cells ≥ 400 cells/mm³ or < 400 cells/mm³ respectively. After the initiation of anticancer treatment, the CTCAE Version 5.0 was used to classify the severity of lymphopenia.

Results

36 out of 64 patients had HSV-1 clinical manifestation during the time of observation, most of HSV-1 manifestation was self-limited and resolved within 7-10 days. 16 patients developed clinical signs of HSV-2 reactivation and 12 patients demonstrated *herpes zoster* clinical features.

60 patients had normal TNL and CD4+ cells before anticancer therapy. Lymphopenia was observed in 52 patients during the follow-up (grade I-II in 35 patients and grade III-IV in 17 patients). Severe lymphopenia was associated with concomitant chemo- and radiation therapy or external beam radiation followed by intracavitary brachytherapy and clinical manifestation of VZ/HHV-3 infection.

Conclusions

Reactivation of various herpes viruses can be induced by local trauma or systemic stress during the anticancer therapy. Clinical manifestation of alpha-herpes viruses is associated with lymphopenia- decreased TNL as well as CD4+ cells in our patients.

Disease aggressiveness indices association with fatigue in rheumatoid arthritis patients

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Objectives

In RA patients with aggressive clinical course and concomitant inflammation of many joints, rapidly progressive erosive joint lesions with the development of deformities often develop fatigue. Elevated levels of antibodies to anti-cyclic citrullinated peptide antibodies (anti-CCP) and rheumatoid factor (RF) indicate laboratory aggressiveness. The aim of the study was to determine which laboratory aggressiveness parameter is associated with the development of fatigue in RA patients.

Materials and Methods

Overall 30 RA patients were included in the study: 23 females (76.7%) and 7 males (23.3%) with the average age 59.5±11.2 (ranging from 39 to 79), who were subjected to semi-structured questionnaire. To achieve the goal, patients were interviewed and indicators of disease aggressiveness: RF, anti-CCP, immunoglobulins IgA RF, IgM RF, IgG RF and anti-carbamylated proteins antibodies (anti-CarP) were measured using ELISAs according to the manufacturer's protocols.

Results

A positive correlation was found between RF and RF IgM, IgG, respectively; between RF IgA and RF IgM, IgG and anti-CarP, respectively, in the fatigue group of RA patients. A positive correlation was found between RF and RF IgM; as well as between RF IgG and anti-CarP, anti-CCP, respectively, in the group of RA patients without fatigue. In both groups of RA patients, a positive correlation was found between RF IgM and RF IgG, anti-CarP, respectively.

Conclusions

Of the laboratory parameters of aggression, RF IgA is more closely associated with fatigue in RA patients.

European network on myalgic encephalomyelitis/chronic fatigue syndrome – EUROMENE

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Objectives

Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) is a frequent and severe chronic disease drastically impairing life quality. Research on ME/CFS in Europe is characterized by the absence of a collaborative approach between research centers, therefore there was a clear need to create a sustainable multidisciplinary integrated network of researchers in Europe working in this field to address the research challenges arising from unknown etiology, clinical variability, lack of diagnostic biomarkers and limited treatment options, high associated socio-economic burden.

Materials and Methods

22 countries are participating in the EUROMENE network: Austria, Belarus, Belgium, Bulgaria, Denmark, Finland, France, Ireland, Italy, Germany, Greece, Latvia, Netherlands, Norway, Rumania, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, and UK. The Action activities were organized in six working groups: on epidemiology; biomarkers; clinical research; socio-economic; conferences, seminars and training schools; dissemination and exploitation.

Results

During the Network we assessed the current research and clinical practices on ME/CFS and produced a set of recommendations for enhancing research and health care, considering the additional need of multi-sectorial integrated actions – including the Education, Work and Pensions, and Social Services sectors. We considered the simplicity and ease of access of the suggested tools in the recommendations. Because these tools are currently used in Europe, this would facilitate the participating countries to adopt the recommendations. This will enable users to synchronize diagnosis and identification of ME/CFS cases, data collection, and input of data and samples relating to ME/CFS research harmonization. By doing so, it will be possible to create an international database for collecting consistent and comparable epidemiological data to further facilitate scientific and clinical research, assess burden of disease.

Conclusions

13 joint publications are published in Open Access journals, "Recommendations for a public health European-wide approach" has been developed" targeted to politicians, health policy makers, professionals/medical doctors, researchers, NGOs, including patients' organizations, and to the general public.

Human activin B in patients with chronic fatigue syndrome/myalgic encephalomyelitis

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Objectives

Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) is a disabling clinical condition characterized by unexplained and persistent post exertional fatigue accompanied by a variety of symptoms related to cognitive, immunological, endocrinological, and autonomous dysfunction. Activin B level can induce a loss of muscle mass. Taking together immune dysregulation and the loss of muscle mass suggests that the activin B is potentially involved in the pathogenesis of CFS/ME, given the prominence of muscle weakness and pain as diagnostic criteria across the various case definitions. According to the available literature the role of activin B in ME/CFS has been studied by one group of researchers from Australia. The aim of this study was to determine the clinical utility of activin B as a biomarker for ME/CFS.

Materials and Methods

79 patients [22 male (30–76 years old) and 57 females (24–78 years old)] with clinically diagnosed ME/CFS corresponding to 1994 Fukuda criteria and 30 healthy controls were recruited for this study. Measurement of human activin B level in plasma samples were conducted using validated Human Activin B ELISA assay from LifeSpan BioSciences, USA.

Results

Our results clearly show that there is no difference on activin B level between patients and controls - activin B levels in plasma samples of 79 patients and also 30 healthy controls were less than 15.63 pg/ml. This is not in line with previously published data reporting on significantly elevated activin B level in ME/CFS patients compared to healthy controls. Up to now activin B have not been reported to be elevated or reduced in other diseases.

Conclusions

The results of the study to date do not agree with those previously published, which suggested that activin B may be a biomarker in ME/CFS. However, in order to draw definitive conclusions, we plan to increase the study and control groups.

Inflammatory chemokine receptors in Epstein–Barr virus infection

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Objectives

Chemokines transmit signals via chemokine receptors (G-protein coupled cell-surface receptors) and thus the chemokine-receptor network controls immune responses in a body and directs migration of cells. Chemokine receptors CCR1, CCR2, CCR3, and CCR5 are the CC-receptors of the one protein-sequence-homology cluster. They share responses to the multiply inflammatory chemokines. Earlier, we have demonstrated that infection of B cells, isolated from the peripheral blood (PB) of healthy donors, with Epstein–Barr virus (EBV) up-regulates chemokine receptors CCR1 and CCR2B in the course of infection and in established lymphoblastoid cell lines (LCLs). EBV, a DNA gamma-1 herpes virus (human herpes virus 4), can infect B lymphocytes in vitro and immortalize them transforming into lymphoblasts, which express the EBV latency III program genes. EBV is associated with various types of B-cell malignancies, including Burkitt lymphoma (BL). All endemic BL tumors are carrying EBV.

The study was designed in order to find out whether expression of CCR1, CCR2, CCR3, and CCR5 is linked to the EBV latency program in B cells.

Materials and Methods

Fifteen BL cell lines (11 EBV-carrying and 4 EBV-negative) and 2 LCLs were analyzed for expression of CCR1, CCR2, CCR3, CCR5 and EBV latency genes, EBNA2, LMP1, and LMP2A, using duplex or real-time RT-PCR, Western blot, and flow cytometry analyses.

Results

The CCR3 and CCR5 mRNA expression was not detected in the study cell lines. High levels of CCR1 and CCR2B mRNA and protein expression were determined in LCLs and BL cell lines with the EBV latency III program.

Conclusions

We suggest that expression of CCR1 and CCR2B in BL cells play a role in distribution of malignant cells in a body. Both chemokine receptors could be considered as prognostic markers of BL pathogenesis.

The studies were funded by the Latvian Council of Science projects No.651/2014 and No.lzp-2018/1-0156.

Morphological and laboratory cytokine indices in osteoarthritis patients demonstrated in the presence of human herpesvirus 7 infection

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Objectives

Osteoarthritis (OA) has long been suggested as a degenerative disease affecting joints. More recent studies demonstrate the contribution of inflammation to the development and progression of the disease. Furthermore, the inflammatory affection of the synovium is considered a powerful driver of the disease. Among arthritogenic viruses manifesting with synovial damage human herpesvirus 7 (HHV-7) remains very little studied. Therefore, we proposed several objectives when assessing synovitis in OA patients, determining the occurrence and distribution of the HHV-7 antigen within the synovial membrane of OA-affected subjects, and correlating plasma and tissue levels of common proinflammatory cytokines.

Materials and Methods

Forty-eight OA patients presented with synovial materials obtained during joint replacement surgery were stratified into two groups: nineteen HHV-7 polymerase chain reaction (PCR)+ subjects (39.6%) and 29 HHV-7 PCR- subjects (60.4%). Synovitis was assessed by applying the Krenn scoring system. Synovial HHV-7, CD4, CD68, and TNF antigens were detected immunohistochemically, the plasma levels of TNF and IL6 measured by an enzyme-linked immunosorbent assay.

Results

Persistent HHV-7 infection was confirmed in 81.5% but reactivation in 20.5%; virus-specific DNA was found in 35.2% of synovial membrane tissue samples. No significant difference in the plasma levels for TNF or IL-6 was determined by comparison of the HHV-7 PCR+ and HHV-7 PCR- groups. Histopathologically, both study groups presented with low-grade synovitis. The number of synovial CD4- positive cells in the HHV-7 PCR+ group was significantly higher than that in the HHV-7 PCR- group. The number of TNF+ and HHV-7+ lymphocytes, as well as HHV-7+ vascular endothelial cells, was strongly correlated.

Conclusions

The balance between virus latency and reactivation is a long-term relationship between the host and infectious agent, and the immune system appears to be involved in displaying overreaction when a shift in the established equilibrium develops.

Possible involvement of human herpesvirus-6 U12 and U51 gene coded proteins in the development of autoimmunity – an immunological investigation

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Objectives

HHV-6 has frequently been detected in autoimmune thyroiditis tissues, possibly implicating the infection in the initiation of autoimmunity. We investigated the role of two virally encoded chemokine receptor homologues (U12 and U51) as autoimmunity triggers by using potentially immunogenic peptides designed from viral protein amino acid sequences.

Materials and Methods

Blood plasma from 64 autoimmune thyroiditis patients was analyzed in this study. Prior to this study thyroid tissues from these patients were analyzed for HHV-6 presence, and all were demonstrated to harbor HHV-6 genomic sequences.

U12 and U51 protein amino acid sequences were aligned with human CCR1, 3 and 5 using the T-Coffee software. Alignment was combined with linear epitope prediction algorithms to design 20 mer peptides. Acquired viral peptides and recombinant human CCR1, 3 and 5 were conjugated to magnetic beads. Blood plasma and the conjugated beads were used in Suspension Multiplex Immunological Assay for the detection of human chemokine receptor and viral peptide specific IgG and IgM antibodies and the evaluation of peptide specific antibody cross-reactivity.

Results

Antibodies specific for several viral peptides were found in patient plasma samples. Peptides with highest MFI values were selected for cross-reactivity assessment. Overall MFI values for peptide specific IgM antibodies were significantly higher compared to IgG antibodies. Interestingly, patient plasma contained antibodies for two of the human chemokine receptors - CCR1 and 5. Again, MFI values for receptor specific IgM antibodies were much higher. Eluted peptide specific antibodies were not able to bind human chemokine receptors – no cross-reactivity was observed.

Conclusions

HHV-6 peptide specific antibodies were found in patient's samples, with higher signals for IgM antibodies, indicating HHV-6 reactivation and active infection. Even though, no cross reactivity between HHV-6 peptide specific antibodies and human recombinant CCR1, 3 and 5 was found, further investigation of potential conformational epitopes is necessary.

Prevalence of KIR2DL2/DS2 and KIR2DL3 and presence of B19V in patients with thyroid disorders

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Objectives

Natural killer (NK) cells are crucial components of the innate immune system and provide a first line of defence against infection. NK cell function is controlled by a network of activating and inhibitory receptors, prominent among these are the killer cell immunoglobulin-like receptors (KIR), a family of genes clustered in one of the most variable regions of the human genome - on chromosome 19q13.4. This study aimed to investigate the possible interplay between KIR allotype, B19 infection and thyroid disorders.

Materials and Methods

Thyroid gland tissue of 30 patients with autoimmune thyroid gland diseases (AITD) [median age 49 years (IQR: 37 – 59)], 30 patients with non-autoimmune thyroid gland diseases (non- AITD) [median age 53 years (IQR: 41 – 62)] and 30 randomly selected age and gender matched deceased subjects whose histories did not show any of autoimmune or thyroid diseases (control group) were enrolled in the study. The presence of B19V, KIR2DL2/DS2 and KIR2DL3 were detected using PCRs (nPCR, PCR).

Results

The results showed that 28% of thyroid tissue of AITD and 67% of non-AITD resulted positive for the presence of B19V, in contrast only 5% control tissue samples harboured B19V DNA. B19V positive AITD patients had increased frequency of KIR2DL2/DS2 homozygosity and decrease of the homozygous KIR2DL3 genotype compared to B19V negative ones (33% vs 21% and 17% vs 46%, respectively).

Conclusions

Overall, although our data shows that B19V positive patients with AITD have increased frequency of the KIR2DL2/DS2 allele (both in homozygosity and heterozygosity condition), suggesting an impairment of NK cell function that might allow virus replication and pathogenic effect, further studies in a larger group of patients are however needed to characterize the contribution of B19V and KIR molecules in defining susceptibility to thyroid disease.

Shadow burden of undiagnosed chronic fatigue syndrome on society

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Objectives

Chronic fatigue syndrome (CFS) is a poorly understood, complex, multi-system disorder, with severe fatigue not alleviated by rest, and other symptoms, which lead to substantial reductions in functional activity and quality of life. Due to the unclear etiology, treatment of patients is complicated, but one of the initial problems is insufficient diagnostic. The increase in the number of undiagnosed CFS patients is becoming specifically relevant in the COVID-19 pandemic. The aim of this study was to investigate the issues of undiagnosed CFS potential patients, and this disease's shadow burden on society.

Materials and Methods

The study design was based on two surveys. One of them was distributed on a social networking platform that is most relevant to the structure of potential patients. The second survey's data were obtained from COVID-19 patients cohort established at the National Biobank – Genome Database of Latvian population. Both questionnaires (*inter alia*) contained questions on the CFS relevant symptoms in accordance with CDC (Fukuda) criteria. Descriptive and analytical statistical methods have been utilised for analyses of the obtained data.

Results

The data of the social networking platform's survey showed that 197 (85,3%) of 231 respondents, reported more than 3 long-term symptoms similar to CFS symptoms. The COVID-19 patients' survey showed that 20 patients (16.7%) of 120 respondents, reported 4 to 8 CFS specific symptoms simultaneously. Noticeably, that 95% of these respondents reported launching symptoms after COVID-19. With the assumption that the burden of CFS before COVID-19 was around € 50 billion in Europe, the expansion of CFS with insufficient diagnostic and treatment, can vastly increase the financial burden on society in future.

Conclusions

Undiagnosed CFS creates a significant shadow burden on society, and this burden increases without timely treatment. Consequently, an integrated diagnostic approach and appropriate treatment could reduce this burden in the future.

The burden of infection associated diseases on society and the economy

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Objectives

COVID-19 pandemic requires reassessment of major quantitative measures for severe epidemics. Infectious diseases have been major challenging factor on supply side starting in early capitalistic economy, when the specialisation of workforce increased (Sombart). Economic crisis caused by a pandemic is a complex demand and supply crisis, in case of COVID-19 having unique traits. Pandemic effects are especially long-lasting: burden vs. cost. Supply side crisis means also damage happening now but having very protracted negative impact, only in part quantifiable. Unique are high prevention costs with outright negative impact on future income via education and training channel. COST Action CA18218 European Burden of Disease Network (BODN) has developed a protocol on burden assessment arising from COVID. We are assessing this protocol against the factors during the second wave proposing adjustment factors.

Materials and Methods

Expert analysis of protocol. Factor prioritisation for gap explanation. Econometric analysis and forecasting. GAP analysis, over- and under-trend technical analysis.

Results

DALY (disease adjustment life years) have substantial limitation in COVID assessment due to number of post-infectious disability cases, which is however increasing: well-known ailments as ITP and ME/CFS require 6-month lag. Decomposition of output gap and comparative analysis allow addressing income loss due to education and qualification, loss of intergenerational interaction, prevention costs. Comparison with broad crisis theory allows to access comparatively the 6% future income loss which is usually attributed to working life deficit of generation entering labour market during a major crisis. Hysteresis arising from pandemic is heavily based on education and training deficits additionally.

Conclusions

Non biometrical components of disease burden are not accessible by DALYs protocols. Decomposition of output gap allows closer assessment of burden factors.

Orthopaedics And Trauma

Ankle fracture radiological examination – how much is enough?

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Objectives

To create radiological examination system for ankle fracture preoperative assessment and postoperative result evaluation. It is part of study about complex ankle fracture treatment, with specific interest in fractures with posterior malleolus involvement.

Materials and Methods

Literature review was performed identifying various radiological measurements used for ankle fracture pre- and post-operative diagnostics. Measurement techniques with high reliability and potential to be introduced in clinical practice were selected, including new measurement variations.

Results

Following radiological examination and measurement algorithm was created for pre- and post-operative diagnostics:

1. Plain x-ray – used for all ankle fracture
 - (a) Projections – AP, Lateral, Mortise view, +/- weight bearing AP both legs (specific conditions)
 - (b) Measurements performed
 - i. Ankle joint clear spaces – medial, superior, lateral
 - ii. Presence of fractures – lateral malleolus, medial malleolus, posterior malleolus, small fragments (Tillaux-Chapi, Wagstaffe)
2. Computed tomography (CT) – used for ankle fractures with posterior malleolus involvement or other specific intraarticular fracture extensions
 - (a) CT is performed for both legs in one examination, to gain information of normal anatomy of the uninjured side
 - (b) Images in axial, coronal and sagittal planes are obtained
 - (c) Measurements performed
 - i. Fibula length in coronal plane
 - ii. Fracture gap in articular surface in all planes
 - iii. Tibiofibular syndesmosis position according to Phisitkul et al. – depth and engagement, in axial plane
 - iv. Fibula torsional position

Conclusions

Although numerous radiological examination and measurement methods are available, not all of them are convenient for everyday clinical use due to various reasons. Our presented algorithm allows measurements for all clinically relevant fracture placements using plain x-ray and CT images. In addition, it is easy to adapt for routine use.

Complete elbow joint reconstruction using chimeric lateral condyle flap: case report

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Currently main options for elbow joint reconstruction after complete loss are total elbow arthroplasty and arthrodesis. In severe cases none of these options are sufficient, therefore new solutions must be sought. Authors present novel technique for complete elbow joint reconstruction that can be used as an alternative in challenging cases.

Case report: 34-year-old male presented with large bone defects and no cartilage in left elbow joint. Temporary external fixation and previous debridement were done beforehand by colleagues from orthopaedic department. Patient had history of motor vehicle accident, fractures of left proximal and distal humerus, proximal ulna and femur. Elbow region fractures were open Gustillo Anderson II and developed deep infection after osteosynthesis.

Flap consisted of cartilaginous parts of lateral femoral condyle and lateral patella, iliotibial tract, skin island and synovial tissue. All parts were based on branches from superolateral genicular artery. Bone flap sizes were approximately 2.5x2.5 cm. Femoral condyle was fixed to distal humerus and patellar flap to proximal ulna with two 2.5 mm screws each. Iliotibial tract was used to reconstruct distal tendon of triceps muscle and lateral collateral ligament. Skin island size was 7x3 cm and was used for covering soft tissue defect that occurred due to increased volume of reconstructed elbow joint. Synovial tissue was included for production of synovial fluid for neo-joint. End-to-end anastomosis with ulnar artery and subcutaneous vein were performed. Five months after surgery knee arthroscopy was performed and several free cartilage fragments were evacuated.

Six months after surgery all wounds are completely healed with no signs of infection. On computer tomography scans complete consolidation of bone flaps and visible joint space is evident. Active elbow flexion extension is 70/5/5 degrees. Pronation supination is 60/0/50. Patient is pain free and has no donor site morbidity despite extensive grafting.

COVID-19 crisis influence on orthopaedic surgery practice

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Objectives

The aim of our study was to compare the work intensity of 2 orthopedic wards before and during the COVID-19 crisis, as well as to analyze individual aspects of work organisation - number of hospitalized and operated patients, their structure, preoperative and total inpatient time. The impact of the crisis on the treatment of isolated skeletal trauma and polytrauma patients was also analyzed.

Materials and Methods

The retrospective study compared the treatment data of two patients units, called the Trauma Clinic and the Polytrauma Clinic, over a 30-day period in March, April 2019 (before the crisis) and 2020 (the onset of the COVID-19 crisis).

Results

In similar periods in 2019 and 2020, there was a significant decrease in the number of treated patients (from 206 to 143 (30.6%) at the Trauma Clinic, from 42 to 27 (27.2%) at the Polytrauma Clinic. Surgical activity has not changed significantly, as has the age of patients. The number of men treated in the polytrauma clinic has decreased, the number of women has not changed. In the polytrauma clinic, preoperative time and length of hospitalization decreased by one third, while in the trauma clinic it did not change significantly. In the Trauma Clinic, the decrease occurred in the number of low-energy trauma patients, in the Polytrauma Clinic based on the number of high-energy trauma.

Conclusions

The COVID-19 crisis has led to a significant decline in the number of patients treated (approximately 30%) in Trauma Clinic for both isolated skeletal and polytrauma patients. At the Trauma Clinic, the reduction in the number of patients at the expense of low-energy injuries shows the same. The significant reduction in the number of men in the Polytrauma Clinic demonstrates the paradoxical positive impact of the COVID-19 crisis on the total number of serious injuries related to work, household, sports and solid ill-considered risks.

Experience in using a new-generation rod fixation apparatus for pelvic bone fractures

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1. Tashkent Medical Academy

Objectives

To improve the results of treatment with the developed rod device for pelvic bone fractures.

Materials and Methods

In the Department of emergency traumatology of the 2nd clinic of the Tashkent Medical Academy, from 2019 to 2020, surgical treatment of the developed rod external fixation apparatus was performed in 4 patients, all patients were male. The age of the patients ranged from 28 to 56 years. We have developed a rod device (patent-FAP 01441 dated 26.11.2019 A method for treating fractures of the pelvic bones, acetabulum and Central dislocations of the femoral head). The postoperative period was uneventful, all patients started physical therapy on 2-3 days and started walking with crutches after 4 weeks, without loading the damaged lower limb. The average duration of inpatient treatment was 9.7 days. Control and dynamic radiography was performed at 2, 4, 6, and 12 months. The average fixation period was 120 + 25 days.

Results

The advantages of the proposed rod device are: due to its minimally invasive nature, it can be used in the first hours after injury and early stable fixation of the pelvic bones helps to stop bleeding, reduce pain, and is an important point of anti-shock measures; there are different variants of the device layout depending on the fractures of the pelvic bones and the possibility of installing the device of the "pelvis-hip" system allows to reposition bone fragments of the acetabulum bottom; facilitates patient care and provides the possibility of early activation and reduces various secondary complications.

Conclusions

Thus, the proposed developed new model of rod device allows to stably fix not only fractures of the pelvis, acetabulum and central dislocations of the femoral head, but also without technical difficulties successfully sets the central dislocation of the femoral head, with the implementation of bone fragments reposition the bottom of the acetabulum.

Function, sports and recreational activities outcome after osteochondritis dissecans surgical treatment choice

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Objectives

The aim of the study was to determine patient function, sports and recreational activities outcome after surgical treatment (fragment fixation or removal) for osteochondritis dissecans (OCD) type III – V.

Materials and Methods

Clinical case series analysis included 8 patients (mean age 24,6 years), treated in Traumatology and orthopaedics hospital from 10.2016- 02.2019. Patients were surveyed after KOOS scale (SP1-SP5) and subjectively analogue scale (patients had asked to grade their function and sports level from 0-100). Patients were divided into two groups : group one – 5 patients who were treated by fixating OCD fragment (type III or IV) and group two – 3 patients with OCD fragment removal (type III to V)

Results

Patients who had OCD fragment fixation KOOS function, sports and recreational activities score (SP1 – SP5) had 99 points while patients with OCD evacuation had mean score – 43,3.

Using subjectively analogue scale group 1 had score – 90 while group 2 had score 53.

Conclusions

Patients with osteochondritis dissecans fragment re-fixation has better short term function, sports and recreational activities results than patients with osteochondritis dissecans fragment removal. Patients return to sport outcome, especially, in physically high demanding activities such as squatting, jumping, twisting, kneeling is better with surgical fixation. It is quite important to recognize young, symptomatic patients who still has not developed type IV or V osteochondritis dissecans.

How hip joint shape variation is associated with osteoarthritis

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Objectives

Statistical shape modelling (SSM) is a new technique, which allows quantitative measurements of the hip shape from 2-dimensional images (radiographs). The objective of this study was to identify hip joint anatomical abnormalities that could be associated with osteoarthritis development based on radiographic measurements and SSM.

Materials and Methods

123 hospitalized unilateral hip osteoarthritis patients in Hospital of Traumatology and Orthopaedics for hip arthroplasty surgery (Arthritic group) and 100 patients with no hip pain and no/mild radiographic signs of osteoarthritis (Tonnisgrade 0, I) (Control group) from year 2018 to 2020 were included in the study. Predefined radiographic parameters (lateral center edge angle, neck shaft angle, alpha angle, acetabular depth, acetabular index, Singh index, cortical thickness index, pistol grip deformity, crossover sign) were measured and assessed using the *Impax-Orthopaedic-Tools 3.0.2.3* program. A statistical shape model was built using the *BoneFinder 1.3.4* program which detects and sets 75 landmark points on the proximal femur and hemipelvis in AP radiographs to analyse the shape variations between the two groups. The obtained data were statistically analysed by the *IBM SPSS 23* program.

Results

The mean age in the Control group was 75.40 ± 10.75 and Arthritis group 67.50 ± 8.75 years. Comparing predefined radiographic parameters between the Arthritic and Control group, increased alpha angle ($>50^\circ$) ($p < 0.001$), Pistol grip deformity ($p < 0.001$) (characteristic for Cam deformity) and center-edge-angle less than 25° ($p < 0.001$) (characteristic for acetabular dysplasia) was significantly more prevalent in the Arthritic group. Patients with hip osteoarthritis had significantly higher scores of shape modes 1, 2 and 4 ($p = 0.002$; $p = 0.01$; $p = 0.02$).

Conclusions

By applying predefined radiographic measurements and SSM- defined hip joint characteristics, Cam deformity, acetabular dysplasia, flattened head-neck junction, non-spherical femoral head and prominent acetabular posterior wall can be associated with osteoarthritis. Anatomical shape of the hip joint may play an important role in the development of osteoarthritis.

Isolated ulna dislocation in distal radioulnar joint without fracture

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Isolated volar ulna dislocation in distal radioulnar joint (DRUJ) without fracture is rare pathology. There is no research regarding this dislocation, only other case reports. In about 50% cases is misdiagnosed or diagnosed in late phase. 47 years young woman got trauma at home. Mechanisms of trauma was hand hipersupination with fixed ulna. She was misdiagnosed twice in 2-day interval in two different trauma specialized hospital emergency departments. Correct diagnosis was made in ambulatory department. Patient was complaining about pain in wrist. Her hand flexion and extension were almost full range but was fully blocked pronation and supination, ulnar and radial deviation. By physical examination there were no palpable styloid of ulna. CT scan showed full ulna dislocation to volar side without any fracture. Surgery was 3 weeks after trauma. In OR under plexus anesthesia closed reduction with hiperpronation of hand. Reposition was successful and went without problem, under C-arm anatomy of DRUJ was restored. As reposition went easy, decision was made to stay with closed reduction and osteosynthesis with percutaneous K wire pinning proximal to DRUJ. Postoperative CT scan showed ulna subluxation in DRUJ. Open DRUJ revision was done after 4 days. In open revision dorsal radioulnar ligament was torn and TFCC was dislocated in DRUJ and blocked full reposition of ulna. TFCC was sutured back to fovea ulna. Percutaneous pinning with K wire proximal to DRUJ for 3 weeks was also made for extra stability. 6 weeks after operation patient has full range flexion and extension. After pin removal slightly reduced passive protantion/supination. This case report shows importance of soft tissues and TFCC in DRUJ. Malreduction and soft tissue interposition after close reduction could be more often in such trauma . MRI should be done if there is suspicion of soft tissue trauma rather then fracture.

Outcome of patients with tibial and fibular shaft fractures: seasonal characteristics

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Objectives

The different trauma mechanism and energy in winter and summer might influence the lower leg injury types and outcome. The aim of the study is to evaluate the outcome of patients with surgically treated tibial and fibula shaft fractures, focused on the seasonal characteristics.

Materials and Methods

Retrospective study of 85 patients with tibial and fibular shaft fractures, admitted in the Hospital of Traumatology and Orthopaedics from December to February and from June to August 2013 till 2017 was conducted. Trauma mechanisms, preoperative, postoperative, follow-up radiographs and Lower Extremity Functional Scale (LEFS) were analyzed.

Results

There were 74 patients with tibial and fibular shaft (37 A1; 11 A2; 11A3 type, 5 B1; 2 B2; 2 B3 type, 4 C1; 1 C2; 1 C3 type) fractures. The winter season trauma had 52 patients, the summer season trauma – 33 patients. Outcome was evaluated in 23 patients 23 – 59 months after trauma (8 females, 15 males, mean age 44 years, 13 winter injuries and 10 summer injuries).

Conclusions

Our findings suggest that functional outcome in patients with tibial and fibular shaft fractures, who underwent intramedullary nailing, did not differ significantly. For all patients the most difficult were activities which demand dorsiflexion in the ankle joint – running on uneven ground, hopping and squatting.

Primary complex total knee replacement – surgical principles for knee deformities

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Objectives

To determine total knee replacement (TKR) surgical principles for extra- and intra-articular knee deformities.

Materials and Methods

Causes for extra-articular deformities includes posttraumatic or congenital deformity, prior osteotomy, osteomyelitis, metabolic bone diseases of lower limb. These are relatively infrequent clinical problems.

Preoperative planning rules for extra-articular deformities are clinical examination, radiological examination includes long leg standing x-rays with extremity in neutral rotation, anatomical axis of femur is measured in sagittal plane to determine deformity angle and level, resection level of femoral bone cuts not extends above the level of epicondyles.

Extra-articular femoral deformities can be corrected by compensatory intra-articular distal femur resections. Magnitude of correction can be assessed by digital templating based on mechanical axis deviation.

Extra-articular tibial deformities can be corrected by compensatory intra-articular tibial resection, but it can lead to ligament instability.

Angular deformity correction in cases of extra-articular deformities – if deformity is more than 10-15° varus or valgus, or more than 20° in sagittal plane, plan osteotomy at apex of deformation and axis correction before TKR as two stage treatment.

Causes for intra-articular deformities are avascular necrosis of femoral or tibial condyles, previous ligament damage, prior arthroscopy, intra-articular fractures, congenital deformities, patellofemoral subluxation. Usually they are combination of intra-articular bone loss and simultaneous ligament contracture.

Preoperative planning rules for intra-articular deformity are clinical examination, weight-bearing long leg standing x-rays, AP view with knee in extension, in cases of valgus knee deformity - 30° of flexion and with knee in 90° flexion. Tibial resection level depends on magnitude of defect.

Conclusions

Complex primary TKR in cases of intra- and extra-articular deformities requires surgeons experience and understanding of surgical principles. Preoperative clinical examination and x-ray digital planning is essential. For major femoral or tibial angular deformities two stage surgical plan could be the optimal choice.

Stress fracture of the femoral stem of a hip endoprosthesis in a patient with high BMI

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Objectives

Complications can occur after total hip replacement surgery, due to various surgical or patient related factors, such as elevated BMI, level of activity and compliance. Fracture of an implant is a rather rare complication worldwide, however it can occur and create necessity for revision arthroplasty.

Case report: Patient, 63 year old male, obese (1.85m, 170kg BMI 49.67) with several comorbidities had undergone right side total hip arthroplasty (THA) due to osteoarthritis of the right hip joint 3 years prior. A total cemented implant was used with a size 12 lateralized femoral stem, size 32 M femoral head. Neck-shaft angle of femoral component was 128°. The patient was discharged without early postoperative complications. After primary arthroplasty the patient had gained ~ 10kg of body weight, however walking and daily activity was satisfactory. Three years after THA the patient felt sudden pain in his right hip joint, without any trauma and could not stand on his right leg. X-ray findings displayed a fracture of the femoral component at the base of neck level. A revision hip arthroplasty was scheduled and performed. The primary femoral stem, head and bone cement from the femoral canal was removed, and a size 10 cemented standart stem (neck-shaft angle 135°) and a 32mm M head was implanted. The postoperative period was without complications, and the patient began early range of motion exercises and was discharged with overall improvement.

Keywords: Hip arthroplasty, BMI, implant fracture.

Conclusions

Increased patient body weight, as well as femoral neck-shaft angle <135° of an implant can cause implant fractures, which require revision and therefore make rehabilitation more difficult.

Tibial shaft fractures with intact fibula – trauma mechanisms and associated injuries

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Objectives

The diagnostics and treatment of tibial shaft fractures with an intact fibula remains controversial due to the possibility of the intact fibula negative effect on tibial fracture consolidation. The aim of the study is to evaluate the trauma mechanism and diagnostics of tibial shaft fractures with intact fibula.

Materials and Methods

A retrospective study of 19 patients with tibial shaft fractures with an intact fibula admitted to the Hospital of Traumatology and Orthopaedics from 2013 till 2017 was conducted. Eighteen patients were treated by tibial internal fixation using intramedullary nailing and one patient had open reduction and internal fixation with plate. Trauma mechanisms, preoperative, postoperative and follow-up radiographs were analysed.

Results

There were 19 patients with fractures of the tibia and intact fibula (13 male, 6 female, age 19-91 years). Trauma mechanisms were motorcycle accidents (5 patients), skiing (3 patients), ice hockey training (2 patients), football training (1 patient), fall down the stairs (1 patient), fall on the street (6 patients), fall in to a pit (1 patient). There were seven A1, four A2, five A3 type; one B3 type and two C3 type fractures. Patients had 10 associated injuries: one marginal talus fracture, one medial malleolus fracture, two fractures of the medial malleolus apex, two avulsion fractures of lateral malleolus apex, two deltoid ligament injuries, one Volkmann's triangle fracture, one fibular head fracture.

In the two years follow-up radiological examination two patients had shortened tibia and varus malunion of tibia; four patients had deformed fibula. The mean time to complete healing of these fractures was 22 weeks (range: 19-24 weeks).

Conclusions

Our findings suggest that two thirds of patients with tibial shaft fractures with intact fibula suffer from motorcycle and sports injuries. Careful clinical and radiological evaluation of lower leg is essential to diagnose associated injuries.

Treatment of ankle fractures in geriatric patients

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Objectives

To review different treatment options for elderly patients with ankle fractures and choose the most appropriate surgical treatment strategy for this group of patients

Materials and Methods

Patients, with ankle fractures (AO/OTA fracture classification- 44), which were treated in Hospital of Traumatology and Orthopaedics, Riga, Latvia in period from 2016 to 2019 were identified. All patients older than 69 years of age were included. Radiological examinations and medical documentation were analyzed.

Results

In the period of year 2016 to 2019 1013 patients with different pattern ankle fractures were treated in Hospital of Traumatology and Orthopaedics. 96 (9,47 %) patients were eligible for the study. Fracture of lateral, medial and posterior malleolus (back part of the tibia) (AO/OTA fracture classification- 44B3.2, 44B3.3, 44C1.3, 44C2.3, 44C3.3) were the most common type of injury (69,79%). Conservative treatment were used for 11 (11,46 %) patients. The main indications for conservative treatment were bedridden patients, atherosclerotic injury of arteries with extremity ischemia. Percutaneous transarticular ankle joint fixation with Kirschner wires were used for 5 (5,21 %) patients. Internal fixation methods were used in rest cases (83,33 %).

Conclusions

The incidence of ankle fracture in geriatric patient slowly increases with time. The most common type of injury is trimalleolar fracture, that is highly unstable, with distal tibiofibular syndesmosis injury- conservative treatment in such cases leads to significantly inferior outcomes. Indications for operative treatment in geriatric patients should not differ from those in younger patients. Performing internal fixation, surgeon must try to make stable osteosynthesis with maximal soft tissue preservation. Surgeons should avoid performing unstable fixation, for example, transarticular ankle joint fixation with Kirschner wires, that increase risk of complication.

Unique simultaneous bilateral total hip replacement surgery and management of patient with Down syndrome, aphasia, and pericarditis: case report

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Objectives

Trisomy 21 is the most common chromosomal disorder, with incidence 1 in 750. It is associated with many different abnormalities. With prolonged life expectancy, patients with Down syndrome have increased incidence of coxarthrosis. People with intellectual disabilities are 4 times more likely than general population to die from an injury, therefore it is important to early identify a deteriorating patient and to act accordingly.

Case report: A 61-year-old 140 cm tall woman presented to Hospital of Traumatology and Orthopaedics with hypotension and severe pain in her hips after falling. From her anamnesis- Down syndrome, aphasic. Based on the X-ray a diagnosis of bilateral transcervical fractures of Femur with dislocation was made. The patient was prepared for simultaneous bilateral total hip replacement in combined spinal-epidural anaesthesia (ASAIII). Epidural analgesia was used, one unit of RBC was transfused. Additionally, norepinephrine support was initiated due to hemodynamic instability. On POD¹ no contact could be established, IBP 75/55mmHg without vasopressor support. Echocardiogram showed pericardial effusion. On POD² IBP 90/50mmHg, vasopressors were stopped. On POD³⁻⁴ NBP 115/70mmHg, epidural catheter was removed. On POD⁵ NBP 110/65mmHg, HR 79x', SpO₂96%. On POD⁶ the patient was stabilized in upright position and began physiotherapy. At the end of the week, patient started walking. She is still alive and well.

Keywords: Simultaneous bilateral femoral neck fractures, Down syndrome, bilateral total hip replacement.

Conclusions

Simultaneous bilateral femoral neck fractures are extremely rare. We have demonstrated that this rare injury can be safely managed during a single operative session in the presence of an experienced multidisciplinary team, despite serious patient comorbidity.

Physical Medicine And Rehabilitation

Advantages and disadvantages of accelerated forms of rehabilitation in surgical fields

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Objectives

The research compares advantages and disadvantages of rapid recovery approach in patients with total hip replacement. It divides the point of view according to individual research problems - in terms of length of hospitalization, return of the patient on emergency care, length of convalescence and influence of surgical approaches on muscle shortening.

Materials and Methods

The research sample consisted of 720 respondents from two countries of the European Union - Slovakia, Czech Republic and Austria. The data was collected in 2018 and 2019 in this countries. Statistical indicators ANOVA Singel factor, t-test of two mean values with dispersion inequality and t-test of two mean values were used to verify the hypotheses determined by the work. All quantitative data are processed at a significance level of 0.05.

Results

The difference in average hospitalization time is 2.79 days. The shortening of hospitalization by almost 3 days proved to be statistically significant and is attributed to the application of the rapid recovery concept in pre-operative patient preparation. Based on the average data, it can be concluded that there was an improvement in the iliopsoas musculus after the operation. From an average of 0.813 before surgery it improved to 0.347 after surgery. In contrast, when evaluating the latae musculus tensor fascia, the values show exactly the opposite values. From 0.55 before surgery, the value increased to 0.76 after surgery.

Conclusions

Based on the obtained results, a shift towards a ventral surgical approach with a shortened length of hospitalization and convalescence of the patient is declared. The positive effect of the ventral approach is also reflected in the results of lower muscle contraction m. iliopsoas and m. tensor fascia latae.

Communication between physiotherapists and patients with chronic pain – qualitative analysis

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Objectives

The aim of this qualitative study was to find out how communication is constructed between physiotherapists and patients with chronic pain.

Materials and Methods

Grounded theory approach by Charmaz was applied. Ethnographic observations and audio recordings of conversations during the interaction between five physiotherapists and 10 patients with chronic pain were made, starting with the first consultation. The audio recordings and observation notes were transcribed verbatim and analysed by creating simple and focused codes, using constant comparison and writing memos, forming categories and sub-categories. Throughout this analytical process, the explaining theoretical framework was created. The study was approved by Rīga Stradiņš University Ethics committee (NR. 26/28.06.2018.).

Results

During the data analysis a number of processes emerged that occurred in different sequences during interactions. Two basic processes, the *Introduction of Clarity* and the *Search for Words*, came to the forefront. The *Introduction of Clarity* describes the communication processes that are based on uncertainty. The *Search for Words* describes processes related to looking for best words to match the experience. One can not reach clarity until the correct words have been found. These two processes interact with each other and share common features that manifest through smaller communication actions, e.g. the agreement about roles and nature of cooperation, the way patients express their uncertainties, the way physiotherapists explain theoretical rationale behind their actions, give instructions and commands.

Conclusions

There are communication differences that physiotherapists should be aware of to minimize potential risk of miscommunication: interaction, that is itself permeated by uncertainties and search of words, is largely dominated by physiotherapists, using closed-ended questions to focus on hypotheses about patient's problem (embodying their professional identity), whereas patients engage in different way by bringing forward their own experience (all that has happened and has been felt), that way explaining and justifying their condition.

Correlation between chewing muscle strength and tongue strength in children with adenoid hypertrophy

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Objectives

To investigate the correlation between chewing muscle strength and tongue strength and also a correlation between chewing muscle forces in children with adenoids hypertrophy before adenotomy and compare results with a control group.

Materials and Methods

The research took place at the Latvian Children's Hearing. A total of 68 children aged 3-7 years participated in the study. Research group - 34 children with confirmed adenoid hypertrophy prior to adenotomy and control group 34 children without diagnosed adenoid hypertrophy. To measure tongue strength and chewing muscle strength an instrument Myoscanner was used.

Results

Tongue strength measurements showed that in the study group 88% (n= 29) cases, the tongue strength is reduced compared to the control group by 29% (n= 10). In the study group 56% (n=19) of children showed reduced right side chewing muscle strength compared to 6% (n=2) in the control group. Also the left side chewing muscle strength in the control group was reduced in 79% (n=27) of all cases. In all cases, all participants in the control group reported results within the normal ranges. In the control group statistically significant ($p > 0.01$) negative correlation between tongue strength and left chewing muscle strength indicators. Mutually statistically significant in the study group

($p > 0.01$), the forces of both chewing muscles are also strongly correlated, where the correlation coefficient was .586. There was statistically significant ($p > 0.01$) strong correlation between right and left chewing muscle strength with a correlation coefficient .716.

Conclusions

The obtained results showed that children with adenoid hypertrophy have reduced tongue and chewing muscle strength compared to control group. Data on a moderate- negative, but statistically significant correlation between the tongue strength and left side chewing muscle strength in a research group were obtained.

Effect of additional resistance and balance training in cardiac rehabilitation for older adults after valve surgery/intervention

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Objectives

Our study aimed to identify the short- and mid-term effects of resistance and balance training provided in addition to the usual cardiac rehabilitation (CR) exercise program for older adults after valve surgery/intervention.

Materials and Methods

The study involved patients, aged ≥ 65 years ($n=116$, 76.1 ± 6.7 years) who participated in CR (18.6 ± 2.7 days), early after (14.5 ± 5.9 days) valve surgery/intervention. Patients were randomly divided to intervention (IG; $n = 60$) and control group (CG; $n = 56$). All patients participated in 3-week exercise-based inpatient CR, including aerobic endurance training on a cycle ergometer (30 min, 5 days/week), additional aerobic exercises (sitting or standing, 30 min, 5 d/week), and respiratory training (15 min, 7 days/week). The IG obtained additional resistance and balancing training sessions 3d/wk. Patients were evaluated after CR-completion and 3 months after. Functional capacity was evaluated using short-physical-performance-battery (SPPB) test and 5-meters-walk-test (5MWT). SPPB was also used for physical frailty level evaluation (0-7 points – frail, 8-9 pre-frail, 10-12 – robust).

Results

As a result of CR SPPB, 5MWT and physical frailty level improved significantly ($p<0.05$) in both groups with no significant difference between groups. After 3 months SPPB and 5MWT improvements were sustained ($p<0.05$), while improvement in physical frailty level was significantly more pronounced in IG ($p<0.05$). Ordinal logistic regression revealed that intervention (OR 7.649; CI 95% 2.011-34.158; $p=0.004$) and age (OR 0.779; CI 95% 0.6603-0.893; $p=0.001$) were predictors of 3-months follow-up improvements in frailty level. Linear regression analysis revealed that every single balance and strength training session influenced the CR-effects on SPPB (+0.68) and 5MWT (+0.08 m/s) ($p < 0.01$).

Conclusions

Although additional benefits from the resistance and balance training could not be confirmed resistance and balance training sessions do have a positive effect on physical frailty and function in a setting of inpatient exercise-based CR.

Influence of dynamic sitting on vertebrogenic pain

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Objectives

The main objective of the research was examine the influence of dynamic sitting on the aid pad on vertebrogenic back pain, verifying its effect on preventive use compared to occasional use. The effectiveness of using aid pad in combination with other therapies against separate use and its impact on reducing the intensity of the analgesic therapy needed in investigated.

Materials and Methods

Research was attended by 117 respondents aged 10 to 59 years. Data collection was performed in 2019 and 2020 through an online questionnaire in patients to whom the aid pad was recommended by physiotherapist Respondents used the same dynamic aid pad at least two months, then completed a questionnaire with 11 questions. The hypotheses were verified by f-test for equality of two variances and t-test of two mean values. A significance level for data processing were used at level of 0.05.

Results

Respondents using additional therapies simultaneously with aid pad had an average reduction in pain of 22.62%, while using dynamic sitting alone had an average reduction in pain of 9.13%. In the group that used aid pad preventively, the intensity of analgesics use decreased by 21,62%, while using an aid pad only in the recurrence of pain it was negligible.

Conclusions

The conclusion is that dynamic aid pad has a positive effect on reducing vertebrogenic pain. Our research shows that the best results are observed when using dynamic aid pad in conjunction with other non-pharmacological therapies. We also found that preventive dynamic sitting leads to significant decreasing of analgesic use.

Physical activities – contributing and delaying factors: experience of persons with thoracic spinal cord injury

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Objectives

To find out the experience of maintaining physical activity, contributing and delaying factors for persons with incomplete thoracic spinal cord injury (SCI).

Materials and Methods

In the qualitative study participated five persons with incomplete thoracic SCI. The length of time since the onset of disability was one year and more (range, 2-17 years). Semi – structured interview was used to find out the personal experience of an individuals with SCI in maintaining daily physical activity – contributing and delaying factors. Interview transcriptions were analysed using inductive thematic analysis.

Results

Optimal recovery, independence and control for individuals after incomplete thoracic SCI are the contributing factors, where the skills of motivating themselves are the most important, but those who succumb to negative emotions are less physically active in everyday life. Professional athletes after SCI considers requirement to be physical active as the routine. We consider that limited information in the country about possibilities to be physical active for person with SCI significant limiting everyday physical activity. Environment, financial situation and government priorities are the physical activity delaying factors more than society as a whole.

Conclusions

Given the individual desires and needs for person with SCI, any of factors can be both a contributing and delaying reason to be physically active every day. Any emotional factors that shape the readiness to accept reality, make a decisions, control them and adapt to new life, the same as purpose and perseverance contributes daily physical activity for person with SCI. In order to promote environmental accessibility and integration, it is not only sufficient to improve physical accessibility, but it is also necessary to improve the ability of society to communicate, especially for those working in service.

Key words: physical activities, persons with spinal cord injury, incomplete thoracic spinal cord injury, contributing factors, delaying factors

Psychometric properties of most common malnutrition functional assessments: systematic review

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Objectives

To determine most often used functional outcome measures for malnutrition assessment and analyze their psychometric properties.

Materials and Methods

PubMed, Science Direct, SAGE Journals, Web of Science, SCOPUS and ProQuest were searched for articles published until October 2019, using key word "Malnutrition" and MeSH terms. Cut-off for most commonly used measures was 5%. To analyze each measurement property an already defined criterions (positive, negative, indeterminate) by Terwee et al. were used.

Results

1311 studies described 92 functional assessments. Most commonly used outcome measures were: Mini Nutritional Assessment (MNA) – 312 times (30%), Subjective Global Assessment (SGA) – 139 times (13%), Nutritional Risk Screening 2002 (NRS-2002) – 96 times (9%), Malnutrition Universal Screening Tool (MUST) – 83 times (8%) and Patient-Generated Subjective Global Assessment (PG-SGA) – 47 times (5%).

MNA proved to have most varied number of studies available. According to criteria, MNA had positive internal consistency ($\alpha=0.830$) and test-retest reliability ($ICC=0.89$), among other properties, and no floor or ceiling effect was found to be present. A lot of information was missing on SGA psychometrics, but whatever could be found, indicated positive internal consistency ($\alpha=0.707$) and reproducibility. The biggest literature gap, however, was detected for NRS-2002, even though first validation studies on it were published in early 2000s. Available evidence established positive content validity, test-retest reliability ($\kappa =0.956$) and responsiveness. For MUST English version most of the indicators were positive in different settings, but contradicting results were observed for culturally adapted versions. PG-SGA is a comprehensive outcome measure, including both patient's and physician's perspective, it has a strong base of evidence and positive ratings on almost all properties, however, lacks evidence on interpretability, to give context for clinically meaningful changes in results.

Conclusions

MNA is the most commonly used malnutrition functional assessment. The amount and quality of evidence available on it, indicate overall positive measurement properties.

Quality of life in women with urinary incontinence after self-practicing Kegel exercises

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Objectives

Find out the quality of life in women with urinary incontinence after self-practicing Kegel exercises.

Materials and Methods

A 12-weeks study was conducted to find out the quality of life in women with various types of urinary incontinence after self-practicing Kegel exercises. The study involved 22 women of different ages (34 - 76 years old). Participants were divided into 2 study groups: the 1st group: performed self-practicing 12-min. 6-Kegel exercise program 2x a day and, in addition, 1x daily 20 min. with the TensCare iTouch Sure 5033435110438 Pelvic Floor Exerciser for personal use, using a program tailored to participant's urinary incontinence type; the 2nd group: performed self-practicing 12-minute 6-Kegel exercise program 2x a day.

Results

The study was completed by 10+10 participants (14-Stress urinary incontinence, 4-Urge urinary incontinence, 2-Mixed urinary incontinence). 18 out of 20 participants completed the study with urinary incontinence improvement. The overall average data, based on the three medical questionnaires: International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form, Urogenital distress inventory UDI-6 Short form and Incontinence Quality of Life Questionnaire, before and after study, shows a statistically significant improvement (ANOVA, $p=0.001$). Group 1 - average improvement - 15.6 points, group 2 - 18.7 points. The improvement only by Quality of Life questionnaire data is statistically significant - ANOVA, $p=0.03$. The average Quality of Life score of participants before the study - 44.65 points, after - 34.75 points (improvement as points decrease).

Conclusions

Indicators of the Quality of Life for women with urinary incontinence after 12-weeks of self-practicing exercise, performing a specific program of Kegel exercises, improve because urinary incontinence rates decrease. The study confirms that independently but correctly performed Kegel exercises at home provide a solid improvement in cases of stress urinary incontinence.

Solving sexuality problems in the context of occupational therapy practice in Latvia – experiences of patients and occupational therapists

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Objectives

This paper aims to identify experiences and related opinions among occupational therapists and patients on solving issues of sexual activity in the context of Latvian occupational therapy practice.

Materials and Methods

In this qualitative - phenomenological study, five occupational therapists and five patients (with different functional states) were interviewed through semi-structured interviews. The research is based upon data thematic analysis method; the obtained data were transcribed and coded using MAXQDA2018 software.

Results

Sexuality in the context of occupational therapy in Latvia is not being adequately addressed; none of the surveyed patients had discussed sexuality issues with their occupational therapists. Whilst the surveyed occupational therapists had only touched such topics when the patients themselves had initiated it. Lack of their own competencies, limitations of the physical environment, stereotypical prejudices about sexuality, prioritization of other activities over sexual activities were mentioned as the main constraints for occupational therapists to actively initiate discussions with patients on sexuality problems.

Patients noted that their or their partners' health condition had caused various types of sexual dysfunction and restrictions on sexual activity. Some of the patients would be willing to discuss these issues with the occupational therapist and everyone confirmed that someone from the health care professionals (including the occupational therapists) should ask the patients about their sexual health and the problems associated with it, as well as discuss the necessary interventions if the patient showed a willingness to address their sexuality problems.

Conclusions

1. At least some occupational therapists need additional education on sexuality issues in order to be able to use adequate intervention in solving sexual problems.
2. It is necessary for health care professionals (including the occupational therapist) to provide the patient (and / or his / her spouse) with information about opportunities to discuss sexuality and sexual activity related problems in rehabilitation.

Standardization of RAN-RAS test in Latvian population of 5–18-year-old school students

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Objectives

Rapid automatized naming (RAN) and Rapid alternating stimulus (RAS) test is highly prognostic in assessing potential risks of literacy difficulties and poor phonological skills, even before formal acquisition of reading. Therefore, the test has been established as a gold standard assessment worldwide. This study aimed to standardize RAN-RAS test in Latvian population of 5-18-year-old school students.

Materials and Methods

RAN-RAS test results are measured as a subtest stimulus naming time and analyzed according to age. 695 students (ages 5.0-18.11) from general population with Latvian as native language were enrolled. Assessment was done with RAN-RAS Latvian version (Riemere, Savicka, Kuļičenko, Vabale, Vētra, 2015-2018). Standard naming time was described in seconds as M±SD and analyzed in preschool (5-6 y.o.), younger school (7-12 y.o.), middle school (13-15 y.o.) and young adult (16-18 y.o.) stages.

Results

All subtests illustrate a tendency for naming time to decrease with age, as developmental processes occur. Subtest Colors takes 92±31 seconds to name in preschool and 35±5 seconds at middle school. Naming subtest Letters takes 92±45 seconds at preschool, which is the beginning of formal acquisition of letters. Naming time reaches 22±4 seconds at younger school age (12 years), when letters have been automatized visually and phonologically throughout learning process, which explains why naming time stays approximately the same for adults. RAS 2 stimuli subtest naming at 7 years of age took 40±10 seconds, 24±4 seconds for 13-year-olds and 21±3 seconds at age 18. Both RAS subtests show gradual decrease in naming times throughout younger and middle school years until young adult stage, when verbal working memory undergoes expansion in functional capacity. Highest correlation with age was observed for subtest Letters and Numbers.

Conclusions

Findings showed that RAN-RAS Latvian version has been standardized for use in speech therapist practice and it can differentiate between participants of different ages appropriately.

The importance of rehabilitation in treating cervicobrachial syndrome

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Objectives

Cervicobrachial syndrome is a term that describes radiating pain of the cervical spine with symptoms in upper extremity or fingers. The pain has boundless, diffusive character and it might be provoked by the body position or head movement, additionally by irritating the painful parts of spine. The pain can be associated with vegetative symptoms such as nausea, vomiting, vertigo, or with associated symptoms coming from internal cranial base.

Materials and Methods

The aim of this thesis is to highlight the importance of diagnostics and subsequent rehabilitation in treating cervicobrachial syndrome in terms of manual therapy. The research method is based on the patient's case history after his hospitalization at Neurological Clinic as the result of sudden monoparesis of upper right extremity, subsequently indicated by infuse, corticoids and polyvitamin therapy. The patient was sent to rehabilitation treatment therapy due to persisting malfunction and associated symptomatology – vertigo, headache, static and dynamic movement disability of upper right extremity with an associated edema. Thus, the therapy was based on the application of manual therapy defined by mobilization of C2 segment with the infiltration through trigger points in the area of short extensor muscles of C-spine. The patient subsequently underwent kinesiotherapy focused on stabilization of C- spine.

Results

The complete remobilization of upper right extremity and the subsequent disappearance of associated symptoms were achieved by the kinesiotherapy aimed at stabilization of C-spine in addition to targeted mobilization therapy of the musculoskeletal segment.

Conclusions

The complete function of extremity and following improvement of life quality of a patient with Cervicobrachial Syndrome was achieved by differential diagnostics with the subsequent segment-targeted manual therapy in addition to kinesiotherapy of C-spine.

The use of Lokomat® therapy in patients with spinal injury

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Objectives

In this study, a diagnosis about the development of the Robot-assisted therapy rehabilitation with Lokomat in Czech republic is made. To focuses on the use of the Lokomat® therapy in patients with spinal cord injury. The study deals with people who are affected by spinal cord injury, mainly with those who suffer from paraparesis and tetraparesis.

Materials and Methods

Comparison of two groups of patients. First group of patients has during rehabilitation process except for other procedures, therapy in Lokomat® device, in duration two months, two therapies every week. Second group of patients does not have this therapy. In the end of the thesis we analyze the use of Lokomat® therapy to the group of patients without this therapy. In subgoals category we want to present weight distribution to proportion 50/50 and length of step to physiological average 630 mm at the start of the therapy and at the end in the group of patients which used Lokomat® therapy during rehabilitation.

Results

We tested 40 patients. We processed the tests in the IBM SPSS program. We therefore proved that for the Lokomat® group, the weight distribution for the left and right side reached nearer to 50 (50%) after the therapy. We proved that for the Lokomat® group, the stride length reached nearer to 63 (63 cm) after therapy.

Conclusions

In this work, we tried to point out the importance of the overall robotics and especially the Lokomat® device in physiotherapy. In conclusion we would like to remind that despite the finding that our hypotheses (Locomat group should improve better) were not confirmed, the Lokomat® device is a very important part of rehabilitation. Finally, but certainly not in the last place, we have actually proved that in physiotherapy no effort can surpass the efforts and work of a therapist yet.

Sports Medicine

Personalized approach in sports medicine and training program planning

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Objectives

The WHO has declared physical activity as one of the priorities in improving people's health. Physically active people decrease the risk of death by 20–30% compared to inactive people. The WHO recommendations for physical activity are too general: definite minutes per week, and often do not reach the target audience. The significant tool is the Pre-competition examination with using Complex cardiopulmonary exercise testing and Sports medicine doctors' experience and knowledge. The goal of the study is to evaluate the sports medicine doctor's consultation value with individually suitable training program influence to the athletes' health and functional status.

Materials and Methods

1600 adult amateur athletes (1050 male, 550 female), who have done regular training program with high intensity dynamic load and high or medium intensity statistic load sports were tested twice with Complex cardiopulmonary exercise testing and consulted by Sports medicine doctors for necessary treatment and individually suitable training program. The protocol was approved by the Riga Stradins University Ethics Committee and was drafted according to the Declaration of Helsinki.

Results

The physical working capacity, aerobic capacity and anaerobic capacity, functionality of the cardiovascular and respiratory systems were significantly better after Sports medicine doctors' consultation for necessary treatment and recommendations for individually suitable training program ($p < 0.05$).

Conclusions

The WHO recommendations for physical activity should be clarified and explained by the Sports medicine doctor. Individual suitable training program recommendations should be made in close cooperation between athlete, sports medicine doctor and sports trainer. It is essential for the improvement of the health condition, fitness level and physical exercise tolerance and physical overload avoidance.

Physiotherapeutic treatment of upper limbs lateral dominance in volleyball

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Objectives

Most of the volleyball players have some kind of lateral preference or dominance of upper limbs. Lateral dominance of one extremity is affecting the performance of every single athlete. Most of the athletes complain about pain during the game without any objective findings on the examination. Spiral stabilisation or dynamic neuromuscular stabilisation, both methods were found in Prague and are used as physiotherapeutic treatment in sports. However there was no measurement done to differentiate their effect on laterality in sports.

Materials and Methods

Using the tapping test method we distinguished upper limbs lateral preference or dominance of one hundred volleyball players. Using the spiral stabilisation and dynamic neuromuscular stabilisation we made a four week physiotherapeutic plan for volleyball players with the strongest lateral dominance. We used the range of motion examination method, the shortened muscles examination and the pain scale to see the objective differences in physiotherapy treatment.

Results

It was found that the spiral stabilisation can be found as faster method to treat laterality, however the results did not found the dynamic neuromuscular stabilisation as non effective. The dynamic neuromuscular stabilisation was found as also affective although it took much more time to see the objective results of physiotherapeutic treatment.

Conclusions

Spiral stabilisation and dynamic neuromuscular stabilisation are both possible methods to treat laterality and its symptoms. Spiral stabilisation was found as faster method for physiotherapeutic treatment. However, none of the physiotherapeutic methods is recommended to use separately. Every patient must be treated individually according to his current health condition, age and abilities. After the volleyball players finished the physiotherapy treatment we got nine from ten positive feedbacks about their health condition, pain and sports performance.

Regular physical activity as a powerful neuropreventive tool to improve cognitive functions in Alzheimers disease

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Objectives

Alzheimer's disease (AD) represents an increasing challenge to public health care systems and affects approximately 47 million people worldwide. Despite enormous efforts in AD research, there is no effective treatment to delay gradual neuronal loss. Thus calling attention to novel ideas - the extension of scientific focus from *treatment to prevention* strategies. The purpose of this study is to advance our understanding about physical activity (PA) as a neuropreventive strategy for AD.

Materials and Methods

A systematic search (2010-2020) of the PubMed, Science Direct, EBSCO, Scopus and Clinical Key was performed by using key terms: PA, prevention, cognitive impairment, AD.

Results

The search yielded up to 1000 records. After screening of the titles and abstracts, 137 records met the criteria. Both old and current studies present that PA plays a fundamental role by reducing the cognitive impairments and even in some cases slowing the progression of AD. Research from 2011 until 2020 shows that daily treadmill and wheel running exercises increase neuroprotective effects in various transgenic AD models. These studies demonstrates that PA can reduce oxidative stress, microglia activation, neuronal loss, A β burden and spatial memory loss. Additional in vivo studies indicates that PA can protect against neuroinflammation-related diseases, such as AD, significantly inhibited neuroinflammation.

Conclusions

The results of extensive research studies demonstrate the potential role of the PA as a neuropreventive treatment of AD. These findings point out the need for further pre-clinical research to investigate the potential beneficial effects of PA in neurodegenerative disease models.

The role of variations within the genes encoding collagen I and III in Lithuanian athletes performance

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Objectives

Some variations in collagen-encoding genes have been *related* to the specific athletic performance phenotypes and susceptibility to injuries. Studies have shown that *COL1A1*(rs1800012, TT genotype) and *COL3A1* (rs1800255, AA genotype) associated with sports-related musculoskeletal injuries. The aim of this study was to investigate collagen genes variants (*COL1A1* G>T, rs1800012 and *COL3A1* G>A, rs1800255) in Lithuanian professional athletes.

Materials and Methods

A total of 296 athletes (80 power-oriented, 66 endurance-oriented, 150 footballers) and 203 non-athlete controls from Lithuania were genotyped using *TaqMan* RT-PGR assay. Statistical analysis was performed using Rv3.2.

Results

The distribution of genotype frequencies of *COL1A1* polymorphism in endurance-oriented group significantly differed from the control group (GG/GT/TT: 71.2/16.7/12.1% vs 71.9/24.1/3.9%; p=0.032). The proportion of *COL1A1* risk TT genotype observed in endurance athletes (12.1%) was larger than in controls (3.9%). The OR of endurance athlete harboring *COL1A1* TT genotypes compared to control was 3.36 (95%CI:1.2-9.3, p=0.02). Significant *COL3A1* genotypes distribution was determined between the group of endurance&power athletes and controls (GG/GA/AA: 63/34.9/2.1% vs 60.6/30/9.4%; p=0.019). The proportion of *COL3A1* risk AA genotype, observed in controls (9.4%) was larger than in athletes (2.1%), especially in power-oriented group (1.3%; p=0.05). The odds ratio (OR) of athletes harboring *COL3A1* AA genotypes compared to control was 0.2 (95%CI:0.05-0.61, p=0.012). There were no differences in genotype frequency distributions between the footballers and control groups. However, the OR of footballers harboring *COL3A1* risk AA genotypes compared to control was 0.29 (95% CI: 0.08–0.89, p=0.04).

Conclusions

Our findings provide support for an association between *COL3A1*(rs1800255), *COL1A1*(rs1800012) and athletic performance. Carrying the *COL3A1*AA genotype have 0.2 times less chance to being a professional athlete. Endurance-oriented athletes are more likely to have *COL1A1* TT genotype compared to controls. These results suggest that the *COL1A1*TT genotype may influence increased risk of musculoskeletal injuries in endurance-oriented athletes.

Military Medicine

Assessment of physical training effect in military personnel cohort

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Objectives

Military training is characterized with high physical endurance exercises and psychological load. Physical endurance capacities are being developed during military training and it also have impact to the body composition parameters. Analysis of anthropometric parameters and summarizing data of body composition parameters changes have topicality for support physical fitness capacity and good health of military personnel during high physical endurance exercises. The purpose of the study is providing assessment of body composition status at the beginning and at the end of four month long military training period.

Materials and Methods

We have examined military personnel (n=74) in aged from 21 years till 30 years, of both genders (male (n=65) and female (n=9)). The study was conducted in National Defence academy of Latvia, the study group included cadets - combat training course participants. Training included various sports exercises and tactical marches (10-15 km) weekly. The bio impedance method was used for determining body composition parameters (fat mass, muscle mass, hydration level, bone mass), as well anthropometric measurements were taken and calculation of anthropometric indices were provided

Results

Assessment of anthropometric parameters and body composition components revealed changes during higher physical load. The visceral fat level grown up in 53.8 % of respondents, and in 15.4 % of respondents slowed down, the changes of visceral fat level were not being fixed in 30.7% of respondents. The muscle mass value increased in 51.6% of respondents and decreased in 48.4 % of respondents

Conclusions

Analysis of changes of body composition allows evaluate four month long military training effect. Study group participants have various physical preparedness and fitness level, the physical load level during four month long military training induced changes of individual body composition parameters, that is essential in adapting physical training program.

Fit and comfort of infantry boots in Land Forces of Latvia

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Objectives

Investigate infantry footwear comfort and fit to establish its' possible relation with lower extremity overuse injuries.

Materials and Methods

We carried out a cross-sectional study at the Latvian National Army Logistic Command Military Medical Support Centre. Participation was voluntary, and all study participants provided written informed consent. In total, 227 (males, n=213; females, n=14) active-duty infantry soldiers at a mean age of 29.5 years old, and with an average service time of 7.2 years were assessed for history of overuse injury, footprint length, appropriate shoe size, and footwear comfort. Sixty-six (29%) of all study participants were selected for detailed testing to assess the relationship between footwear comfort and lower leg overuse injury; all were males with a history of overuse injury (n=32) and non-injured age-matched controls (n=34).

Results

The mean overall footwear comfort rating was 6.4 (males 6.5; females 5.9), and the forefoot cushioning had the lowest mean rating 6.1 (males 6.1; females 5.6). 37 (56.1%) of study subjects were wearing an inappropriate shoe size daily. No relationship was found between footwear comfort and history of lower leg overuse injury.

Conclusions

Study results showed that inappropriate infantry boot size significantly affects footwear comfort ratings. History of previous lower extremity overuse injury was not related to either shoe size selection or footwear comfort ratings. Based on our study results, we recommend footprint length assessment for proper footwear size selection.

Military personnel feet health support: problems and decision

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Objectives

Dermatological disorders of foot are provoked by external factors of military surrounding such as high physical and psych emotional load, and intrinsic factors (individual) such as anthropometric parameters. The aim of the study was to assess of individual habits and skill of support foot hygiene for participants of Combat training course.

Materials and Methods

The study group (n=37) included military personnel- cadets of National Defence Academy in aged from 21 till 30 years, who participated in Combat training course (CTC)-2020, that is compulsory part of study program. The survey included anthropometric measurements and an anamnesis of respondents about the pre-existing foot diseases as well survey the knowledge about the foot's skin healthcare.

Results

The study group included military personnel of both gender, 86% of which were males and 14% females. The main anthropometric measurements were obtained, weight (51 - 103 kg), height (164 - 190 cm) and the status of the existing foot disease.

The slight predominance of the respondents 54.0% didn't have any problem with feet health during lifetime, but those in a minority – 45.9% mentioned that the most common problems were - flat feet 18.9%, ingrown toenails 10.8%, callus 10.8% and hyperhidrosis 5.4%. The number of respondents that had infectious foot issues was 18.9%, where the most common feet infections were fungi 16.2% and viral warts 2.7%. Despite the fact that the 45.9% of respondents had issues with feet during lifetime, only 21.6% visited any specialist (general practitioner, surgeon, and dermatologist).

Conclusions

The military personnel with active feet health disorder and greater weight are in a risk group of developing more severe skin damage during and after CTC. The consultation of dermatologist before the CTC was provided to help cadets to improve the feet health during CTC, and to decrease the feet skin disorders and inability to continue military service.

Dentistry

A cone-beam computer tomographic study of root and canal morphology of mandibular first and second premolars

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Objectives

The success of endodontic treatment depends on a knowledge of the root canal system.

The purpose of this study was to investigate the root and canal morphology of mandibular first and second premolars in a group of patients in RSU Institute of Stomatology.

Materials and Methods

Digital CBCT images of the mandibular first and second premolars were collected from patients who had undergone CBCT scanning for diagnostic purposes at RSU Institute of Stomatology from November 2017 to September 2020. Subjects under 16 and over 60 years of age and those with any evidence of endodontic treatment, internal or external resorptions were excluded. The final study enrolled 70 patients. Anatomy of 105 teeth were analysed. The number of roots and canal morphology were tabulated according Vertucci classification. All CBCT images were evaluated by a single dentist.

Results

For the mandibular first premolars, the most common Vertucci classification were type I (1, 34,5%), type V (1-2, 31%) and type III (1-2-1, 25,9%), and least common was type VII (1-2-1-2, 1,7%). Unreadable apical anatomy was presented in 6,9% cases. Three roots were found in 1,8% of teeth. For mandibular second premolars, the most frequent Vertucci classification was type I (1, 85,1%), least common were type V (1-2, 10,6%) and type III (1-2-1, 4,3%).

Conclusions

First mandibular premolar shows various root configurations. There is high incidence of one rooted tooth with most frequent Vertucci classification type I, II and III, followed by incidence of two roots. Three roots are rarely found. All the second mandibular premolars show one root appearance, with most frequent Vertucci classification type I.

Assessment of resin cement residue removal technique impact on cementation quality and discoloration using micro-CT and stereomicroscopy

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Objectives

The objective of this study was to compare the size of marginal defects in micro-CT images and evaluate discoloration for adhesively cemented veneers when using two cement removal techniques.

Materials and Methods

Twenty premolars were included and all were prepared similarly: 0.5 mm deep with rounded corners, chamfer finish line, borders in enamel.

Ceramic (*IPS e.max CAD*) veneers were made using a scanner *Ceramill Map 600* and milling device *Ceramill Motion 2*. The cement gap was set to 0.02 mm and *PANAVIA V5 (Kuraray, Noritake)* cement system was used. The specimens were divided in 2 groups. For first group (n = 10) cement excess was removed with a probe after 3 – 5 second polymerization continuing to complete polymerization. For second group (n = 10) cement excess was removed with a brush, then completely polymerized. All teeth were stored in alginate gel until micro-CT examination (*Scanco medical µCT50*). Scanning was done twice: directly after cementation and after thermocycling (*Thermocycler 1100/1200, SD Mechatronik, Germany*) in distilled water for 10'000 cycles between 5°C and 55°C. For each tooth 413 micro-CT slices (starting 2 mm from the tip of the cusp) were obtained.

To analyze discolouration, teeth were coloured using 0,5% basic fuchsin and examined under stereomicroscope. Depth of dye infiltration was scored with score 0 (no discolouration) to 5 (discolouration along the entire margin).

Results

All specimens exhibited cementation defects most common of them being structural defects inside cement layer and irrelevant overfill (cement covers the veneer surface). Some teeth showed extensive cement overfill or underfill (concave cement contour). Removal with a probe showed more contour defects (p<0.0000001). Differences in defect types between groups were not found.

Conclusions

According to our preliminary results cement removal with a brush shows less contour defects and could be more stable against discoloration.

Changes in pain/burning levels after topical capsaicin application among patients with Burning mouth syndrome

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Objectives

Determine pain/burning level changes in patients with burning mouth syndrome (BMS).

Materials and Methods

20 patients (18 females, 2 males) took part in the study at the Institute of Stomatology of the Department of Oral Pathology. Data was gathered from 11.09.18 till 30.06.20. Patients received a 0.02% oral capsaicin rinse, that they had to use 3 times a day for 3 weeks. Pain was measured using the visual analogue scale, where patients had to present their pain/burning levels on a 10 point scale in 3 times frames of the day (morning, afternoon, evening) before and after treatment. Means (\pm SD), medians (IQR) and Wilcoxon tests were calculated. Results were compared with other studies.

Results

Mean age of respondents was 61.25 ± 12.35 years. Mean pain/burning levels before the treatment in the morning were 1.65 ± 1.22 , in the afternoon – 2.65 ± 1.57 and in the evening – 4.2 ± 2.62 , but after the treatment changed to 1.15 ± 1.42 for the morning, 1.55 ± 1.64 for the afternoon, 2.7 ± 2.70 for the evening periods respectively. Median of pain/burning levels before the treatment in the morning were 2 (IQR 1), afternoon – 3 (IQR 1), and evening – 4 (IQR 3), but after the treatment changed to 0 (IQR 2) for the morning, 1.5 (IQR 3) for the afternoon, 2 (IQR 6) for the evening respectively. For the morning period 9 patients noted improvement, 10 had no change, 1 had worsening, for the afternoon and evening 10 noted improvement, 8 had no change, 2 had worsening. Wilcoxon test: For the morning was $Z = -1.996$ ($p = 0.46$), afternoon $Z = -2.613$ ($p = 0.09$), evening $Z = -2.789$ ($p = 0.05$).

Conclusions

Data shows an increase of pain burning throughout the day before and after the treatment. Overall pain/burning levels had decreased after the treatment procedure. Data was statistically significant.

Effect of temporary cement on the bond strength of adhesively cemented ceramic overlays. An in vitro study

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Objectives

Determine whether temporary cement penetrates into dentin tubules and how it affects the tensile bond strength of adhesively cemented restorations.

Materials and Methods

Twenty six extracted intact premolars were included in this study.

Six teeth were grounded to expose dentine surface and PMMA overlays were cemented with *TempBond NE* (Kerr Dental) on them. Temporary cement residues were polished for three samples, and left for the other three. All specimens were broken along vertical axis to undergo SEM/EDX (SEM, Tescan Mira/ LMU; EDX, Oxford Instruments X-Max^N detector size 150 mm²) analysis to detect Zn ions that are present in temporary cement.

Remaining twenty teeth were embedded in 16x25mm PMMA cylinder perpendicular to vertical tooth axis. The teeth were grounded to expose dentine surface. Twenty zirconia overlays (*Katana Zirconia STML*, Kuraray Noritake) (13.15x3.2 mm) and ten PMMA overlays were fabricated to simulate temporary restoration. All teeth were divided in two equal groups. In the first group temporary PMMA overlays were cemented on each tooth surfaces by *TempBond NE*, subsequently cleaned by rotary polishing brush and pumice and sequentially zirconia overlays were cemented adhesively by *Panavia V5* (Kuraray Noritake) – (PV5-1) according to protocol. For second group zirconia overlays were directly cemented by *Panavia V5* to teeth surfaces – (PV5-2). After cementation the bond strength was evaluated by tensile bond strength test (*Instron Universal Machine*, Norwood, USA) with a head speed of 0.5mm/min.

Results

Zn ions were detected in both groups respectively up to 25µm in depths despite whether temporary cement is removed or not. PV5-2 showed statistically higher tensile bond strengths (70,6-108,59 N) than PV5-1 (60,3-80,8 N).

Conclusions

In limitation of this study it is concluded that after temporization temporary cement remnants remain in dentine tubules. The use of temporary cement does not alter bond strength of ceramic restorations luted to teeth surfaces using the tested adhesive system significantly.

Immunophenotypic profile of mesenchymal stem cell from gingiva of elderly patients. An in-vitro study

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Objectives

Elderly adults have a high burden of dental damage. Dental rehabilitation is expensive and complex. A major problem is loss of supporting structures. Recent advances suggest that oral tissues could be regenerated based on Mesenchymal Stem Cells (MSCs), but it is not clear that they exist in adequate quality in elderly adults. The aim is to evaluate the Immunophenotypic Profile of Gingival Mesenchymal Stem Cells (GMSCs) from gum samples of elderly patients.

Materials and Methods

In-vitro design. An experimental group of five samples of gum of elderly patients (mean age 62.5 years-old; 4 male) and a control group of five samples of umbilical-cord blood bank of VidaCel-Lab (Santiago, Chile) were obtained. In both groups, MSCs were isolated with direct cell-outgrowth from the tissue explants under Good-Manufacturing-Practices protocols. Cells were washed with 1-phosphate-buffered-saline, trypsinized (Invitrogen), centrifuged at 1,500 rpm for 5-min and subcultured to a flask. MSCs were detached by incubation with TrypLE™ (Invitrogen) before they reached 70% confluence. Isolated MSCs were expanded at 1×10^4 cells/cm² in DMEM supplemented with 10% autoserum without antibiotics up to Passage 7. Primary antibodies (CD29, CD146-Stro1) as positive markers for MSCs and CD34-CD11b-CD45 as negative cell culture markers were used. Acquisition and analysis of curves of antibody markers were performed and compared between both groups with flow cytometry according to the manufacturer's protocol. Differences in percentage of antibody marker expression between groups were analyzed (t-de Student test; $p=0.05$)

Results

The average for principal markers CD29, CD146 and Stro1 in older adult periodontal tissue was $29.2\% \pm 2.4\%$, $43.1\% \pm 4.8\%$, $34.7\% \pm 2.9\%$ and in umbilical tissue was $31.2\% \pm 1.5\%$, $46.6\% \pm 2.1\%$, $33.2\% \pm 2.5\%$. There was no statistically significant difference in response rates.

Conclusions

The expression of MSCs markers in periodontal tissue of older adults is similar to that of more undifferentiated tissues, so they could potentially be a source of MSCs for tissue regeneration.

Impact of apical periodontitis on C-reactive protein levels in blood samples in healthy individuals. Pilot study

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Objectives

The aim of the study was to determine whether the presence of apical periodontitis in healthy individuals has an effect on overall health, especially on inflammation markers such as C- reactive protein (CRP).

Materials and Methods

The study design was a cross-sectional pilot study. Inclusion criteria were healthy adults with symptomatic or asymptomatic apical periodontitis from emergency or planned visits in RSU Institute of Stomatology. Exclusion criteria: individuals with systemic diseases, smokers, patients with marginal periodontitis, patients with obesity, pregnant patients. The control group consisted of healthy adult volunteers without apical periodontitis. RSU Research Ethics Committee allowance was received. Written consent was obtained from every patient. Information about patients was received from questionnaires about general health. Apical periodontitis was diagnosed clinically and using x-rays. Periodontal status was detected measuring bleeding and probing depth. Blood samples were collected by the nurses and delivered to laboratory to detect CRP levels. Mean CRP values were calculated for both groups by using the R software.

Results

Twelve blood samples were collected. Mean age was 37 (range 21- 57). In the apical periodontitis group (n=8) CRP levels were in normal range(0-5mg/L), except only patient with acute apical abscess had CRP level above normal range (11,76mg/L). All patients without apical periodontitis (n=4) had normal CRP levels (0-5mg/L). Mean CRP value in group with AP is 2.45 ± 3.88 . Mean CRP value in control group is 0.13 ± 0.23 . Values are not statistically different ($p=0.122$).

Conclusions

All patients with AP, except one with acute apical abscess, had normal CRP levels. Mean CRP value was higher in AP group than in control group. Further research is needed on patients with acute apical abscess. More inflammation markers should be detected in the same manner.

Latvian dentists' treatment decision for caries treatment during COVID-19 pandemic period

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Objectives

To explore whether Latvian dentists are ready to introduce minimally invasive caries treatment methods in daily practice and whether this decision could be related to recommendations or restrictions of dental services during COVID-19.

Materials and Methods

Descriptive cross-sectional study. Data were collected using a previously validated online and printed survey with questions about demographic data; 2) determination of the dentist's profile by previously used and adapted questions; 3) readiness of dentists to apply non-invasive and minimally invasive caries treatment methods (NMCTM). Data collection was performed between August-October 2020. The minimum sample size was 174 (~10% active dentists in Latvia). All data processing, cleaning and analysis has been performed in the R statistical program. The study was performed as a part of the project VPP-COVID-2020/1-0011.

Results

We received 373 complete questionnaires (response rate for online questionnaires were 21.6% and 56.2% for printed questionnaires) from dentists who had graduated between 1973-2020 comprised from 92.5% general dentists and 92.2% female 13.9% had a NMCTM profile. For permanent dentition, and under restrictions of aerosol-generating methods or recommendation not to use them, dentists would prefer selective carious tissue removal and glass-ionomer fillings (75.4%), followed by non-restorative caries treatment (67.5%), sealants (42.4%) and traditional fillings (39.1%). For primary dentition, 23.3% would choose Hall-crowns.

Conclusions

Most Latvian dentists are aware of minimally invasive techniques for caries control and are willing to use them to minimize the generation of aerosols associated with the risk of viral infection. This would allow dental care to be maintained during periods of pandemic.

Management of tooth with endodontic-periodontal lesion with communication: case report

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Objectives

To report a clinical case a patient with endodontic-periodontal lesion with communication, treatment and observed results.

Materials and Methods

39 years old women was referred to Periodontology Department in Institute of Stomatology with complaints about the pain on cold and hot stimuli on D36. A patient was diagnosed with generalized periodontitis grade IV, stage C. Baseline clinical examination - deep pockets DB and DL - 10mm, bleeding on probing, furcation involvement, tooth mobility I grade. Tooth was partly vital. Radiographic examination revealed periapical and lateral translucency. The prognosis for this tooth was set as questionable. D36 initially underwent endodontic treatment. Ledermix paste (LP) was left in root canals and glass ionomer cement secured the cavity. After four weeks intracanal medicament was changed to a 50:50 mixture of LP and Ca(OH)₂ paste. Then the periodontal non-surgical treatment was done. Evaluating the results after 2 months, pocket depth was reduced to 7mm with bleeding on probing. That was not accepted as healed periodontium and surgical treatment was done. Two months after periodontal surgery, pocket depth was reduced to 4mm without bleeding on probing. It was accepted as a stable periodontal situation and the endodontic canal treatment was finished with obturation. Final restoration with the composite filling was done.

Results

At the 6-months evaluation treatment with a combination of endodontic and periodontal therapies, the healing was observed clinically – pocket depth was reduced to 4mm, without bleeding on probing, no furcation involvement and mobility was detected anymore. Signs of a reduction in inflammation were also observed radiographically.

Conclusions

This case report demonstrates the sequential treatment of endodontic periodontal lesions with communication with observable healing. Treatment of such defects takes a long time, therefore, it is essential to continually reassess the prognosis after each phase of treatment and after appropriate time intervals to allow healing and stabilization of the tissues.

Oral health in Latvian patients with phenylketonuria

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Objectives

Phenylketonuria (PKU) is an inborn error of metabolism that results in decreased metabolism of the amino acid phenylalanine. Untreated, PKU can lead to intellectual disability, seizures, behavioral problems, and mental disorders.

The treatment of PKU entails a strict low protein diet and Phenylalanine free amino acid formula which is sweetened and might be with low pH level.

Oral health is a key indicator of overall health, well-being and quality of life. It encompasses a range of diseases and conditions that include dental caries, periodontal disease, tooth loss.

The aim of this study was to evaluate oral health in PKU patients in comparison to healthy controls.

Materials and Methods

33 PKU patients (10 males, 23 females) and age-sex matched control group are recruited for this study. The dental status was assessed by number of the filled, missing, abraded and carious teeth. The Silness & Loe, CPITN, Teeth application indexes were detected, as well as caries risk and tartar removal necessity.

Results

Investigation of oral health showed a statistically significant difference in the number of abraded teeth between PKU patients and the control group, 1.21 ± 1.88 and 2.61 ± 2.98 , respectively ($p=0.026$) and in number of carious teeth – 3.97 ± 4.02 and 1.85 ± 2.62 ($p=0.014$). Both groups (patients vs controls) also showed a statistically significant differences ($p<0.000$) when detecting Silness & Loe index (grade 3: 9 vs 1), CPITN index (grade 4: 5 vs 0), teeth application indexes (grade 3: 13 vs 1), high caries risk assessment (16 vs 2) and tartar removal necessity (21 vs 16).

Conclusions

PKU patients have significantly worse oral health in comparison to healthy controls, it could be explained by lifestyle and eating habit, use of amino acid formula and limited intellectual possibilities in older patients who have born before introducing newborn screening or partially treated patients.

Role of HHV-7 and Epstein-Barr virus in the pathogenesis of oral lichen planus: a systemic review

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Objectives

Herpes group viruses infect almost 90% of the population, mostly in childhood. In a large number of cases, the viruses are not fully eliminated after the primary infection and remain in the form of persistent infection throughout life. Oral lichen planus (OLP) is the most common non-infectious, chronic inflammatory oral disease affecting 1-2% of the general adult population. Its etiology is unknown, however there is some information on the involvement of Epstein-Barr virus (EBV) in the etiology of OLP and almost none on the role of human herpes virus-7 (HHV-7). The aim of the study was to provide currently available information on the association of EBV and HHV-7 with the development of oral lichen planus.hjkk

Materials and Methods

Online databases (PubMed, Scopus, Research gate, Science direct and Google Scholar) were searched from date of inception till November 2020. Studies were included if they met the following criteria: 1) observational studies that assessed the relationship between HHV-7 and EBV with OLP, 2) the study comprised OLP patients and control subjects, 3) diagnosis of OLP was confirmed histologically, and 4) articles were in English.

Results

A total of 10 studies (from 27) comprising 403 OLP cases and 216 controls were included. The results of the pooled studies revealed a significant positive association between EBV and OLP in 5 studies prevalence being 25.5 % and just one study suggested that there is 33.3% association between HHV-7 and OLP. Thus, the results suggest a significant positive association between presence of viruses EBV and HHV-7 and development of oral lichen planus.

Conclusions

The results of the present systematic review suggest that EBV and HHV-7 infection is significantly associated with increased risk of OLP. However, these results are preliminary, and high-quality, large-scale studies are required to further explore the potential role of HHV-7 and EBV in the pathogenesis of OLP.

The outcome of root canal treatment provided by postgraduate students at the Department of Endodontics, Institute of Stomatology, Rīga Stradiņš University

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Objectives

The main objective of endodontic treatment is to prevent or treat apical periodontitis. Treatment outcome of root canal treatment differs significantly between specialist and general dentists.

The aim of this study was to evaluate the outcome of root canal treatment provided by postgraduate students of the department of Endodontics of Institute of Stomatology, Riga Stradins University.

Materials and Methods

The study involved ninety-eight teeth (71 patient) who were clinically and radiographically examined. Periapical index (PAI) was used to evaluate apical periodontitis (AP) radiographically. PAI score dichotomize success and failure, PAI<3 success, but PAI ≥ 3 failure. Based on clinical and radiographic evaluation outcomes was defined as healed, healing and disease. For statistical analysis was used SPSS software.

Results

Outcome for primary teeth in initial endodontic treatment group 72% teeth is healed, 14% is healing. Among the 48 retreated teeth 85% is healed and 12% is healing. An association was found between success rate and preoperative signs or symptoms.

Conclusions

In this study postgraduate students prove to show good outcome rate both in primary endodontic treatment group and retreatment group. Outcome in this study were similar to those previously reported. Limitation of the study is the small sample size and problematic recall rate, larger sample size is needed to assess outcome predictors more precisely.

Orthodontics

Changes in the third palatal rugae after rapid maxillary expansion: pilot study

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Objectives

To evaluate and compare transversal changes in third palatal rugae after rapid maxillary expansion with tooth-borne and hybrid (tooth-bone) borne appliances.

Materials and Methods

The study sample consisted of 18 subjects (median age 12.6 [9.3 – 16.0], 11 females, 7 males) with transverse maxillary constriction, treated with tooth-borne (Group 1) and hybrid (Group 2) rapid maxillary expansion device. Intraoral scans were taken before and after expansion (median 7.2 months [5.3-9.1]). Distances between medial and lateral aspects of left and right third palatal rugae were measured on the intraoral dental scans.

Results

There were a statistically significant increases in the inter-medial and inter-lateral distances of the third palatal rugae after expansion in both groups ($p = 0.008$). Median values in Group 1 before expansion - inter-medial distance 2.6 mm [interquartile range 1.4], inter-lateral 19.61 mm [4.4], after - inter-medial 3.8 mm [1.4] and inter-lateral 25.3 mm [5.2]. For Group 2 before expansion - inter-medial 3.6 mm [1.4], inter-lateral 19.8 mm [4.5] and after expansion inter-medial 5.8 [2.3], inter-lateral 25.1 mm [3.5]. There were no statistically significant differences between the groups. There was a moderate correlation ($r = 0.531$, $p = 0.023$) between the increase in the inter-medial and inter-lateral distances.

Conclusions

Intraoral measurements showed similar increases in the inter- medial and inter-lateral distances of the third palatal rugae after maxillary expansion with both expansion appliances.

Changes of the facial width during growth

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Objectives

Assess the facial width changes from the age of 11.1 until 15.3 years in the Latvian population.

Materials and Methods

The sample (56 males and 45 females) was taken from the growth study at Riga Stradins University – randomly chosen children who had been born in 2002. 3dMD face scanner was used to obtain 3D facial images, and 21 landmarks were identified. All facial shapes were registered using Procrustes analysis. The distances between mid-endocanthion (m-en) and several facial landmarks were measured in three dimensions. Facial width was measured between several bilateral landmarks in the upper and lower facial regions.

Results

The inner canthal distance and philtrum width in girls showed the least growth (about 1 mm) during the observation period. The interalar distance in boys showed the greatest growth (about 4.5mm). Different structures of the face had different growth patterns. For girls, growth of the nose and eyes ceased from the age of 13.9 years and that of the mouth, from 14.2 years. For boys, facial width ceased to grow from 13.8 years (eyes and mouth), but the nose continued to grow beyond the observation period. Boys had two peaks of growth between 13.1 and 13.7 years, while girls had one peak for most structures around 11.6 years. Boys had greater values of most facial widths than girls throughout the entire observation period. The boys and girls had similar lip widths until 13 years, when boys started to grow more, increasing the difference to 1.8 mm.

Conclusions

The different facial width measurements show different growth rates and amounts in boys and girls between 11.1 and 15.3 years of age, providing the development of sexual dimorphism of the face during puberty.

Comparison of patients' and orthodontists' perception on the orthodontic treatment outcome using Maxillary Canine Aesthetic Index

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Objectives

The aim of this study was to evaluate the treatment outcome of a previously impacted canine from the patients' perspective and to compare it with an objective assessment by a panel of orthodontists. An additional objective was to test the influence of the initial position of the canine on the treatment outcome.

Materials and Methods

The study sample consisted of 28 patients from a previous study who agreed to fill a questioner regarding the treatment outcome. Clinical photographs of the cases were assessed by three orthodontists using MCAI (Maxillary Canine Aesthetic Index). The treatment outcome was associated with the initial position of the canine assessed on the cone beam computed tomography.

Results

Thirteen patients (46%) could not see any differences between the previously treated and the contralateral canine, while the orthodontists noticed the differences in 23 (82%). The difference was significant ($p = 0.005$). The patients were less critical about the aesthetic appearance of the previously impacted canines as compared to the orthodontists. But these differences were not significant, except for the mesiodistal angulation, where the patients noticed the difference only in one case, while the orthodontists identified differences in six cases ($p = 0.043$). The orthodontists were able to detect the differences in the gingival height and root inclination and that was reflected in the higher Maxillary Canine Aesthetic Indices. The treatment outcome was insignificantly influenced by the initial position of the canine.

Conclusions

The orthodontists were more critical than patients concerning the treatment-related outcome. The Maxillary Canine Aesthetic Index can be used for professional assessment, but it reflects the patient's perspective to a lesser extent.

Long-term condylar bony changes following combined orthodontic-orthognathic surgery treatment in skeletal class III patients

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Objectives

To investigate long-term (4 years) effects of combined orthodontic-orthognathic surgery treatment on condylar bone structure and volume in skeletal Class III patients.

Materials and Methods

The study included 27 (23 females, 4 males) patients diagnosed with skeletal Class III malocclusion, who underwent bimaxillary orthognathic surgery. The mean age of the patients at surgery was 23.5 ± 6.4 years. Cone-beam computed tomography (CBCT) images, obtained before surgery (mean 1.3 ± 1.9 months) and at long-term follow-up (mean 4.6 ± 0.6 years), were analysed. Condylar bony changes were assessed and condyles were classified as normal, having condylar remodeling or having degenerative joint disease. Three-dimensional models of the condyles were used to evaluate the changes of condylar volume pre- and post-surgery.

Results

The percentage of radiographically-detected subcortical sclerosis had statistically significantly ($p < 0.001$) increased after surgery. A higher proportion ($p = 0.012$) of the condyles with the status of remodeling was found at the long-term inspection. Condylar volume decreased on average (sd) by $4.5 (135.4) \text{ mm}^3$, representing about 0.3 % of the total volume.

Conclusions

Combined orthodontic-orthognathic surgery treatment induced condylar bone remodeling 4 years after surgery. The quantitative assessment showed minor changes of the condylar volume at the long-term follow-up in skeletal Class III patients.

Long-term condylar dimensional changes in skeletal class III orthognathic surgery patients

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Objectives

To evaluate long-term condylar dimensional changes in skeletal Class III orthognathic surgery patients using cone beam computed tomography (CBCT).

Materials and Methods

The sample was composed of 33 (27 females, 6 males) patients diagnosed with skeletal Class III dentofacial deformity, who underwent bimaxillary orthognathic surgery. The mean age of the patients at surgery was 22.7 ± 4.8 years. CBCT images were taken before surgery (mean 0.03 ± 0.2 years), after surgery (mean 1.1 ± 0.3 years) and at long-term follow-up (mean 4.5 ± 0.6 years). Three-dimensional (3D) condylar models were constructed from CBCT images utilizing threshold segmentation and manual editing. Volumetric measurements were performed to quantify condylar postoperative dimensional changes. To assess linear changes condylar surface color-coded distance maps were computed, and five regions of interest were selected for interpretation of condylar remodelling.

Results

Significant condylar volume change on average by 20.1 ± 73.8 mm³ ($p = 0.036$) was recorded 1 year after surgery. Condylar volume significantly increased on average by 32.0 ± 65.8 mm³ ($p < 0.001$) between post-surgery and long-term follow up. Four years after surgery, the volume was not significantly different from the preoperative volume ($p = 0.408$). Among the condylar remodelling signs, bone resorption showed a higher frequency than bone formation 4 years after surgery. However, the overall amount of remodeling did not exceed 0.5 mm in any of the regions of interest.

Conclusions

Minor condylar dimensional changes were observed 4 years after bimaxillary orthognathic surgery in skeletal Class III patients.

The association between facial and dental asymmetry in the adolescents with class II subdivision

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Objectives

The objective was to assess the differences in the facial parameters of the individuals with Class II subdivision (Class IIs) compared with Class I and Class II individuals.

Materials and Methods

The sample was retrieved from an ongoing growth study at the Rīga Stradiņš University. From the initial sample of the 107 individuals with facial scans, 17 individuals were excluded from the occlusion analysis for different reasons. Total sample was 90 individuals (47 males and 43 females) with an average age of 15 years. In the final sample was 30 Class I, 21 Class II and 30 individuals with Class IIs. The facial scans were obtained using 3dMD facial scanner. The occlusion was scanned with 3Shape scanner.

Results

The dental midline was significantly deviated to the Class IIs side compared with Class I ($p=0.030$) and Class II ($p<0.000$) individuals. The deviations of the upper midline points (mid-endocanthion, mid-exocanthion, mid-nasion and mid-glabella) from the midsagittal plane were more significant than those of the lower parts of the face, except for the mid-pogonion and mid-chelion. The mid-pogonion point in the Class I individuals was perfectly set on the midsagittal plane (0.01 ± 1.58). It was shifted to the respective side in the Class IIs individuals (0.45 ± 1.51) and to the right in the Class II individuals (-0.47 ± 1.23). Class IIs individuals have the respective side chelion higher. The mid-chelion point was shifted to the left in the Class IIs.

Conclusions

Occlusal parameters are represented in the face to some extent. The facial asymmetry seems to be beyond the occlusion in Class I and Class II individuals.

Oral and Maxillofacial Surgery

Evaluation of facial soft tissue asymmetric changes in class III patients after orthognathic surgery

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Objectives

To investigate the changes of facial soft tissue asymmetry over time after orthognathic surgery in Class III patients, using three-dimensional (3-D) stereophotogrammetry.

Materials and Methods

The study included 101 patients with skeletal Class III malocclusion (72 females, 29 males; age range 19-53 years; mean age 28.6 years), who underwent orthognathic surgery. The mean follow-up was at least 12 months. 3-D photographs were acquired using the 3dMDtrio (3dMD, Atlanta, GA) stereophotogrammetric system. 21 anthropometric landmark positions were evaluated at 3 time points: before (T0), 6 months (T1) and 12 months (T2) after surgery by superimposing the 3-D photographs. The facial asymmetry were assessed and classified as follows: 0-2 mm (mild); 2-5 mm (moderate); more than 5 mm (severe). The changes were compared between gender, type of surgery, 5 facial regions and time of image taking.

Results

The face asymmetry showed significant differences in relation to the average distance (AD) before surgery (T0 - median 0.73) and 6 months after the surgery (T1- median 0.64; $p < 0.012$). No statistical difference was between T0 and 12 months after surgery (T2) ($p > 0.146$). The Chin Volume Asymmetry Index (CVAI) between all 3 time points was statistically different ($p < 0.05$), but no differences were found between gender or surgery type groups ($p > 0.05$).

Conclusions

The asymmetry of facial soft tissues significantly decreased after orthognathic surgery. However, there was a tendency for soft tissue asymmetry to return after 6 months, but not at the same level.

Platelet rich fibrin perspectives in orthognatic surgery

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Objectives

Orthognatic surgery is a common treatment approach for severe dentofacial deformities. Despite favorable result and development of 3D planning to get predictable outcomes, still remains adverse results after jaw repositioning.

Materials and Methods

Literature review was done using articles searched in PubMed (National Library of Medicine) using key words. Articles were screened by title and abstract, including publishing years from 2009. 16 full text articles were analysed. Articles were cited using PubMed citation in AMA format.

Results

Skeletal stability of the osteotomy sites is dependent on the quality of bone union. After large mandibular movement, insufficient bone contact may result in bony defect in mandible and can create unpleasant mandibular notching or lower border irregularities. To improve bone healing variable biomaterials are used. No studies were found about PRF use directly in orthognatic surgery. Mostly studies showed stimulating effect on bone formation in single staged implant placement in maxillary frontal zone, after 3rd molar extraction However, some researches showed no significant effect on bone formation (sinus augmentation) and no stable effect using PRF alone.

Conclusions

There is a lack of evidence in literature regarding PRF application for the osteotomy sites in orthognatic surgery. PRF may be useful in solving insufficient bone formation problem, to avoid mandibular contour defect. Besides it is necessary to evaluate PRF antibacterial and antifungal effect which can influence compromised bone healing and may lead to bone formation improvement. Further careful researches are needed.

The authors acknowledge financial support from the Latvian Council of Science research project No. lzp-2020/1-0054 "Development of antibacterial autologous fibrin matrices in maxillofacial surgery (MATRI-X)".

Precision of the fully digital 3D treatment plan

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Objectives

Virtual 3D planning of orthognathic surgery has become the gold standard of modern orthognathic surgery, but questions about precision remain crucial.

The objective of the study was to evaluate precision of the digital 3D orthognathic surgery plan for bimaxillary surgery compared to the actual surgical outcome in all three dimensions.

Materials and Methods

30 patients were involved in the present study (11 male; 19 females; average age 23.7 years). 24 patients were Class III and 6 were Class II.

The preoperative and postoperative CBCT after bimaxillary surgery of each patient was superimposed. Eleven dental and skeletal points were used for comparison between the real and digital outcome in all three planes.

Results

In our study, average measurement values for all points were less than 2 mm. After further scrutiny of cases with larger discrepancies it was discovered that those cases were planned without "piggy-back" final occlusion definition method. In addition, these cases had pronounced facial asymmetry and occlusal plane canting. The data obtained in this study show that the surgical plan for maxillary movement is more predictable and precise when compared to the mandibular one in the sagittal and vertical plane.

Conclusions

Method of surgical outcome precision analysis presented in this paper provides better insight about discrepancies that may arise from virtual plan to surgical outcome. The results indicate that 3D digital planning of orthodontic surgery, if transferred appropriately, is an accurate assessment of the surgical outcome and there is no clinically significant difference between the planned and actual position. More improvements and innovations in virtual planning software could further improve surgical outcome precision.

Success rate of autotransplantation of third molars with open root apex for replacement of tooth row defects

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Objectives

Autotransplantation of third molars with unformed roots has several biological benefits: preservation and regeneration of bone, providing a functioning tooth, with no need for biomaterials.

The aim of the study was to investigate the efficiency of autotransplantation of the immature third molars, performed in the Institute of Stomatology, Riga Stradins University.

Materials and Methods

There were 14 patients (4 males and 10 females, mean age 18,0 years, range 14 - 21) with 16 immature third molars autoransplantations. Out of them in one patient tree teeth were transplanted. Procedures were performed from 14/08/2019 till 08/06/2020 by the same specialist. Only patients with at least 6-month observation period were included.

Two teeth from the maxilla to the maxilla, seven teeth from the maxilla to the mandible, three teeth from the mandible to the mandible and four from the mandible to the maxilla were transplanted.

Gingival pockets and vitality tests for transplanted teeth were assessed clinically. Bone attachment, obliteration of pulp chamber, root length growth and possible appearance of root resorption were evaluated in the periapical radiographs.

Results

An increased gingival pocket of 6 mm was observed in one case. Positive vitality test was assessed in 10 teeth, delayed response- in 6 teeth and complete loss of vitality was not observed for any tooth. Radiological examination revealed reestablishment of the bone attachment in 15 teeth. Pulp chamber obliteration was observed in 9 teeth. Root continues to grow in length in 3 teeth. Internal root resorption was detected in 1 case.

Conclusions

Autotransplantation of the immature third molars could be considered as effective method for replacement of missing molars. Further development for method and evaluation of long-term results is under way.

Tooth autotransplantation clinical success – a retrospective study with follow-up period varying from 8 months to 8 years

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Objectives

The aim of study was to evaluate the long term outcome of autotransplanted teeth (AT) in the frontal region.

Materials and Methods

This was a retrospective cohort study. The sample consisted from 37 patients with 38 autotransplanted teeth who were treated at the Institute of Stomatology (Rīga Stradins University) between 2012-2019. In the final sample were included 29 teeth. Eight patients were excluded because the transplanted teeth were in the posterior region. The follow up period varied from 8 months to 8 years, with the mean of 3.1 years. The following baseline information was recorded from the patients' medical files: gender, age at transplantation, indication for transplantation, donor tooth and the status of the recipient site, the root formation stage, Age at transplantation was from 8.9 to 12.7 years. All donor teeth were premolars. During recall visit a periapical x-ray was taken and clinical assessment of pink esthetic score (PES) and white esthetic score (WES) were used to evaluate the clinical outcome. As the success criteria were set: no inflammation, normal periodontal tissues, root/ crown ratio > 1. A score "tentative" was given, if one of criteria above was not fulfilled, and failure was recorded, if tooth was lost

Results

Only 9 of 29 transplanted teeth were reconstructed using composite material. The mean WES score was 6.7. Soft tissue evaluation using PES score showed mean score of 6.5, but 10 patients still had on going orthodontic treatment. Sixteen teeth were classified as success, 13 teeth's prognosis was classified as tentative. None of autotransplanted teeth was lost during this follow- up period.

Conclusions

Tooth autotransplantation can be treatment of choice for replacement of missing anterior teeth. The protocol of this procedure needs to be improved because of rather high percentage of tentative cases.

Biomaterials

Amorphous calcium phosphate biomaterials: synthesis, properties and applications

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Objectives

Objectives of the current research were to develop synthesis technology for obtaining of nanostructured amorphous calcium phosphate (ACP), study its physico-chemical properties, *in vitro* cell viability and demonstrate potential applications in biomaterial field.

Materials and Methods

ACP was synthesized by dissolution-reprecipitation method. Physico-chemical properties of the obtained products were characterized in conjunction with synthesis pH and drying conditions (dried at 80 °C or freeze-dried). Characterization included XRD, FT-IR, BET, DSC/TGA, SEM, TEM and heating microscopy methods. Further, the *in vitro* cell viability was evaluated with MG-63 cells at 72 h time point for two sample series; samples were produced as pellets. One series were in amorphous state, but the other - in crystalline state that was obtained by heat treatment at 700 °C for 1 h.

Results

The developed dissolution-reprecipitation synthesis enabled obtaining of ACP at synthesis pH of 9-11. The method allowed preservation of amorphous phase during drying at 80 °C, thus considerably shortening manufacturing time in comparison with the lengthy freeze-drying process (48-72 h). Obtained ACP had specific surface area of 133-154 m²/g which is considerably higher than previously reported values. FT-IR spectra revealed presence of carbonate ions within the ACP samples. Carbonates are present in mineralized bone tissue as well. ACP is known to be meta-stable and transform into crystalline phases, therefore its long-term stability (air atmosphere, room temperature) was evaluated. The developed ACP materials were stable at least for 7 months. *In vitro* results showed 2.7 times better *in vitro* MG-63 cell viability for the amorphous samples when compared to the crystalline scaffolds.

Conclusions

The dissolution-reprecipitation synthesis method of ACP offers following advantages: high specific surface area of the material, shortened production time and long-term stability. These advantages have enabled further development of various types of nanostructured ACP granules to be used as stand-alone biomaterials or integrated within composite materials.

Applying principles of the cold sintering process for densification of amorphous calcium phosphate

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Objectives

Although amorphous calcium phosphate ceramics are of great interest in the field of artificial bone substitute materials, it is still a great challenge to obtain amorphous calcium phosphate in a bulk form. The main reason that makes densification of amorphous calcium phosphate difficult is its unique structure which gets irreversibly altered when amorphous calcium phosphate is heated to temperatures above a few hundred degrees Celsius. Here, for densification of amorphous calcium phosphate, we used principles of the so-called cold sintering process. This process uses transient liquid, an applied uniaxial force, and heat to aid the densification of a powder compact and lately has raised great interest among the low-temperature sintering techniques.

Materials and Methods

We investigated the effect of sintering temperature (room temperature to 150 °C), presence or absence of transient liquid (20 wt. % water), and applied uniaxial pressure (500 to 1500 MPa) on densification and structure of amorphous calcium phosphate.

Results

The applied pressure had the most significant effect on relative density of the samples that retained amorphous calcium phosphate structure. Relative density of the samples that were produced at room temperature and 500 MPa pressure already exceeded 75%. Neither increased sintering temperature nor the presence of transient liquid significantly affected bulk, true and the resulting relative density values of the samples that retained amorphous calcium phosphate structure.

Conclusions

Our findings indicate that principles of the cold sintering process can be used for the successful densification of amorphous calcium phosphate.

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Charging capacity of the Ti and Mg originated materials to adhere cells

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Objectives

The goal of the research was to identify the charging capacity of the Ti and Mg originated materials to adhere cells.

Materials and Methods

The following groups of cylinder shape samples were under investigation: TiAl6V4, TiAl6V4 coated by CaP, MgCa1, MgCa1 coated by CaP, MgCaP1 coated by CaP with Ga dopping, MgCaP1 coated by CaP with Zn dopping. The *Saccharomyces cerevisiae* yeast was used for cells' immobilization experiments. The photoelectron emission spectroscopy method was used to identify the electrical charge located on the surface. The UV irradiation was applied for the deposition of the surface electrical charge.

Results

The area covered by the immobilized cells is 5.24% for the nonirradiated TiAl6V4 samples, and 6.83% for the irradiated during 1 hour TiAl6V4 samples. In the case of TiAl6V4 coated by CaP the sample area covered by the immobilized cells is 6.53% for nonirradiated samples, and 3.20% irradiated during 1 hour samples. In the case of MgCa1 the area covered by the immobilized cells is 13,11% for nonirradiated samples, and 29,15% for the irradiated during 1 hour samples area. In the case of MgCa1 coated by CaP the sample area covered by the immobilized cells is 7,18% for nonirradiated samples, and 9,62% for the irradiated during 1 hour samples. In the case of MgCa1 coated by CaP+Ga the sample area covered by the immobilized cells is 4,45% for nonirradiated samples, and 3,23% for the irradiated during 1 hour samples. In the case of MgCa1 coated by CaP+Zn the sample area covered by the immobilized cells is 6,96% for nonirradiated samples, and 3,09% for the irradiated during 1 hour samples.

Conclusions

The MgCa1 pickled samples UV irradiated for 1 hour have the highest area covered by cells.

The research was done within the framework of COFUND-ERANET-RUS-PLUS-68/01.08.2018 project.

Commercial vs autologous fibrin – handling from material point of view

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Objectives

Platelet-rich fibrin (PRF) is an autologous material derived from a patient blood with a high concentration of platelets and leukocytes. It contains high concentrations of growth factors and biologically active substances that play an important role in providing hemostasis and bone healing. PRF is used in different fields of medicine, including dentistry, oral and maxillofacial surgery. On the other hand commercially available fibrin glues take advantage of a simplified method for fibrinogen activation, bypassing the clotting cascade.

Materials and Methods

Samples were prepared from donor blood (ethics commissions approval was obtained) and commercial thrombin, fibrinogen and CaCl₂. Samples were compared by gel fraction, coagulation time and antibacterial drug release. For drug release Vancomycin hydrochloride and poly (lactic-co-glycolic acid) (PLGA) microcapsules were used as drug carriers.

Results

For the preparation of A-fibrin matrices, centrifugation for a shorter period of time results in a small amount of PRF. In turn, longer centrifugation promotes clot formation. As for K-fibrin matrices, thrombin should first be mixed with 40 mM CaCl₂ solution and then with fibrinogen to obtain a homogeneous mass.

A-fibrin matrices have longer coagulation time (30-40min) than commercial ones (2-3min). The gel fraction of K-fibrin matrices is 84.01 ± 0.54 %, which is higher than for A-fibrin matrices (65.14 ± 0.60 %).

Conclusions

In the first hours, the maximum concentration of vancomycin was observed, which were higher for A-fibrin matrices (7,23 µg/mL) than for K-fibrin matrices (2,34 µg/mL). Furthermore, K-fibrin matrices inhibit the release of vancomycin in both microcapsule and free vancomycin form.

It can be concluded that both of the materials have their pros and cons and their use should be assessed according to the application and patient needs.

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Evaluation of antibacterial properties of chemically cross-linked hydrogels based on ϵ -polylysine and hyaluronic acid

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Objectives

In recent years, fabrication of novel hydrogels with certain multifunctional properties has attracted research interest in different fields of biomedicine. The bacterial infections and antibiotic resistance are becoming a global problem in health care sector, and therefore design and development of hydrogels for tissue engineering with an antibacterial function are a main focus in biomedical research. The aim of this study is to develop and investigate novel antibacterial hydrogels based on natural biopolymers: antibacterial ϵ -polylysine (ϵ -PL) and intrinsic biocompatible hyaluronic acid (HA).

Materials and Methods

The hydrogel series based on ϵ -PL and HA (mass ratios of ϵ -PL and HA are 50:50; 60:40; 70:30 and 80:20 wt%) were *in situ* synthesized via chemical cross-linking using 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (EDC) and N-hydroxysuccinimide (NHS) crosslinking agents (with molar ratio of EDC:NHS =1:1) [1]. The molecular structure, phase composition and morphology of all synthesized hydrogels were evaluated using Fourier transform infrared spectroscopy (FTIR), X-ray powder diffractometry (XRD) and scanning electron microscopy (SEM). The minimal inhibitory concentrations (MIC) of ϵ -PL against Gram+ and Gram- bacteria were determined. The antibacterial activity of the fabricated ϵ -PL-HA hydrogels were tested against *E.coli* and *S.aureus* bacterial cultures.

Results

FTIR spectra indicated interaction between ϵ -PL and HA and successful formation of cross-linked copolymer via amide bond linkage. XRD patterns show diffraction maximum of copolymer amorphous phase without external maximums. SEM micrographs of the lyophilized hydrogels revealed homogeneous and microporous structure. The MIC of ϵ -PL against *E.coli* and *S.aureus* were determined to be 25 μ g/ mL.

Conclusions

In the described study, novel hydrogels based on chemically cross-linked ϵ -polylysine and hyaluronic acid copolymer system were synthesized and investigated. The antibacterial tests indicated inhibition ability against Gram+ and Gram-bacterial cultures. It is concluded that the developed hydrogels can be considered as promising antibacterial biomaterials for tissue engineering.

Pharmaceutical Science

Adherence level valuation depending on the duration of therapy among patients with arterial hypertension

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Objectives

Arterial hypertension is a preventable risk factor for premature death and disability worldwide. Currently, one of the major problems in cardiology practice is poor adherence to drug therapy. The aim of the study is to determine the level of medication adherence by assessing the association with the duration of antihypertensive therapy, patient demographics, and disease control characteristics, including the role of the pharmacist as a health care provider.

Materials and Methods

This cross-sectional observational study was conducted in a primary care settings. The questionnaire contained questions about patient demographics, disease control, pharmaceutical care, and adherence level to medication. This study involved 187 participants.

Results

The prevalence of non-adherence was 45.9% among patients with arterial hypertension. There was a trend for the proportion of adherent patients to decrease to 38.2% with medication use for 2–4.9 years, but the adherence rate increased with the increase in hospitalization episodes due to arterial hypertension. Non-working seniors were more adherent (adherence level 64.6%) than other employment groups ($p = 0.014$). Even though 84.7% of the respondents had a blood pressure monitor at home, only 25.3% of them reported measuring blood pressure every day, the rest measured it inconsistently or did not measure at all. There were statistically significant differences between the groups of adherent patients in terms of the patients' net income ($p = 0.011$), medication co-payment ($p = 0.007$), and whether the pharmacist offered to reduce the costs of drug therapy ($p = 0.002$).

Conclusions

Level of medication non-adherence was high among patients with arterial hypertension in Latvia. Intentionally non-adherent respondents discontinued their medication because of fear of getting used to medicines. Blood pressure control level at home was generally assessed as poor/inadequate. Pharmacists' behavior, offering to reduce the costs of medications used, was influenced by socio-economic factors such as employment status and income levels of patients.

Analysis of vancomycin therapeutic drug monitoring in two multidisciplinary hospitals in Latvia, with and without a monitoring protocol

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Objectives

Vancomycin is a glycopeptide antibiotic which acts against various gram-positive microorganisms. Systemic infections are treated with intravenous vancomycin with dosing adapted to renal function and body weight. Due to the narrow therapeutic index, therapeutic drug monitoring should be performed. That helps to reach adequate therapeutic efficacy, while reducing the risk of potential nephrotoxicity. However, even various guidelines for appropriate vancomycin therapy is available, majority of patients do not reach appropriate vancomycin concentration. Inadequate therapeutic drug monitoring is often mentioned as a reason. Therefore, various approaches are implemented for more precise monitoring of vancomycin concentration, including supervision of clinical pharmacist.

Retrospective study was performed in two multidisciplinary hospitals in Latvia. The aim of the study was to investigate details of monitoring of vancomycin concentration, to investigate influence of therapeutic drug monitoring protocol developed by clinical pharmacist.

Materials and Methods

Data about the patients included in the study were analyzed based on gender, age, body weight, BMI, renal function. Data about vancomycin therapy analyzed: dosing schemes (vancomycin dose and dosing interval), data about loading and maintenance doses, vancomycin concentration, details about vancomycin concentration (sampling time and concentration level).

Results

Differences between the hospitals were found in terms of documenting the initiation of vancomycin administration and concentration sampling- more correct notes were found in hospital with protocol if compared with the hospital without the protocol (97.22% vs. 18.95%, $p < 0.001$), performance of administration of loading dose (22.73% vs. 1.29%, $p < 0.01$) and reaching target concentration (55.56% vs. 35.29%, $p < 0.01$). Concentration sampling in correct timeframe before the vancomycin dose and vancomycin administration did not show statistically better results in either of hospitals (4.60% vs. 6.29%, $p = 0.786$).

Conclusions

Better results were in the hospital with TDM protocol. However, for long term maintenance of good results and improvement of vancomycin administration regular training for medical professionals is necessary.

Chemical composition, antiradical, anti-collagenase, and anti-inflammatory activities of *Prunus padus* L. flower extract

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Objectives

Based on the ethnobotanical knowledge found in the records of Latvian folk medicine from the 19th century and due to the lack of studies related to the pharmacological activities of *P. padus* flowers, the aim of the study was to assess the chemical composition, antiradical, anti-collagenase, and anti-inflammatory activities of the ethanolic extract of *P. padus* flowers (PPFE).

Materials and Methods

Flower extracts of *P. padus* were subjected to phytochemical analysis using gas chromatography-mass spectrometry and liquid chromatography-mass spectrometry techniques to determine the chemical composition. Antiradical activity of PPFE was measured as its ability to scavenge the 2,2-diphenyl-1-picryl hydrazyl (DPPH) free radical and the total phenolic content was tested by the Folin-Ciocalteu method. Anti-collagenase activity was investigated using a spectrophotometric method *in vitro*. The effect of PPFE on inflammation was evaluated by measuring specific markers using flow cytometry and assessing pro-inflammatory cytokine (IL-6) release by bone marrow-derived macrophages (BMDMs) *ex vivo*.

Results

The three major compounds of the ethanolic extract of *P. padus* flowers were quercetin diglycosides, chlorogenic acid, and di-caffeoyl-coumaroyl spermidine, which was tentatively identified for the first time in *P. padus* flowers. Total phenolic content of PPFE was 85.19 mg GAE/g extract and the EC₅₀ value in the DPPH assay was 0.55 mg/ml. PPFE inhibited collagenase activity in a dose-dependent manner. Preincubation of BMDMs with PPFE reduced the population of M1 (pro-inflammatory) and increased the population of M2 (anti-inflammatory) macrophages after 24 h treatment. Moreover, PPFE decreased pro-inflammatory cytokine IL-6 release from BMDMs for 35% and 25% at concentrations of 500 and 250 µg/ml, respectively.

Conclusions

PPFE is rich in bioactive components, mainly phenolic compounds. PPFE showed a significant anti-inflammatory effect, supporting its ethnomedicinal use reported in the records of Latvian folk medicine for the reduction of inflammatory processes.

Development of high performance liquid chromatography ropivacaine serum concentration determination method

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Objectives

Local anesthetics dates back to 18th century, and many different regional anesthetics methods have been developed since then. Nowadays local anesthesia is widely used to reduce pain during or after surgery, specially after knee surgery which is one of most painful. Nevertheless, It is known that if local anesthesia drugs gets into blood circulation, they can potentially cause life threatening complications, one such drug is ropivacaine. Therefore, therapeutic drug monitoring can help assess patients safety. The objective of this work is to develop HPLC (high performance liquid chromatography) method to determine ropivacaine serum levels of patients during and after surgery.

Materials and Methods

The patients received ropivacaine via N. Femoralis block before knee surgery or via infiltration anesthesia during the surgery. The blood samples were taken from patients using EDTA anticoagulated vacutainer, before anesthesia, 10, 30, 60 and 120 min. after. The serum was obtained via centrifugation and 0.5 ml were taken for analysis. Prior to analysis, the centrifuged samples were kept at – 80 °C. Ropivacaine was extracted using diethyl ether after basification with KOH. Afterwards, the ether layer was evaporated, and the dry residue redissolved in HPLC mobile phase. HPLC analysis was done on *Thermo Ultimate 3000* HPLC-UV system equipped with *ascantis* C18 column. The calibration was done by spiking pooled, blank patient plasma with diluted ropivacaine hydrochloride.

Results

The analytical method is capable to determine ropivacaine serum concentration starting from approximately 0.05 up to 5 µg/ml with excellent linearity coefficient $R^2 = 0.999$. Ropivacaine plasma concentrations ranges from undetected up to 1.2 µg/ml, the peak concentration is reached after approximately 1-2 hours.

Conclusions

The current analytical method provides valuable information on patient ropivacaine serum concentration levels. The currently gathered data, comparing prementioned ropivacaine administration methods, suggest that ropivacaine serum levels do not surpass venous toxicity threshold of 2.2 µg/ml described by literature.

Extraction and antioxidant activity of freshwater sapropel poly-acids

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Objectives

The aim the study was extraction of humic and fulvic poly-acids from sapropel sediment and determination of its antioxidant activity for development of topical applications improving lymph and blood circulation in joints.

Materials and Methods

Sapropel sediment from different layers and different locations were analyzed. Mineral, organic and chemical compounds represented the properties of sapropel extract as well as antioxidant properties. Antioxidant activity was measured with spectrometric methods, that are based on ability to scavenge free DPPH and ABTS radicals, also total phenolic content and total antioxidant status was provided. Sapropel extracts also were tested in *in vitro* to evaluate optimal concentration for further use in topical medicinal applications. Balb/c 3T3 mouse dermal fibroblast and HaCaT keratinocyte growth was monitored using Cell IQ.

Results

All studied samples had antioxidant effect that varied between different lakes but was similar for different layers in the same lake. It was found that antioxidant levels are higher in sapropel samples with higher humic acid concentration. There is strong correlation ($R^2 = 0.90$) between antioxidant levels and humic acid concentration in sapropel extract. Preliminary results indicate that Sapropel extract in high concentrations (70 µg/ml, 140 µg/ml) may promote cell growth shortly (up to 6h); low concentration seems to have no harmful effect on cell growth.

Conclusions

Due to strong correlation between antioxidant levels and humic acid concentration in sapropel extract as well its promotion on cell growth in *in vitro* tests, it can be used as topical application. The ratio of humic and fulvic acids together with other characteristics of the sapropel like - pH, organic matter content and ash content can be used to characterise the sapropel from particular lake and can be used as tool for the identification of the source of sapropel in pharmaceutical and cosmetics product production.

The research was co-financed by project No.1.1.1.1/16/A/165.

Fingerprint analysis of medical herbals

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Objectives

Herbal medicine plays an essential role in modern human life. Identification and quantification of chemical markers are crucial to the quality control of herbal medicines. Usually, control methods like thin layer chromatography (TLC) and other chromatographic methods are based on Pharmacopoeia methods in every country or region. The resulting data contain only general information about some compounds, but lack any fast-accessible information for determination of differences and similarities of samples as complex systems.

Objective: To describe methods for the rapid element and compound composition analysis of plant material using like atomic spectroscopy and molecular spectroscopy in conjunction with chemometrics.

Materials and Methods

Medical herbals, atomic spectroscopy methods (ED-XRF, ICP, LIBS) and molecular spectroscopy (FTIR, Raman). The spectral patterns were used for Multivariate principal component analyses by SIMCA strategy. All spectra were smoothed and normalised before chemometric studies. Using SIMCA 14 software — the Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (HCA) was performed by using Savitzky-Golay and 2nd derivative filter. For the HCA, Ward's algorithm was used.

Results

A comparison between spectra recorded by atomic spectroscopy and molecular spectroscopy sampling methods showed high sensitivity and good discrimination of herbal species based on spectral information. The sensitivity of the methods and the reliability of the obtained results were tested using reference materials.

Conclusions

The results show the possibility to describe samples and identify similarities and differentiate based on a complex pattern of spectral lines measured by different analytical techniques. The proposed strategy for plant material sample chemical composition screening allows the quick method to improve laboratory work efficiency, reduce unnecessary analysis and rapid method for control reliability of results of more complex chemical methods, such as ICP-MS, HPLQ-MS

ERAF Post-doctoral Research Support Program project Nr. 1.1.1.2/16/I/001. Research application "Development of screening methods by innovative spectroscopy techniques and chemometrics in research of herbal medicine", Nr. 1.1.1.2/VIAA/2/18/273.

Levofloxacin efficacy against *E. coli* isolated from pet rabbits: pilot study

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Objectives

Escherichia coli are commensals, but some strains can be pathogenic. Enteropathogenic *E. coli* causes diarrhea that could be lethal for companion animals, including pet rabbits. Enrofloxacin is a first-choice antimicrobial agent, although microbial resistance to this drug has been reported. Levofloxacin (LVFX) is a third-generation broad-spectrum fluoroquinolone (FQ) antimicrobial, approved for human medicine and is recommended by the International Society for Companion Animals Infectious Diseases as an off-label drug. LVFX *in vitro* efficacy against *E. coli* isolated from companion rabbits was evaluated.

Materials and Methods

Rectal swabs were aseptically collected from 6 (two sampling times) clinically healthy companion rabbits with no history of FQ administration. Swabs were seeded on McConkey agar and *E. coli* presence was confirmed using the VITEK 2 system. Preliminary susceptibility to LVFX was detected with an E-test®. Minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) were confirmed with broth microdilution method according to Clinical and Laboratory Standards Institute M100 guidelines. *E. coli* strain ATCC 25922 was used as a reference.

Results

The reference *E. coli* strain had the MIC of 0.02 µg/mL (susceptible). In the first sampling, three *E. coli* isolates were identified, two of which showed the MIC > 8 µg/mL (resistant). One LVFX isolate exhibited MIC value of 0.93 µg/mL (intermediate susceptibility). In the second sampling, 6 rabbit samples revealed two *E. coli* isolates, one of which had the MIC 0.25 µg/mL and MBC 0.5 µg/mL (susceptible), another MIC 1 µg/mL and MBC 2 µg/mL (intermediate susceptibility). The results found are in line with MIC and MBC values reported in other domestic species.

Conclusions

Potentially dangerous *E. coli* were isolated from companion rabbits. LVFX resistant strains were present, despite no history of FQ treatment. Larger isolate sample size is required to evaluate the incidence of carrying *E. coli* in pet rabbits and to investigate the susceptibility range for LVFX.

Levofloxacin pharmacokinetics and tissue residues after oral administration in geese

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Objectives

Levofloxacin (LVFX), a promising, potent, third-generation fluoroquinolone antimicrobial agent, has been extensively investigated in the field of veterinary medicine recently. This study aimed to assess the pharmacokinetic profiles of LVFX in geese after either a single intravenous or oral administration, and to evaluate the depletion profile in tissues – skeletal muscle, heart, liver, kidney, and lung after a single oral dose.

Materials and Methods

A total of 26 clinically healthy geese (Bilgorajska breed) were used in this study. The first group (n=8) received LVFX (2 mg/kg) intravenously, while the second group (n=8) was treated with LVFX orally (5 mg/kg). The tissue depletion study involved 10 geese which were dosed orally (5 mg/kg) and two animals were sacrificed at different time points to collect the selected tissues. LVFX was quantified in all matrices tested by a validated HPLC method with spectrofluorimetric detection. The pharmacokinetics profiles were analysed using a non-compartmental model.

Results

LVFX was quantifiable in plasma after up to 24 h in birds administered intravenously and up to 48 h after oral treatment. LVFX was rapidly absorbed after oral administration ($T_{max} = 0.38$ h) showing high bioavailability ($96 \pm 21\%$). The average volume of distribution value was 1.40 ± 0.28 L/kg. Plasma clearance was rapid (0.28 ± 0.06 L/kg/h). LVFX residues were highest at 6 h (first collection point) and decreased consequentially until 48 h in the selected tissues. Liver and kidney were found to have the highest drug concentrations.

Conclusions

Based on the calculated pharmacokinetic/pharmacodynamic surrogate index - area under the concentration versus time curve divided by the minimal inhibitory concentration (AUC/MIC), the LVFX dosing regimen used in the present study could be effective against bacteria with the MIC < 0.24 µg/mL in geese. In addition, drug accumulation in edible tissues could be controlled using an estimated withdrawal time of 90 h.

Quantitative analysis of tannins in some herbs of Latvian flora

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Objectives

Aim of this research was to analyse quantitative amounts of tannins in some Latvian flora herbs. We analysed plants commonly growing in Latvia: Wormwood (*Artemisia absinthium*), Common Wormwood or Mugwort (*Artemisia vulgaris*), Tansy (*Tanacetum vulgare*), Heather (*Calluna vulgaris*). Tannins in these plants are less studied to our knowledge. Tannins have antibacterial effects, anthelmintic effects. This research is part of project "Development of herbal plant containing medical extracts with anti-parasitic effect" funded by the Latvia Ministry of Agriculture and Rural Support Service program LAD16.2 project: The support for pilot projects and for the development of new products, practices, processes and technologies.

Materials and Methods

Plants were collected in Latvia cultural district of Vidzeme during blooming in July and August. Wormwood herb, Mugwort herb, Heather herb, Tansy flower and leaf were dried in the shade ambient temperature, then grinded in mill 1-2mm particles. Tannin amounts were analysed as described in European Pharmacopoeia 9 using Hide powder at 760nm (METTLER TOLEDO UV7 spectrophotometer) protected from light. We used 1g of herbal material to make decoctions. Each experiment was done in triplets. Statistical analysis Microsoft Excel 2010.

Results

Mugwort herb contained the most tannins 3.02% (SD = 0.67; VR +/- 0.44). Heather herb and Tansy leaf contained approximately equal amounts of tannins of 2.45% (SD=0.17; VR +/- 0.03) and 2.43% (SD=0.37; VR +/- 0.14), respectively. Less tannin is found in Tansy flower 2.01% (SD=0.18; VR +/- 0.44) and Wormwood herb 1.10% (SD=0.07; VR +/- 0.17). Compared to the required minimum tannin content according to Eur Pharm 9 monographs for some commonly used tannin containing herbal drugs, such as Oak bark (*Quercus cortex*) and Witch-hazel leaf (*Hamamelidis folium*) min 3%, Pelargonium root (*Pelargonii radix*) min 2%, Common Lady's mantle (*Alchemilla herba*) min 6%; Bilberry fruit, dried (*Myrtilli fructus siccus*) min 1%, our analyzed plants have a medium amount of tannins.

Conclusions

Experimental data show that analysed herbs have tannins, further research is necessary to identify types of tannins and to determine medicinal effects.

Solvent effect on extraction amounts of polyphenolics in herbs growing Latvia

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Objectives

Aim of this research was to find optimal solvent and concentration to extract polyphenols from herbal drugs. Polyphenols are of great interest in search of alternative antibacterials and antihelmetics.

This research is part of project "Development of herbal plant containing medical extracts with anti-parasitic effect" funded by the Latvia Ministry of Agriculture and Rural Support Service program LAD16.2 project: The support for pilot projects and for the development of new products, practices, processes and technologies.

Materials and Methods

Wormwood herb (*Artemisia absinthium*), Mugwort herb (*Artemisia vulgaris*), Tansy flower and leaf (*Tanacetum vulgare*), Heather herb (*Calluna vulgaris*) were collected in Latvia (Vidzeme) in July and August 2018, Oak bark (*Quercus robur*) was collected in March 2018, and dried in the shade, ambient temperature, grinded in mill (1-2mm). Extracts: 100ml ethanol and acetone (70%, 50%, 30%) and 10g of plant material. Extraction time 1h 20 min. Vacuum evaporation used to make semi solid extracts. Folin-Ciocalteu method was used to estimate the total phenolic content (TPC) in extracts. Results expressed as gallic acid equivalents (GAE). Statistical analysis: Microsoft Excel 2010.

Results

The highest amounts of TPC were found in 70% acetone extracts of Tansy leaf (6990mg/100g GAE; SD 271; CI 674), Heather herb (6126 mg/100g GAE; SD=757; CI=582), Mugwort herb (5876mg/100g GAE; SD=145; CI=361) and Oak bark (5511mg/100g GAE; SD=245; CI=609). Tansy flower 50% acetone (7737mg/100g GAE; SD=337; CI=837) and 30% acetone (7760mg/100g GAE; SD=295; CI=733) extracts showed the most TPC. However for Wormwood herb best extractants were 50% ethanol (3236mg/100g GAE; SD=411; CI=1021) and 30% acetone (3293mg/100g GAE; SD=520; CI=1292). Altogether acetone extracts had more TPC (7760-1136mg/100g GAE, median 5680mg/100g GAE), while ethanol extracts ranged from 6535 to 2867 mg/100g GAE, median 4349mg/100g GAE.

Conclusions

Our research shows that optimal solvent varies on plant species and herb type. Our findings correspond with other polyphenol extraction optimization research results.

The Drug Evaluation Alliance of Nova Scotia, Canada: improving population drug use

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Objectives

To discuss the structure, functioning and interventions of the Drug Evaluation Alliance of Nova Scotia (DEANS), Canada.

Materials and Methods

DEANS is an interprofessional, multisectoral alliance to encourage drug stewardship. The Nova Scotia government's Pharmaceutical Services and Extended Health Benefits Branch appoints volunteer committee members, provides a secretariat and is accountable to the Minister of Health and Wellness. The committee includes individuals with expertise in family medicine, pharmacy, pharmacoepidemiology, and continuing education. It identifies and prioritizes drug therapy issues, provides evidence on optimal drug use, analyzes health and utilization data, and implements and evaluates interventions to improve drug therapy. Interventions include live and online presentations, toolkits for providers, small-group workshops and Academic Detailing (ADS).

Results

DEANS provides an annual report of its interventions to its major stakeholders. Three examples follow from 2018/9:

1. Educational sessions at the 2018 Faculty of Medicine Annual Refresher course included: chronic pain management; drug therapies in COPD, ADD and hyperlipidemia; thiazide diuretics; SGLT2 inhibitors in T2DM.
2. The ADS developed "*Choices Before Opioids for Chronic Non-Cancer Pain*" for neuropathic pain, fibromyalgia, chronic low back pain and osteoarthritis. The detailers completed 110 visits: 234 family physicians; 17 medical students; 30 nurse practitioners; 27 others.
3. The prevalence of antipsychotic use in older adults and concordance with STOPP (Screening Tool of Older Persons' Potentially Inappropriate Prescriptions) criteria was determined. Six percent of eligible Pharmacare beneficiaries received at least one antipsychotic dispensation. Of beneficiaries with at least one antipsychotic dispensation and a fall-related hospitalization, over 75% were dispensed an antipsychotic in the 100 days following discharge

Conclusions

DEANS provides a structure and process to identify drug therapy issues and implement and evaluate changes to address these issues. This benefits our health care providers and our population by reducing inappropriate medication use with associated cost savings.

The role of levofloxacin in veterinary medicine currently

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Objectives

The third-generation fluoroquinolone antimicrobial agent levofloxacin (LVFX) has been in the focus of research in veterinary medicine recently. LVFX is being used in animals, including both registered (Argentina, China, India) and off-label formulations (USA). Although, it is restricted to human use only in the EU. The currently available scientific data from the veterinary field related to LVFX were summarized to evaluate the adequacy and appropriateness of the use of this antimicrobial agent in veterinary practice.

Materials and Methods

The *Scopus* database (keywords: "levofloxacin" and "veterinary") research articles and articles referenced by them were used as information sources.

Results

Thirty-eight research articles on LVFX pharmacokinetics in mammals and birds, 8 tissue depletion articles, and 84 articles referring to the antimicrobial activity (*in vivo* and *in vitro*) of LVFX against microorganisms isolated from animals and their habitats were found and analyzed. Broad antimicrobial activity spectrum, favorable for once-daily administration, pharmacokinetic properties, short depletion time in edible tissues, and legal use in veterinary medicine outside the EU speak in favor of LVFX. However, microorganism isolates from companion and farm animals also revealed resistance to LVFX, e.g., *Clostridium difficile*, *Escherichia coli* and *Staphylococcus pseudintermedius*. These findings limit the potential of LVFX in veterinary medicine.

Conclusions

Independently of the legal status of LVFX in different countries, it is used in veterinary medicine in the biggest countries in the world. It could not be omitted that microbial resistance could spread across the borders, and the inadequate LVFX use can have an impact on antimicrobial efficacy and global health. Therefore, pharmacokinetic-pharmacodynamic studies are demanded to establish the correct and safe LVFX dosing regimen for each single animal species.

Morphology

Adoptive cell therapies in haematology and beyond

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Objectives

Adoptive cell therapy, also known as cellular immunotherapy, is a form of treatment that uses the cells of the immune system to eliminate malignancy. Today, immunotherapy represents a rapidly expanding and transformative force comprising multiple modalities: chimeric antigen receptor (CAR) T, NK or NKT cells, engineered T cell receptor (TCR) T cells, tumour infiltrating lymphocytes (TILs) and dendritic cells (DCs). Only CAR-T cell therapies have been approved as licensed drugs. During the presentation, I am going to outline the biological mechanisms behind various adoptive cell therapies and highlight advances that have been made in recent preclinical and clinical trials.

Materials and Methods

Not applicable.

Results

Not applicable.

Conclusions

Not applicable.

Anatomical variability in determination of some dimensions of the foramen magnum

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Objectives

The aims of the present study were to determine some dimensions and their variability of the foramen magnum (FM).

Materials and Methods

25 adult dry occipital bones of unknown age and gender were selected for the study in the 1st part. Material was provided by the Anatomy Laboratory of the Department of Morphology of the Institute of Anatomy and Anthropology. In the 2nd part 25 adult occipital bones were studied on the virtual 3D dissection table "Anatmage". Sagittal (FMSD) and transverse (FMTD) diameters of the FM were measured by one investigator. In dry occipital bones these sizes were taken using a sliding digital Vernier caliper to the nearest 0.01mm. In virtual images the sizes of FM were measured by digital ruler tool. FM index (FMI) was calculated using the formula: $FMTD \times 100 / FMSD$. The area of the FM was calculated using Radinsky's formula; $A = 1/4 \times 3.14 \times FMTD \times FMSD$. Collected data was analyzed using IBM SPSS Statistics 26.0. The shape of the FM was visually assessed and detected as round, oval, egg-shaped, tetragonal, pentagonal, hexagonal and irregular.

Results

In dry occipital bones FMSD and FMTD were respectively 36.15 ± 3.37 mm and 30.44 ± 2.62 mm while index of foramen and area were respectively 84.69 ± 8.83 and 866.39 ± 130.19 mm². The FMSD diameter ranged from 30.15 to 42.44 mm, and FMTD ranged from 25.50 to 34.66 mm. Tetragonal and pentagonal shapes of FM were found to be the highest in occurrence. In digital occipital bones FMSD and FMTD were respectively 34.50 ± 4.03 mm and 30.60 ± 3.12 mm while index of foramen and area were respectively 89.33 ± 9.17 and 834.35 ± 159.04 mm². FMSD diameter ranged from 25.01 to 40.79 mm, and FMTD ranged from 24.89 to 36.71 mm. FM were mainly hexagonal or irregular in shape (32.0% and 28.0%).

Conclusions

This study illustrated the variability of some dimensions of the FM that are important in human anatomy, anthropometry, forensic medicine, radiology and neurology.

Assessment of neutrophil leukocyte infiltration in aortic valves in patients with infective endocarditis

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Objectives

Infective endocarditis (IE) is an inflammatory disease affecting the endocardium, including heart valves. Inflammatory cells, especially neutrophilic leukocyte migration patterns may play a role in remodeling layers of cardiac valves and vegetation formation. We aimed to assess the neutrophils' infiltration pattern in aortic valve layers in patients with IE and couple these findings to routine laboratory indices.

Materials and Methods

Materials were obtained from nineteen patients diagnosed with IE and undergoing valve surgery. The aortic valve tissues were fixed routinely in 10% neutral formalin, paraffin-embedded, sectioned and stained with hematoxylin and eosin (H&E). Neutrophils were counted semi-quantitatively. Clinical and laboratory data were collected from patient medical records. Laboratory indices were correlated to histopathology data. Data were assessed statistically by using SPSS 26.0 version.

Results

Five patients (26.3%) had bicuspid aortic valve morphology. Six of nineteen (31.6 %) patients had perforations in aortic valve cusps. Twelve tissue samples (63.2%) presented with calcification nodules, whereas 14 (73.7%) demonstrated ingrowth of blood vessels into the cusp. The free edge of the valve leaflet revealed a larger amount of neutrophils (mean 2.11) invading the cusp when compared to the middle portion (mean 1.63, $p < 0.001$) and base (mean 0.68, $p < 0.001$). Furthermore, the *fibrosa* layer was more severely infiltrated by neutrophils (mean 1.75) when compared to *spongiosa* (mean 1.33, $p = 0.02$) and *ventricularis* (mean 1.33, $p = 0.04$). Preoperative laboratory analysis showed an increase in the C-reactive protein and procalcitonin level (mean 46.25 ± 58.33 , and 0.19 ± 1.22 , respectively).

Conclusions

1. Neutrophils' infiltration is more often observed in the free edge and middle portion of aortic valve cusps.
2. *Fibrosa* layer of the aortic valve are more heavily infiltrated when compared to *spongiosa* and *ventricularis*.
3. Elevated levels of C-reactive protein and procalcitonin are coupled to neutrophilic infiltration of the aortic cusp.

Biomarkers for early diagnosis of malignant pleural mesothelioma

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Objectives

Malignant pleural mesothelioma (MM) is a highly aggressive tumor characterized by a poor prognosis. Although its carcinogenesis mechanism has not been strictly understood, about 80% of MM can be attributed to occupational and/or environmental exposure to asbestos fibers.

Materials and Methods

The aim is up-date the new biomarkers for MM early detection.

Results

The identification of non-invasive molecular markers for an early diagnosis of MM has been the subject of several studies aimed at diagnosing the disease at an early stage. The most studied biomarker is mesothelin, characterized by a good specificity, but it has low sensitivity, especially for non-epithelioid MM. Other protein markers are Fibulin-3 and osteopontin which have not, however, showed a superior diagnostic performance. Recently, interesting results have been reported for the HMGB1 protein in a small but limited series. An increase in channel proteins involved in water transport, aquaporins, have been identified as positive prognostic factors in MM, high levels of expression of aquaporins in tumor cells predict an increase in survival. MicroRNAs and protein panels are among the new indicators of interest.

Conclusions

None of the markers available today are sufficiently reliable to be used in the surveillance of subjects exposed to asbestos or in the early detection of MM.

Characterization of the CircSMARCA5-SRSF1 molecular axis in adult gliomas

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Objectives

The aim of this research was to study at immunohistochemical level the selective activation of the CircSMARCA5 - Serin and Arginine Rich Splicing Factor-1 (SRSF1) molecular axis in a cohort of glioblastoma (GBM) and other non-astrocytic adult glioma biopsies in order to evaluate the potential diagnostic utility of SRSF1 immunohistochemical expression in the differential diagnosis of adult gliomas.

Materials and Methods

Cases with a histologically and molecularly confirmed diagnosis of IDH- wild type GBM (n=32), IDH-mutant and 1p/19q-codeleted oligodendroglioma (n=11), ependymoma (n=6) and PA (n=6) were included in the study. Each tumor section was tested for immunohistochemical analyses using a mouse monoclonal anti-SRSF1 antibody. The presence of brown chromogen in the nucleus of cells was interpreted as positive SRSF1 staining. Intensity of staining (IS) was graded on a 0-3 scale. Five categories (0-4) of percentage of SRSF1 immunopositive cells (Extent Score, ES) were identified: <5%; 5–30%; 31–50%; 51–75%; >75%. IS was multiplied by ES to obtain the immunoreactivity score (IRS).

Results

26/32 GBMs showed high SRSF1 immunoexpression (IRS \geq 6), whereas in 6/32 GBM (18,75%) a low SRSF1 immunoexpression (IRS < 6) was found. High SRSF1 levels were found in 8/11 oligodendrogliomas, whereas only 3/11 showed low expression. 3/3 grade III anaplastic ependymomas had IRS value \geq 6. 5/6 ependymomas showed IRS < 6 and, among these, in 4/5 cases SRSF1 staining was completely negative. Similarly, low SRSF1 expression levels were found in 6/6 PAs and in 4/6 cases no immunostaining was detected.

Conclusions

Our results suggested a valid diagnostic utility of SRSF1 immunohistochemical expression in distinguishing adult diffuse astrocytomas from ependymomas and PAs (especially in tumors occurred in adults and in non-cerebellar localization). A further potential application field of SRSF1 immunoexpression was the distinction between oligodendrogliomas with astrocytic-like morphology and WHO grade II and III adult astrocytomas with oligodendroglioma-like cellular component.

Cleft candidate genes and their products in human unilateral cleft lip tissue

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Objectives

Cleft lip and palate are one of the most common congenital pathologies. Cleft lip pathogenesis is associated with multiple genes which play an important role in regulating the development of the craniofacial region. The exact mechanisms are not always clearly known.

Objective of the study was to detect and compare the presence of genes DLX4, MSX2, HOXB3, SHH, PAX7, SOX3, WNT3A, FOXE1 in the patient and control groups.

Keywords: cleft lip, genes

Materials and Methods

The study group included 10 patients with unilateral cleft lip (soft cleft tissues were taken during cleft surgery) and 5 controls without cleft lip or palate with samples taken from frenula labii superioris. Expression of gene DLX4, MSX2, HOXB3, SHH, PAX7, PAX9, SOX3, WNT3A, FOXE1 products was evaluated with immunohistochemistry. Statistical analysis was evaluated semi-quantitatively with the use of Mann-Whitney U test.

Results

DLX4, HOXB3, SHH, PAX7, PAX9, SOX3, WNT3A, FOXE1 were detected in the epithelium and soft tissues in all samples. MSX2 was not found in epithelium, barely detectable in connective tissue both in patient and control group. For SHH statistically significant difference was found between the patient group and the controls in number of immunopositive structures in the connective tissue ($p=0.019$). Statistically significant difference in number of immunopositive structures in patient and control group was found for SOX3 in epithelium ($p=0.012$). For FOXE1 statistically significant difference was found between the patient group and the controls in number of immunopositive structures in the connective tissue ($p=0.011$). No other statistically significant differences were found between the patient and control groups.

Conclusions

Prevalence of SOX3 in the epithelium of patient tissue compared to controls suggests a possible interaction with the formation of defective cleft epithelium. Increased amount of SHH and FOXE1 in the patient connective tissue could indicate intensification of the remodeling processes in the cleft affected tissue.

Common and different tissue factors in right atrial tissue from patients with and without atrial fibrillation

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Objectives

Atrial fibrillation is the most common cardiac arrhythmia, and is associated with increased morbidity and mortality. However, the options for preventative therapies have been disappointing. In this study, we sought to evaluate the difference of distribution of tissue and inflammatory markers in right atrial tissue from patients with and without atrial fibrillation.

Materials and Methods

During elective cardiac surgery, right atrial tissue fragments were taken from seven patients with paroxysmal, persistent or permanent atrial fibrillation and 30 patients without atrial fibrillation. Tissue for routine light-microscopical examination were stained with haematoxylin and eosin and processed for apoptosis, protein-gene peptide 9.5 (PGP 9.5), atrial natriuretic peptide (ANUP), vascular endothelial growth factor (VEGF), chromogranin A (ChgA), endothelin (ET-1), interleukin 1 α and 10 (Il-1 α and Il-10) and β defensins 2, and 3 (β D2 and β D3) by means of biotin-streptavidin immunohistochemistry. For the quantification of structures, the semi-quantitative counting method was used.

Results

The distribution of β D2-positive endotheliocytes was significantly higher in patients with atrial fibrillation compared to patients without atrial fibrillation (p 0.041). Although the difference was not statistically significant, we observed more apoptotic cardiomyocytes in the right atrial tissue in patients with atrial fibrillation than in patients without atrial fibrillation. There were no statistically significant differences of distribution of PGP 9.5, ANUP, VEGF, ChgA, ET-1, Il-1 α , Il-10 and β D3-positive cells in patients with and without atrial fibrillation.

Conclusions

Right atrial tissues from patients with atrial fibrillation are characterized by increased cardiomyocyte apoptosis and release of the antimicrobial peptide β D2.

Correlation between autophagic protein immunoeexpression and prognosis in uveal melanoma

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Objectives

The immunoeexpression of three autophagy-related proteins (p62, Beclin-1 and ATG-7) was investigated in patients affected by uveal melanoma (UM) both with and without metastases, in order to assess the potential prognostic impact of autophagy in this rare malignancy.

Materials and Methods

We retrospectively analysed clinical data and histological samples of 85 patients affected by UM (n= 46 free from metastases; n= 39 with metastatic disease) with the corresponding follow-up data. p62 and Beclin-1 were immunoeexpressed both in the cytoplasm and in the nucleus of neoplastic cells, while ATG-7 only showed cytoplasmic staining. Staining intensity (IS) and percentage of immunoreactive cells (Extent score; ES) were assessed as follows: IS was graded on a scale of 0–3 and ES on a scale of 0-4. IS was multiplied by the ES to obtain the intensity reactivity score (IRS; < 6 = low expression, > 6 = high expression).

Results

Among the 85 cases studied, Beclin-1 expression was high in 55 and low in 20 UMs. Among 46 non metastatic UMs, only 10/46 cases (21.7%) showed L-IRS, while the other 36 UMs showed H-IRS (78.3%). In 39 primary metastatic UMs, 19/39 cases (48.7%) had H-IRS, while L-IRS was found in 20/39 UMs (51.3%). Kaplan-Meier survival analyses showed statistically significant higher survival times free from metastasis in patients with high expression of Beclin-1.

Conclusions

Our results indicated a prognostic role of Beclin-1 in UM, with a lower risk of metastasis and higher disease-free survival times observed in UM cases with higher immunohistochemical expression of the protein. By converse, our population of UM with low expression of Beclin-1 was characterized by a higher metastatic risk. In our study, no statistically significant difference in the immunohistochemical expression of ATG7 and p62 proteins between metastasizing and non-metastasizing primary UM was detected.

Environmental factors and B-cell non-Hodgkin lymphomas: role of the transcription factor Yin Yang 1

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Objectives

B-cell non-Hodgkin lymphomas (B-NHLs) represent a heterogeneous group of lymphoproliferative disorders. Although effective therapies have been developed, there is still a need to lower the occurrence of anti-cancer therapy resistance and tumour relapse. B-NHLs aetiology remains largely uncovered, due to the B-NHL heterogeneity combined with the challenges posed by the identification of the specific exposures (including infections, environmental toxins, lifestyle factor, anti-cancer therapy). On this ground, the objective of this study was to explore the potential involvement of the pleiotropic transcription factor Yin Yang 1 (YY1) in the diagnosis, prognosis, as well as in the development of B-NHLs.

Materials and Methods

Through bioinformatics analyses of gene expression datasets from B-NHL patients, it was assessed YY1 association with different apoptosis regulator genes. By using an aggressive B-NHL cell line (Raji cells), further *in vitro* validation has been performed. Finally, the potential interaction between YY1 and the main risk factors linked with aggressive B-NHLs development was systematically analyzed.

Results

This study revealed a positive correlation of YY1 with the anti-apoptotic factor BIRC5. Importantly, both factors showed to be highly expressed in the aggressive forms of B-NHLs, such as Burkitt's lymphomas (BLs) and their overexpression was associated with a poorer diagnosis. Experiments conducted in Raji cells evidenced that YY1 silencing was associated with BIRC5 downregulation and sensitized the cells to drug-induced apoptosis. The majority of BLs are associated with infection of B-cell lymphocytes with the Epstein-Barr virus (EBV). Recent observations demonstrated that YY1 may efficiently bind EBV epigenome and modulate some of the EBV genes.

Conclusions

Overall, our findings suggested that both YY1 and BIRC5 may be further explored as negative diagnostic biomarkers and therapeutic targets. Future studies will better elucidate the role of YY1 in association with specific environmental exposures involved in aggressive B-NHLs etiology, including EBV infection.

Evaluation of anthropometric parameters in postmenopausal period for healthy women and women with breast cancer

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Objectives

The breast cancer is one of topical cause of death in Latvia and in the EU member states as well the US, China and Japan. In recent decades the obesity growth and physical in-activity of population connected to increasing incidence of the breast cancer cases in more than 30 %. The aim of the study is found differences and changes in anthropometric parameters and indices in control group and in clinical group with breast cancer (1st and 2nd stage) diagnosis without treatment intervention.

Materials and Methods

The study group included apparently healthy women in postmenopausal period (n= 181) and women (n=44) with initial diagnosis (the breast cancer 1st and 2nd stage). Anthropometric parameters (Body mass index (BMI), waist circumference, and waist to hip ratio (WHR) and skin fold thickness) were used for evaluation differences in control and clinical group. The study results have assessed by using statistical analyses, IBM SPSS Statistics for Windows, Version 22.0, the Shapiro-Wilk test, the Mann-Whitney test and a two-tailed p-value (less than 0.05).

Results

The analysis of data showed that in clinical group there were found statistically approved diminishes of the waist-to-hip ratio value. Analysis of average value of index WHR revealed statistical significant differences (p=0.055) in clinical and control groups. We have found statistically significant decreasing of skin fold thickness in clinical group on standardized sites: above *m. biceps brachii*(p=0.012), above *m.triceps brachii*(p=0.011), and subscapular (p=0.091) and suprailiac (p=0.031)skin folds.

Conclusions

The analysis of anthropometric parameters for women in postmenopausal age allow indicated differences of waist-hip index (WHR), the thickness of the skin fold over in control and clinical groups. The body composition changes have been considered in assessment anthropometric status for patient in postmenopausal period with breast cancer (1st and 2nd stage) diagnosis.

Experimental studies of cancer development using the chicken chorioallantoic membrane model

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Objectives

The studies aimed to evaluate cancer developmental peculiarities by grafting tumor tissue samples and cell lines tumor on the chicken embryo chorioallantoic membrane (CAM).

Materials and Methods

Fertilized *Cobb-500* chicken eggs were used for experiments. They were incubated at 37°C and 60% relative air humidity. A window was opened in the egg-shell on the 3rd day of embryo development (EDD3) and covered with a sterile transparent tape (to prevent embryo from dehydration and capacitate the experiment's continuity). Tissue samples from laryngeal squamous cell carcinoma (LSCC), recurrent respiratory papilloma (RRP), glioblastoma, or different cell line tumors were grafted onto CAM on EDD7 to EDD9 and further incubated for 2 to 4 days until harvesting the CAM. Tumor growth, its invasion into CAM, tumor-induced neoangiogenesis was evaluated in control and xenograft-treated with investigational medicines by biomicroscopy *in vivo*; morphometrical and immunohistochemical investigation of CAM and tumor tissue was performed.

Results

Glioblastoma and LSCC implants adhered to the host chicken embryo CAM and induced significant morphological changes, retaining the tumor's original morphology and allowing visualization of the behavior of xenograft's microscopically. Human RRP demonstrated different growth and invasion pattern making superficially spreading sprouts without invasion into CAM, and cells of the implanted tissue retained their vitality until the end of experiment. *In vivo* biomicroscopy of glioblastoma on CAM showed a progressive growth, induced angiogenesis, and a clearly expressed spoked-wheel pattern on day four post-grafting.

Conclusions

The study results indicate that tumor growth pattern, invasion into CAM, tumor-induced neoangiogenesis level depend on tumor type and malignancy degree. Despite some limitations (short time for the experiment limits tumor growth and metastases formation), the CAM model is naturally immunodeficient *in vivo* experimental platform that allows evaluating the tumor malignancy, xenograft sensitivity to the treatment with investigational medicine. The study funded by Research Council of Lithuania, No:P-MIP-20-36.

Gallbladder interleukins in children with calculous cholecystitis

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Objectives

Calculous cholecystitis connects to inflammation and might be a reason for a variety of complications, such as adhesions in the abdominal cavity. Despite it being a common pathology in adults, paediatric population also displays this disease, yet it is still uncertain how inflammation factors are involved in its morphopathogenesis. Our aim was to research the distribution and appearance of different interleukins in calculous cholecystitis affected gallbladder wall in children.

Materials and Methods

A total number of 20 calculous cholecystitis surgery tissue samples were obtained from 18 children, - 12 girls and 6 boys (aged 4 to 17 years, mean age 13.9 ± 3.72). As a control, 7 unaffected gallbladders were used. Tissues were immunohistochemically stained for IL-1 α , IL-4, IL-6, IL-7, IL-8, IL-10, and IL-17 and the slides were inspected by light microscopy. To evaluate statistical differences and correlations between interleukins, Mann-Whitney U and Spearman's tests were used.

Results

Statistically significant difference between patient and control gallbladder epithelium was for IL-1 α and IL-17, but connective tissues – IL-1 α , IL-4, IL-6, IL-7, IL-8, IL-17 positive structures. The highest value of interleukin positive cells in epithelium was for IL-17 (2.235 ± 0.589), but in connective tissues for IL-7 (2.2 ± 0.410), IL-6 (2.150 ± 0.432) and IL-4 (2.105 ± 0.315). A very strong positive correlation was found between IL-1 α in epithelium and IL-1 α in connective tissue ($R=0.855$), as well as between IL-6 and IL-7 ($R=0.865$), both in connective tissues.

Conclusions

The increase of IL-1 α , IL-4, IL-6, IL-7, IL-8 and IL-17 positive structures suggest the role of these interleukins in the morphopathogenesis of calculous cholecystitis. The variable appearance of IL-1 α , IL-4, IL-6, IL-7, IL-8 and IL-17 positive cells in connective tissue proves multi functional interleukin role there, while the epithelial distribution of IL-1 α and IL-17 proves their selective role in the inflammation and immune system activation in the border tissue.

Hemorrhoidal disease III and IV: histopathological assessment in women of different age groups

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Objectives

Hemorrhoids are normal vascular structures found in submucosa of anal canal, while hemorrhoidal disease (HD) is characterised by its symptomatic enlargement and distal dislocation. Besides, nowadays it increasingly occurs in younger individuals. Morphologically HD is mainly described by varicose veins, however, other histopathological changes contributing to its pathogenesis remain obscure.

Materials and Methods

The HD III and IV tissue samples were obtained from 39 patients during closed and open excisional hemorrhoidectomy (Longo, Milligan-Morgan, Ferguson) subdivided into two groups stated by age – women ≤45 years of age (group A) and >45 years of age (group B), respectively. The tissues were processed conventionally, sectioned, and stained with hematoxylin and eosin. Histopathological changes evaluated using light microscope ×100 – 400 magnification. Statistical data analysis performed using SPSS 22.0.

Results

Overall 39 patients were identified, 51% in group A and 49% in group B with the median age of 35.45 (IQR=33–38) and 65.26 (IQR=51–70), respectively. In both groups, varicose veins were found in 50% (group A) and 52.7% (group B), respectively. Thrombosed veins were observed almost half more (30%) in group A when compared to group B (15.8%). Sclerosis of varicose veins was identified more often in group A (60%) than in group B (42.1%). Mucosa of the anal cushions was found hyperplastic in 4 (20%) subjects of the younger age exclusively, whereas edematous submucosa – in 2 (10%) and 1 (1.3%) of women in group A and B, respectively. Finally, chronic inflammation was observed in 25 and 1.3% of samples in group A and B, respectively.

Conclusions

Histopathological assessment confirmed the presence of structural differences in the anal cushions of women aged younger and older than forty-five. Younger patients presented with thrombosis and sclerosis of veins significantly more often than older women. Hyperplastic mucosa of the anal cushion was demonstrated in the younger women's group exclusively.

Immunohistochemical and prognostic characteristics of multifocal glioblastomas

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Objectives

Multifocal glioblastoma (GBM) represents tumours with multiple distantly separated foci. About 7% from all GBMs are multifocal (Dono et al., 2020). The prognosis and immunohistochemical features of patients with multifocal GBM is not well documented. Thus, the objective of this study was to assess prognostic and immunohistochemical characteristics of multifocal GBM.

Materials and Methods

The study group comprised 146 GBM cases, including 16 multifocal tumours. All tumours were immunostained to detect p53, CD44, PDGFRA, IDH1 R132H, p21, p27, Ki-67, p53 proteins. Descriptive statistical assessment was performed including calculation of 95% confidence interval (CI). For association analysis Mann-Whitney U test was used. Survival was evaluated by Kaplan-Meier method.

Results

Multifocal involvement were recognized in 11.0% [95%CI: 5.9–16.1] of GBMs. All multifocal tumours were primary GBMs (IDH1 R132H positive). Multifocality showed statistically significant associations with p27 ($p = 0.037$) and PDGFRA ($p=0.049$) expression. Thus, multifocal GBMs are characterized by lower expression of p27 and higher PDGFRA values. There were no any associations regarding other analysed markers. Patients diagnosed with multifocal GBMs had significantly worse survival than those with solitary tumours (log-rank, $p = 0.002$). Median overall survival (OS) in patients with multifocal GBMs was 3.4 [95%CI: 0–6.9] months compared with a median OS of 8.7 [95%CI: 6.8–10.6] months in patients with solitary tumours.

Conclusions

Patients with newly diagnosed multifocal GBM experience significantly worse survival than patients with solitary GBM. Lower p27 and higher PDGFRA expression values were found more frequently in multifocal GBM supporting importance of these proteins in tumour progression and more aggressive behaviour.

Immunohistochemical expression of caspase-3 in malignant pleural mesothelioma due to asbestiform fiber exposure

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Objectives

Fluoro-edenite (FE) is an asbestiform fiber found in Biancavilla (Italy) and represents a risk factor for malignant pleural mesothelioma (MPM). Apoptosis is involved MPM pathogenesis and caspase-3 represents a key executioners. The study evaluates the caspase-3 expression in FE induced MPM.

Materials and Methods

Tissue from 8 patients with MPM, were included in paraffin and processed for caspase-3 immunohistochemical analysis.

Results

At immunohistochemistry, seven cases (4 epithelioid and 3 biphasic) showed diffuse immunoexpression of caspase-3 in neoplastic cells with nuclear and cytoplasmic localization. One biphasic subtype did not show caspase-3 immunostaining.

Conclusions

Our results are reliable with the hypothesis that activation of caspase-3 is a critical mechanism which leads tissue to irreparable FE induced injury. Further biomolecular studies should be conducted and the results should be integrated with clinical and prognostic data to evaluate caspase-3, as a possible prognostic tool for MPM patients.

Indices of cell proliferation and PTEN expression in benign, premalignant, and malignant endometrial lesions

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Objectives

The objective of this study was the evaluation of cell proliferation and PTEN expression in simple endometrial hyperplasia (SH), hyperplasia with atypia (HA), and carcinoma (CA) tissue samples by the use of immunohistochemistry.

Materials and Methods

Surgically obtained endometrial samples were grouped according to the histopathologically confirmed diagnosis: SH (n=3), HA (n=8), and CA (n=8). Immunohistochemical reactions were performed using anti-Ki-67 and anti-PTEN antibodies. Ki-67-positive glandular cells were counted in all fields of view (FOV) for each region of interest using x400 magnification. PTEN expression was scored as a weak, medium, or strong if <10, 10-50, and >50% of cells respectively were positive. Stromal expression of proliferation marker (PM) and PTEN was estimated as prominent if >50% of cells in FOV were positive.

Results

The mean percentage of Ki-67-positive glandular cells was higher in CA – 35.7% (SD=5.7) with a range from 33.9 up to 37.4% vs. 26.7% (SD=13.5) in HA and 11.05% (SD=16.2) – in SH. Differences between all three groups were statistically significant (p=0.000). Prominent expression of PM in stromal cells was less frequent in the case of CA (51.4%) when compared to HA (64.7%) and SH (65.8%). Expression of Ki-67 in glandular cells was inversely proportional to stromal tissue component (p=0.000).

Weak PTEN expression was more prevalent in CA (25.6%) vs. HA (16.7%) and SH (4.6%). By contrast, strong PTEN expression demonstrated higher rates in SH (52.6%) when compared to HA (37.4%) and CA (29.4%). Stromal expression was significantly more prominent in the SH group (83.6%) vs. HA (61.5%) and CA (44.7%).

Conclusions

The study results suggest expression of the Ki-67 marker increases with cell atypia, with the opposite tendency in the tissue stromal component. The decline of PTEN expression along the axis SH-CA reaffirms the crucial role of PTEN gene inactivation in malignant endometrial transformation.

Inflammation – the microenvironment for tumor progression and stem cell differentiation in colorectal carcinoma

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Objectives

Colorectal carcinogenesis shows intricate links with epithelial-mesenchymal transition (EMT) and inflammation. Down-regulation of E-cadherin (EC) is associated with cancer progression [Christou *et al.*,2017] while over-expression of N-cadherin (NC) has been linked to decreased survival [Xuebing *et al.*,2015] in colorectal carcinoma (CRC).

Materials and Methods

The study included 553 consecutive retrospective CRC cases, subjected to microscopic evaluation including assessment of inflammation. To study the hypothetical relation between EMT, tumor stemness and inflammation, immunohistochemistry for EC, NC and CD44 was performed. Statistical analysis was done.

Results

Adenocarcinoma was found in 88.8% [95% confidence interval: 85.9–91.2], mucinous CRC in 9.6% [7.4–12.3] and primary colorectal signet ring cell carcinoma in 1.2% [0.6–2.6] of cases. By pT, locally advanced tumors predominated: pT3 carcinoma represented 49.6% [45.4–53.7] and pT4 – 35.6% [31.7–39.7]. By grade (G), G2 cancers constituted 64.0% [59.9–67.9], and G3 carcinoma – 25.7% [22.2–29.5] of CRCs.

Low-grade inflammation according to the Klintrup-Mäkinen score was observed in 292 (52.8% [48.6–56.9]) tumours and high-grade inflammation – in 261 (47.2% [43.1–51.4]) carcinomas. There were statistically significant differences regarding pT distribution ($p=0.002$) and status of regional lymph nodes pN ($p<0.001$) in relation to low- and high-grade inflammation. The overall EC score was 1.86[1.78–1.94]; CD44 1.33[1.20–1.46]; N-cadherin 1.76[1.57–1.95]. There was statistically significant differences in EC and CD44 score regarding tumor histogenesis ($p<0.01$). NC levels differed only regarding pT ($p<0.05$). In contrast, CD44 levels did not vary by pT, grade or manifestations of invasive growth. The expression of EC showed statistically significant differences by grade ($p<0.01$). As regards inflammation and EMT, the only significant finding was the association between high density of eosinophils and upregulation of EC ($p<0.01$).

Conclusions

Peritumorous inflammation is associated with local and metastatic tumour spread. EMT has a role on a tumor progression, but there is no evidence to its relation with an inflammation.

Influence of different sodium valproate concentrations on A549 and SK-Lu-1 cell lines tumors on the chicken embryo chorioallantoic membrane

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Objectives

The aim of the study was to investigate the effectiveness of *sodium valproate* (NaVP) on human lung cancer A549 and Sk-Lu_1 cell lines xenograft induced changes of the *chicken embryo chorioallantoic membrane* (CAM), angiogenesis and invasion.

Materials and Methods

Fertilized Cobb-500 chicken eggs and 2 lung cancer cell lines A549 and Sk-Lu-1 were used for the study. On day 7th of embryo development (EDD), experimental tumors made of 1×10^6 of cells mixed with rat tail collagen were transferred on the CAM. At 12 EDD CAM's were collected and processed for the histological investigation. The following groups were investigated: non-treated (control), 4mM, 6mM and 8 mM NaVP treated. Total number of experiments was 94, (10–15 in each group). On stained with H&E slides measurements of the CAM thickness, area, number and summarized area of blood vessels cross sections under onplant were made. In all groups invasion to the CAM mesenchyme was evaluated. For statistical analysis Mann – Whitney test was used.

Results

CAM thickness and area under onlant made of A549 and Sk-Lu-1 lung cancer cell lines was the highest in control groups. In control groups it was highest number of blood vessels and summarized area of blood vessels. 4 mM and 6 mM NaVP doses applied to Sk-Lu-1 cells tumors significantly diminished thickness, area of the CAM under onplant and invasion to the mesenchyme. Angiogenesis parameters were significantly decreased at 6mM concentrations of NaVP in both cells lines tumors. Invasion of A549 cells tumors was effectively suppressed at 6 mM concentration of NaVP.

Conclusions

Sk-Lu-1 cell line tumors respond to 4mM and 6 mM NaVP concentrations with decreased CAM thickness, area, diminished angiogenesis and invasion to the mesenchyme. A549 cells tumors are less sensitive to NaVP and significant changes of tumor dynamics appear at 6 mM NaVP concentrations.

Interactions of growth factors and degenerating enzymes in intraabdominal adhesions in infants

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Objectives

The morphopathogenesis of intraabdominal adhesions is a complex process, characterized by the accumulation of extracellular matrix. The aim of this study was to explore the appearance of transforming growth factor β (TGF β), vascular endothelial growth factor (VEGF), matrix metalloproteinase-2 (MMP-2) and tissue inhibitor of metalloproteinase-2 (TIMP-2), as well as describe their interactions in intra-abdominal adhesions.

Materials and Methods

The study material was obtained from infants who underwent abdominal surgery due to complete or partial bowel obstruction. 50 specimens were rated appropriate for immunohistochemistry and factors were assessed according to the semiquantitative counting method. To evaluate the cross-compliance of two variables Spearman's rank correlation coefficient (r_s) was calculated.

Results

In our study overall moderate (++) number of structures contained TGF β . A few to moderate (+/++) number of MMP-2 positive endotheliocytes, fibroblasts and inflammatory cells were detected. The TIMP-2 findings were variable – from few (+) to moderate to numerous (+/++) positive structures.

We observed a similarly tight positive correlation between MMP-2 and VEGF ($r_s = 0.511$, $p < 0.001$), as well as between TIMP-2 and VEGF ($r_s = 0.593$, $p < 0.001$). Statistically significant moderately tight, positive correlations were observed between MMP-2 and TIMP-2 ($r_s = 0.489$, $p < 0.001$). A statistically significant moderately tight, negative correlation was observed between VEGF and TGF β findings ($r_s = -0.401$, $p = 0.005$). We observed a negative correlation between TGF β and MMP-2 findings ($r_s = -0.333$; $p = 0.021$).

Conclusions

The balance of MMP-2/TIMP-2 is a significant factor for the regulation of VEGF and has an angiogenesis promoting impact.

The suppression of VEGF under the impact of TGF β might be a compensatory mechanism in the development of intraabdominal adhesions.

TGF β inhibits the activity of MMP-2, therefore it stimulates the accumulation of extracellular matrix components and also delays its degradation.

Investigation of mass grave in Lithuania: what kind of war prisoners were those victims?

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Objectives

In 2018, a mass grave was discovered, that was excavated in 2020. The mass grave was dated back to World War II. Historical contexts and artifacts found during archaeological analysis indicate those were Soviet military servicemen that died in Nazi camp. The aim of the study was to perform detailed anthropological analysis before subsequent reburial and collect any data that might be used for identification.

Materials and Methods

In total, remains of 718 males, ages from young adult to mature, in 95 pits were uncovered and were the object of detailed anthropological analysis. Age, sex and stature were determined using conventional morphological criteria.

Results

Study of dental status revealed numerous cases of dental pathologies and dental repair that might be used for identification. Other pathologies included cases of healed traumas, pathologies of joints and vertebral column, few cases suggestive of malnutrition and unspecific infections. At least two cases of bone tuberculosis at early stage (lesions of vertebral bodies) as well as a case of initial osteosarcoma were noted. Numerous cases of perimortal traumas – gunshot traumas of skulls and fractures of scapulae (often in early stages of healing) suggestive of blast lesions are the peculiarity of this mass grave and deserve a special discussion.

Conclusions

Anthropological analysis provided valuable data for identification of individuals as well important details elucidating the fate of individuals inhumed in those mass grave pits.

MacroH2A1 immunoeexpression in breast cancer

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Objectives

Breast cancer actually represents a global health challenge and is still one of the most relevant topics in biomedical research. Worldwide, it is the most frequent form of malignancy in females and incidence and mortality rates are predicted to significantly increase in years to come. MacroH2A1 has two splice isoforms, macroH2A1.1 and macroH2A1.2, that have been studied in several form of cancer. In the literature there are not many scientific papers dealing with the role of macroH2A1 in breast cancer. Breast cancer is the most frequent form of malignancy in females. It tend to metastasize to the bone in ~70% of patients. Despite treatment, new bone metastases will still occur in 30-50% of cases with advanced disease. Overall 5-year survival after the diagnosis of bone metastasis is ~20%. Osteoclasts and osteoblasts of the bone microenvironment are engaged by soluble factors released by neoplastic cells, resulting in bone matrix breakdown. This malfunction enhances the proliferation of the cancer cells, creating a vicious cycle. We investigated immunohistochemical expression of macroH2A1 in primitive breast cancer, focusing on the comparison of metastatic and non-metastatic cases. Furthermore, the immunohistochemical expression of macroH2A1 has been evaluated both in all cases of nodal metastases and in distant metastases.

Materials and Methods

Histologic specimens of 54 cases of primitive breast cancer treated with quadrantectomy and sentinel lymph node biopsy followed by axillary lymphadenectomy if sentinel node was positive, were retrospectively analyzed.

Results

Our data demonstrated that macroH2A1 expression was higher expressed in metastatic breast cancer (77%) vs. non-metastatic breast cancer (32%). Also in analyzed metastases cases, a high macroH2A1 expression was detected: 85 and 80% in nodal and distant metastases cases, respectively.

Conclusions

These results supported the fact that macroH2A1 is more highly expressed in breast cancer with worst prognosis.

Morphofunctional characteristics of ancient Latvian bone remains

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Objectives

The analysis of bone microstructure provides useful information about many aspects of bone biology. Histological examination of bone material gives valuable information about life and diseases in studies of archeological human and animal bone remains. The study aimed to analyze the microstructure of Latvian historic bone specimens, collected from Riga city regions.

Materials and Methods

Nine humerus and four ulna were selected from skeletal collection dated from Middle Ages till the Late Modern Period, that was obtained by archaeological excavation from the St. George's Church in Riga. To evaluate age-related changes in bone samples two approaches were used: i) micro-CT - for measurements and calculations of such parameters as bone volume/trabecular volume (BV/TV), cortical bone and trabecular thickness, and trabecular pore diameter; ii) immunohistochemistry (IHC) was performed to detect Runx2, OPG, OC, MMP2, TIMP2, BFGF, IL-1, IL-10, OPN, defensin-2, BMP 2/4, TGFβ factor presence in bone cells – osteocytes. For statistical tests, SPSS was used.

Results

Comparative analysis between groups revealed significantly higher BV/TV values ($p=0,012$) in the control group, whereas values of the diameter of pores were higher ($p=0,014$) in the patient bones. Within the control group, the measurements of cortical bone thickness had statistically significant difference to other parameters ($p<0,05$), the same observation was obtained within the patient group.

Runx2, OPG, OC, MMP2, TIMP2, BFGF, IL-1, IL-10, OPN, defensin-2, BMP 2/4, TGFβ positive cells were found in all samples. Comparison of groups revealed a higher value of TIMP2 ($p=0,047$) in samples of the control group, while the value of IL-1 was higher ($p=0,036$) in the patient group. All factors had a quantitative superiority over the Runx2 within patient bone samples, but no significant difference was found in the control group.

Conclusions

A lower BV/TV, higher pore diameter, along with an increased number of IL-1 positive cells may indicate some ancient bone disease.

Morphological characteristics of COPD-affected lung tissue in the ontogenesis perspective

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Objectives

Chronic obstructive pulmonary disease (COPD) is characterized by progressive narrowing of airways, development of chronic inflammation, and clinically observable shortness of breath. The morphopathogenesis of COPD is known to be determined by cell and tissue damage under the oxidative stress conditions, the formation of chronic inflammation, as well as changes in local tissue immunity, including antimicrobial protection. However, the perspective of the ontogenesis of these events has been poorly studied. The study aimed to determine and evaluate the morphological characteristics of COPD-affected lung tissue in the ontogenesis perspective.

Materials and Methods

In this study, 40 COPD patients were evaluated. The lung tissue material was obtained during fibrobronchoscopy. Immunoreactive cells in bronchial tissue were detected by biotin-streptavidin immunohistochemistry method for the following markers of IL-1 α , IL-4, IL-6, IL-7, IL-8, IL-10, IL-12, TNF- α , MMP-2, TIMP-2, TGF- β 1, Hsp-70, hBD-2, hBD-3, and hBD-4. Stained structures were graded semiquantitatively. For statistical analysis of the data, nonparametric statistical methods were used.

Results

The COPD course of elderly COPD patients was mostly worse compared to younger COPD individuals. COPD patients with chronic bronchitis, epithelial metaplasia and granulation tissue findings were statistically significantly older. In all COPD patients, we found increased numbers of IL-6 but decreased numbers of IL-8 and IL-7-immunoreactive cells with ageing. In elderly COPD patients aged ≥ 75 years, the numbers of IL-1 α , IL-4, MMP-2, IL-6, IL-10 immunoreactive cells increased, but the numbers of IL-8, IL-7, and TGF- β 1 immunoreactive cells decreased with ageing. Overall, the findings of all studied factors were associated with the ageing process in COPD.

Conclusions

In COPD, ageing is associated with worsening of the course of the disease, as well as the persistence of inflammatory cytokines and altered remodeling with otherwise typical COPD morphopathogenesis events.

Morphopathogenic aspects of tissue factors in bone of primary osteoplasty and rhinoplasty in cleft lip palate patients

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Objectives

Cleft lip palate (CLP) is a disruption of facial structure. CLP can cause considerable morbidity to affected children. The last research indicates the identification of tissue remodeling factors, cytokines, and local immunity factors in the pathogenesis of CLP. In this study, we determined a relative number and appearance of the tissue factors in the bone of patients with CLP during the first time plastic alveolar osteoplasty or rhinoplasty.

Materials and Methods

We performed immunohistochemistry with matrix metalloproteinase-8 (MMP-8), matrix metalloproteinase-9 (MMP-9), osteopontin (OPN), osteocalcin (OC), beta-defensin-2 (β def-2), beta-defensin-3 (β def-3), interleukin-1 alpha (IL-1 α), and interleukin-10 (IL-10). For the quantification of structures, the semi-quantitative census method was used. Spearman rank-order correlation coefficient and Mann-Whitney *U* test were used for statistical analysis.

Results

We observed a significantly higher number of OPN positive osteocytes in the CLP group when compared to the control group ($p=0.002$). The number of OC positive osteocytes ($p=0.000$) and β def-2 positive osteocytes ($p=0.003$) was significantly lower in the CLP group in comparison to the control group. We detected strong, positive correlations between IL-10 and OC ($rs=0.608$; $p=0.002$), IL-1 α and MMP-9 ($rs=0.666$; $p=0.000$), OPN and MMP-8 ($rs=0.620$; $p=0.002$) in the CLP group.

Conclusions

Increased appearance of OPN positive osteocytes in the bone of the CLP patients shows increased bone homeostasis on the basis of seriously decreased mineralization, which could indicate a compensatory reaction to decreased quality of postsurgical bone.

A tendency for the increased appearance of MMP-8, MMP-9 positive osteocytes of the CLP patients, suggests the elevated bone tissue remodeling properties.

The low appearance of IL-10, β def-2 and β def-3, and positive osteocytes in the bone of the CLP patients indicate the tendency for reduced anti-inflammatory mechanisms.

Research on the morphological endotypes of chronic rhinosinusitis with polyps in the case of primary and recurrent polyposis

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Objectives

Establish possible endotypes in patients diagnosed with CRSwNP in the case of primary and recurrent nasal polyps by determining tissue cytokines, proliferation markers and antimicrobial proteins.

Materials and Methods

Material obtained from 8 patients was divided into 4 cases with recurrent polyps and 4 primary ones. Samples of polyps were taken during nasal surgery. Controls were 17 tissue samples of healthy nasal mucosa. Immunohistochemical analysis was performed to detect Ki-67, β -Defensin 2, IL-1, IL-4, IL-6, IL-7, IL-8, IL-10, IL-12. Results were determined semi-quantitatively and evaluated with the use of Mann-Whitney U test and Spearman's rank correlation.

Results

Number of positive structures in Ki-67 ($p=0.006$), β -Defensin 2 ($p=0.002$), IL-1, IL-4, IL-6, IL-8, IL-10, IL-12 ($p<0.001$) was significantly increased in connective tissue of nasal polyps. Immunoreactive cells of β -Defensin 2, IL-4, IL-6, IL-7, IL-8, IL-10, IL-12 ($p<0.001$) were significantly decreased in superficial epithelium of nasal polyps. There were no significant differences in cytokine and antimicrobial peptide expression between primary and recurrent patient groups. There was a strong positive correlation between number of β -Defensin 2 and connective tissue IL-8; connective tissue IL-1 and both connective tissue and epithelial IL-4; connective tissue IL-4 and epithelial IL-4; epithelial IL-6 and IL-8 in primary polyps. Recurrent polyps demonstrated a strong negative correlation between IL-1 and both epithelial IL-1 and IL-10; IL-6 and IL-10 as well as a strong positive correlation between epithelial IL-1 and IL-10; epithelial IL-7 and IL8.

Conclusions

Increase in cytokine and antimicrobial peptide appearance in the connective tissue and a decrease in the epithelium of a nasal polyp indicates a significant intensification of the connective tissue immune response and stimulation of immune cell differentiation. Difference in correlating factors as well as emerging negative correlations could indicate a dysregulation of cytokine secretion in recurrent CRSwNP as the disease progresses.

The concentrations of different cytokines in the cleft lip palate affected tissue

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Objectives

The clarification of the role in cytokines in pathogenesis of craniofacial defects could help better to understand the anomalies. Just limited number of studies have tried to quantify the levels of various cytokines in cleft patients. This leaves a huge gap in analysing the levels of cytokines in cleft tissue and their potential role in tissue remodeling. The present study aims to contribute towards the understanding of concentrations of cytokines in the cleft affected lip (CAL).

Materials and Methods

This study was approved by the Ethical Committee of the Riga Stradins University (5/25.06.2018, Project Nr.5-1/384/2020). The lip material from the defect place was obtained from 12 children (8 boys, 4 girls) aged before primary dentition (3 months to 1,6 years old) during plastic surgery. The half of mothers showed problems in their pregnancy time and the half of children also demonstrated problematic anamnesis morbi. The ELISA kit (Multi-Analyte ELISArray Kits, QIAGEN) was performed, following the company instructions and recommendations to detect cytokine concentrations. Coefficient of Variance (CV%) was calculated to analyse the inter-sample variations.

Results

The highest concentrations were recorded for TGFβ-1 followed by TNF-α. The lowest concentrations were recorded for IL-17A followed by IL-2. A large variation was observed in the concentrations of IL-2, IL-17A, IFN-γ, TNF-α and G-CSF (all having CV > 50%). IL-4, IL-12, and IL-13 showed less variance amongst the samples (all having CV < 30%). There were also individual changes in levels of cytokines observed in CAL.

Conclusions

TGF-β and TNF-α are the most common cytokines in the CAL tissue, proved by the facts, that all patients showed high levels of these factors with almost equal distribution of TGF-β, but wider range for the TNF-α. The cytokine concentrations are very individual, especially for IL-6 and IL-17a proved by their elevated variations in levels from 2.4 to even 24 times.

The effectiveness of dichloroacetate on adult human glioblastoma xenograft growth

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Objectives

The study aimed to investigate the effectiveness of sodium dichloroacetate (NaDCA) and magnesium dichloroacetate (MgDCA) on adult U87 MG cell line glioblastoma (GB) xenograft in a chicken embryo chorioallantoic membrane (CAM) model.

Materials and Methods

The GB xenografts U87 MG cell line (Caucasian adult female) cell tumors were formed with 106 U87 cells and type I Rat Tail Collagen, and grafted onto CAM of a fertilized *Cobb-500* chicken egg. The study groups: 10 mM (n = 24), 5 mM of NaDCA (n = 25), 5 mM (n = 14), 2.5 mM of MgDCA (n = 11), and control (n = 20). Biomicroscopy *in vivo*, stereomicroscopy with fluorescent dextran, histomorphometric and immunohistochemical assays for measurement of the proliferating cell nuclear antigen (PCNA) and enhancer of zeste homolog 2 (EZH2) expression in tumor cells were made to evaluate tumor progression and neoangiogenesis. Research was supported by Lithuanian Council of Research, Grant Nr. S-MIP-20-41.

Results

Non-treated GB-xenograft (control) is highly invasive (80.00 %), increases the number of blood vessels in CAM and the thickness of CAM in area under the tumor ($p < 0.001$), compared with the CAM without a grafted tumor. The treatment with 5 mM NaDCA and 5 mM MgDCA effectively inhibited tumor invasion, CAM thickness, and the number of blood vessels in CAM under the tumor ($p < 0.05$); a fluorescent stereomicroscopy confirmed the suppression of neoangiogenesis in these groups. Compared with the control, PCNA, and EZH2 expression in tumor cells was significantly reduced in all treated groups ($p < 0.05$), except for the 2.5 mM MgDCA-treated ($p > 0.05$).

Conclusions

U87 xenograft growth, frequency of tumor invasion into CAM, CAM thickening, the neoangiogenesis in CAM, PCNA and EZH2 expression in the tumor enables to evaluate the effectiveness of the treatment, which is associated not only with dichloroacetate anion concentration but also depends on the cation in preparation.

The effectiveness of dichloroacetate on pediatric glioblastoma xenograft growth depends on Na⁺ and Mg²⁺ cations

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Objectives

The study aim was to investigate the effectiveness of sodium dichloroacetate (NaDCA) and magnesium dichloroacetate (MgDCA) on pediatric PBT24 cell glioblastoma (GB) xenograft in a chicken chorioallantoic membrane (CAM) model.

Materials and Methods

GB xenografts were studied *in vivo* using the CAM model. The study groups were as following: control (n=13), treated with 10 mM NaDCA (n=12), 5 mM NaDCA (n=13), 5 mM MgDCA (n=11), 2.5 mM MgDCA (n=11). Tumor growth was studied by stereobiomicroscopy. The histological preparation of CAM with tumor was stained with H-E; tumor growth, invasion frequency into CAM, CAM thickening, the number of blood vessels in CAM was assessed. Proliferating cell nuclear antigen (PCNA) and enhancer of zeste homolog 2 (EZH2) expressions in tumor cells were evaluated by immunohistochemistry.

Results

Compared to the control, the tumor invasion into CAM frequency was significantly reduced in 10 mM NaDCA ($p=0.003$) and 5 mM MgDCA-treated ($p=0.004$) groups; the 10 mM NaDCA treatment more effectively reduced tumor invasion frequency than the 5 mM NaDCA ($p=0.04$). The 5 mM MgDCA ($p=0.013$) and 2.5 mM MgDCA ($p=0.041$) treatment significantly reduced CAM thickness under the tumor, compared to the control. The number of CAM blood vessels was significantly reduced only in the 5 mM MgDCA-treated ($p=0.018$) group. Compared to the control, the 2.5 mM MgDCA treatment did not change PCNA and EZH2 expression, but a significant diminishing effect was determined in other study groups ($p<0.05$). PCNA expression was reduced in 10 mM NaDCA ($p<0.0001$). The EZH2 expression was reduced equally in 10 mM NaDCA and 5 mM MgDCA groups ($p=0.002$).

Conclusions

PBT24 xenograft growth, frequency of tumor invasion into CAM, CAM thickening, and neoangiogenesis expression differed depending on the dichloroacetate salt treatment. Tumor progression interferes with PCNA and EZH2 molecular pathways.

Research Council of Lithuania funded the study.

The interactions between various tissue factors in the congenital diaphragmatic hernia affected tissue

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Objectives

The aim of this study was to evaluate growth factors and their receptors, muscle and nerve quality, local defense factor, programmed cell death and separate gene expression in human pathological material with congenital diaphragm hernia (CDH) in order to find immunohistochemical marker differences between the control and the patient group.

Materials and Methods

The diaphragm material was obtained from 5 children age from 1 to 2 days. These samples were stained with immunohistochemistry method for TGF- β , bFGF, FGFR1, IGF-1, IGF-1R, HGF, NGF, NGFR, NF, dystrophin, myosin, alpha actin, β -defensin-2, β -defensin-4, TUNEL, Wnt-1 to detect their expression in diaphragm tissue. A semi-quantitative counting method was used for the evaluation of the tissues and structures in the stained slides. Obtained results were analyzed with IBM SPSS Statistics 23 using Mann-Whitney U test (U) and Spearman's rank correlation, where correlation coefficient (r_s) results were interpreted: 0.80-1.00 very high, 0.60-0.79 high, 0.40-0.59 moderate, 0.20-0.39 low, <0.2 very low correlation. For all test statistical significance was defined as $p < 0.05$.

Results

Statistically significant changes between patient and control groups were found in muscle fibers: bFGF ($U=10$; $p=0.013$), FGFR1 ($U=9$; $p=0.01$), in blood vessels: TGF- β ($U=13.5$; $p=0.032$), FGFR1 ($U=7$; $p=0.005$), IGF-1R ($U=9$; $p=0.01$), β -defensin-2 ($U=14.5$; $p=0.041$), TUNEL ($U=14.5$; $p=0.041$), NGF ($U=10.50$; $p=0.013$), in connective tissue: HGF ($U=0$; $p < 0.001$), but no significant data in mesothelium. Spearman's rank correlation coefficient revealed multiple very strong (r_s 0.8-1.0), strong (r_s 0.6-0.79) and moderate (r_s 0.4-0.59) correlations between immunoreactives in different diaphragm cells and structures.

Conclusions

Various correlations and significant changes between control and patient groups indicates that angiogenesis in diaphragm can be severely affected by CDH pathogenetic processes. CDH could also affect wnt-1 expression whereas the correlations suggest wnt-1 interactions with other growth factors could lead to dysregulation in angiogenetic processes. Notable changes between patient and control groups in bFGF and FGFR expression shows their importance in CDH pathogenesis. Immunoreactive expression showed equal distribution suggesting CDH affects all diaphragm sites equally. Correlations between IGF-1R, HGF, TGF- β and β -defensin-2/apoptosis indicate the leading role of tissue growth, anti-microbial defence and programmed cell death in the morphopathogenesis of CDH. Decreased NGF, NGFR and NF expression indicates the possible decrease of neuronal structure quality in the pathogenesis of this anomaly. CDH has little to no effect on mesothelium as well as myosin formation.

Tissue indicators of inflammation in the cleft affected tissue

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Objectives

Orofacial clefts are one of the most common congenital anomalies worldwide, with the incidence of approximately 1 in 500-550 births. Moreover, morphogenesis and pathogenesis of the cleft lip are not completely understood yet. Whilst the ratio of macrophages (M)1 and M2 has been examined in other pathologies; there has been limited research done regarding the significance of the M1/M2 ratio in cleft affected tissue. Furthermore, due to TNF- α functions and its and macrophages effect on each other, it is also a factor of interest concerning orofacial clefts. Therefore, the aim of this work was to examine the appearance and distribution of M1, M2 and TNF- α , as well as deduce any possible intercorrelations between the three factors in cleft affected lip tissue samples.

Materials and Methods

In the study participated 20 children with clefts. The samples of soft tissue were collected during plastic surgery. Fourteen control tissue samples, which were not associated with an orofacial cleft, were obtained during labial frenectomy. Tissues were stained for M1, M2 and TNF- α immunohistochemically. Nonparametric statistics, Mann-Whitney U and Spearman's tests were used.

Results

A statistically significant difference in the distribution of the particular factor between the patient group and control group was observed only in regards to M1 ($p=0,0002$). Furthermore, whilst a weak correlation was observed between M2 and TNF- α ($R=0,261$), but a moderate correlation between M1 and M2 ($R=0,503$) as well as M1 and TNF- α ($R=0,433$), only the correlation between M1 and M2 was statistically significant ($p=0,024$).

Conclusions

An increase of M1 and their difference between the patients and control along with the increase of TNF- α do suggest a more pro-inflammatory/inflammatory environment in the cleft affected tissue. However, the rise in M2 alongside M1 in one patient's tissue sample could indicate an intensification of protective mechanism, which helps avoid extensive tissue damage.

Transcription and remodelling factors in the development of cholesteatoma from an ontogenetic aspect compared to deep external ear skin controls

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Objectives

There are still uncertainties how transcription and remodelling factor contribute to the pathogenesis of cholesteatoma. The main goal of our work was to describe the appearance and distribution of remodelling markers (MMP-9 and TIMP-4), and transcription factor (NF- κ B) in cholesteatoma compared to control skin tissue.

Materials and Methods

Eight cholesteatoma tissue samples were obtained from eight children, five boys and three girls (age 9–17 years, mean age 14.87 years). Seven cholesteatoma specimens were obtained from seven adults, two male and five female patients (age 23–75 years, mean age 42.71 years). Seven deep external meatal skin controls were obtained from cadavers from a collection in the Institute of Anatomy and Anthropology. Tissues were immunohistochemically stained for NF- κ B, MMP-9, TIMP-4. The slides were analysed by light microscopy using a semi-quantitative method. Non-parametric statistical analysis - Mann-Whitney and Spearman's coefficient - was used to detect statistical differences and correlations.

Results

Statistically significant difference was observed between the number of NF- κ B positive cells in matrix and perimatrix compared to control group skin epithelium and connective tissue. Moreover, there was a statistically significant difference between the number of TIMP-4 positive cells in the perimatrix and the TIMP-4 positive cells in control connective tissue. A very strong positive correlation in the patient group was detected between MMP-9 and TIMP-4. A strong positive correlation was seen between MMP-9 positive cells in matrix and MMP-9 in perimatrix, between TIMP-4 in matrix and TIMP-4 in perimatrix and between TIMP-4 in perimatrix and NF- κ B in the matrix.

Conclusions

Correlation between MMP-9 and TIMP-4 suggests that TIMP-4 intercorrelates to MMP-9 in cholesteatoma tissue. Disbalanced ratio between MMP-9 and TIMP-4 affects NF- κ B and causes uncontrolled cell proliferation and immune response in cholesteatoma. A statistically significant difference between TIMP-4 in perimatrix and skin connective tissue indicates that TIMP-4 most likely regulates the development of cholesteatoma.

**Basic Medical Science
(Biochemistry,
Physiology, Genetics a.o.)**

Best-corrected visual acuity after vitrectomy depending on the full-thickness macular hole size

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Objectives

Optical coherence tomography (OCT) is a standard method for identification of macular holes, which also allows to precisely measure their parameters. When discussing possible visual outcomes with a patient, it is important for a vitreoretinal surgeon to know which parameters exactly should be considered.

Objectives: to measure the minimum diameter of the full-thickness macular hole and analyse it in correlation with best-corrected visual acuity (BCVA) 1 month after the vitrectomy.

Materials and Methods

Prospective study included 19 eyes of 19 patients who underwent pars plana vitrectomy at PSCUH Department of Ophthalmology between September 25, 2019 and October 28, 2020. The preoperative routine examination included measurements of the macular hole size with OCT, which also contained the minimal extent of the hole. All the patients had scheduled follow-up visits 1 month after the surgery, where BCVA was determined.

Results

A total of 14 female and 5 male patients (19 eyes) aged 68.63 ± 5.71 [95% confidence interval (CI) = 65.88–71.38] years were included in the study. The average minimum macular hole diameter was 428.05 ± 211.45 [326.14–529.96] μm . The average best-corrected visual acuity 1 month after the surgery was 0.43 ± 0.13 [0.37–0.49]. Statistically significant negative correlation between the minimum diameter of the macular hole and the postoperative BCVA was found ($r = -0.53$; $p = 0.018$).

Conclusions

The study results demonstrate that the preoperative OCT measurement of the macular hole minimum diameter can be used as one of the predicting factors for the visual outcome after the surgery. Patients with larger macular holes are prone to have worse postoperative BCVA.

Determination of the antioxidant and antiradical activity in berry and fruit juices and wines

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Objectives

Antioxidants can be found in various plants, such as fruits and berries, and also in their derivative products i.e., juices and wine. There already is a number of studies on grape wines, however, the research on berry and fruit wines, which undergo processes that are similar to grape juice production and fermentation, is still lacking. Our interest was to determine the antioxidant and antiradical activity, as well as the concentration of polyphenols in the juices and the respective wines, and find out if remains at the original level after fermentation.

Materials and Methods

Various berry and fruit juices, prepared for wine fermentation, as well as ready wine samples, were studied. To characterize the antioxidant and antiradical properties in juices and wines, the polyphenol content was determined using the Folin-Ciocalteu method, the antiradical capacity was measured using the DPPH method, and the antioxidant activity - using the FRAP method. The data obtained in the study were processed and analyzed using MS Excel program.

Results

Blackcurrant, redcurrant, apple, rhubarb, gooseberry homemade juices, and their respective wines were analyzed. The highest polyphenol concentration, antiradical capacity, and antioxidant activity were determined in the blackcurrant juice and wine, while the lowest numbers were observed in the rhubarb juice and wine. There was no significant reduction in the antiradical activity (DPPH) or antioxidant capacity (FRAP) in the wine fermentation process of the respective juices, besides the fact that the activity decreased proportionally to the dilution of the juices during the wine manufacturing.

Conclusions

Not only various berry and fruit juices, but also wines provide valuable antioxidant and antiradical activity.

Dissecting the interplay between intestinal dysbiosis and B cell function in the pathogenesis of immunoglobulin A nephropathy

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Objectives

Immunoglobulin A nephropathy (IgAN) is the most common form of primary glomerulonephritis that has heterogeneous clinicopathological manifestations and variable prognosis. Approximately 20% of patients diagnosed with IgAN at Pauls Stradins Clinical University Hospital (PSCUH) initiate dialysis within a year following diagnosis. However, the mechanisms of IgAN pathogenesis remain poorly defined, no specific treatment exists. The aim of the research is to characterize the phenotype and function of the B cell compartment, the gut microbiome composition and markers of bacterial translocation in IgAN patients compared to healthy individuals, and the interplay between intestinal dysbiosis and B cell function in the pathogenesis of IgA nephropathy.

Materials and Methods

Prospective study is conducted in PSCUH Nephrology Centre. Adults with a morphologically confirmed (primary) IgAN are included in the study, divided in groups (20 persons in each) according to glomerular filtration rate and method of renal replacement therapy. Fifty age-, sex- and ethnicity-matched healthy individuals will be in a control group. We will investigate peripheral B cell subsets by flow cytometry, assess B cell phenotype by immunofluorescence staining in renal biopsies, and analyze the effect of bacteria/bacterial products /uremic toxins on B cells in vitro; furthermore, perform sequencing of the fecal microbiome, assess bacterial translocation markers and gut-derived uremic toxins.

Results

Project has started the implementation in January 2020. We expect, that this study will be one of the first investigations of the link between B cell responses and dysbiosis in IgAN. Investigation of gut microbiome for the first time in Baltic countries will be carried out for patients with autoimmune kidney disease (IgAN).

Conclusions

The findings may also provide clues to which patients may benefit from B cell-depleting agents as well as identify novel targets for the development of IgAN-specific therapies.

Effect of lifestyle factors and food supplements on fertility parameters of men with severe oligoasthenoteratozoospermia and azoospermia

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Objectives

The aim of the study was to estimate whether allelic variants in sperm motor protein genes, lifestyle factors, and treatment with anti-oestrogens in combination with antioxidants may affect sperm quality and hormone levels in patients with oligoasthenoteratozoospermia (OAT) and azoospermia.

Materials and Methods

50 oligoasthenoteratozoospermia and 23 azoospermia patients were sequenced for pathogenic variants in *DNAH1*, *TEX11* and *CFAP43* genes. Exons with the highest rate of pathogenic variations were selected: exons 11, 23, 76 in *DNAH1*; exon 32 in *CFAP43*; exons 11 and 25 for *TEX11*. Hormone levels and spermograms were evaluated during infertility treatment. Statistical analysis was performed with SPSS. Chi-square test and one-tailed Pearson's correlation was used.

Results

Two allelic variants in OAT group were found - rs11714402 (23%) and rs61734637 (4%), both localized in gene *DNAH1*. In OAT group, testosterone level means increased significantly after the treatment (4.9 ng/mL to 5.2 ng/mL, p=0.017). Non-significant increase in motility class A sperm proportion was observed (1,4% to 2,2%, p=0.061). Significant correlations were found between elevated estradiol levels and excessive alcohol usage (p=0.021) in OAT group; smoking, excessive alcohol usage and increased prolactin levels (p=0.05 and p=0.008) in azoospermia group.

Conclusions

The food supplements and clomiphene citrate may improve sperm quality. The lifestyle habits may have impact on fertility. Further investigation by enlarging sample size and gathering more metadata could elucidate links between genetic and lifestyle factors, and promote the development of new treatment options of male infertility.

Fibrinolytic bleeding

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Objectives

During the last few years, increasing attention has been paid to reports demonstrating the influence of the fibrinolytic system on increased peri- and postoperative bleeding in terms of anti-fibrinolytic prophylaxis and treatment of bleeding. Particularly, attention is focused on trauma coagulopathy and fibrinolytic system activation through to Protein C activation in early haemorrhage shock stages. It is well established that hyper-fibrinolysis occurs in 30–50% of patients undergoing major surgery (cardiac, vascular, liver, orthopaedics, obstetrics) and in 80% of trauma patients. However, inter-individual variations are relatively large due to different inhibitory potential of fibrinolysis determinate by mechanism of injury and genetic predisposition to higher fibrinolytic activity. Moreover, it is often difficult to sort out whether bleeding results only from surgical or trauma injury alone, or from concomitantly occurring coagulopathy with hyper-fibrinolysis detected by viscoelastic tests. Therefore, it is essential to refresh the knowledge of fibrinolysis, both with regard to its pathophysiology, ways of activation, diagnostic tools including viscoelastic testing and individual genetic markers that can lead to a goal-directed treatment.

Conclusions

Fibrinolytic system activation occurs in most of major surgery and bleeding cases. Early prophylaxis, recognition and treatment is essential to reduce haemotransfusion rates and to improve surviving in major bleeding patient.

Gender-related sodium dichloroacetate effect on NKCC1 and SLC5A8 RNA expression in rat thymocytes

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Objectives

Objectives were to investigate the effect of sodium dichloroacetate (DCA) on NKCC1 (Na-K-2Cl co-transporter), SLC5A8 (DCA anion transporter) RNA expression in rat thymocytes of both genders.

Materials and Methods

Wistar rats, aged 4 to 5 weeks, were investigated in the DCA-treated gonad-intact and castrated males and females and in their control groups (n = 6 in the group). The treatment duration was 4 weeks, with DCA 200 mg/kg/day in drinking water. The NKCC1 (the *Slc12a2* gene) and SLC5A8 (the *Slc5a8* gene) RNA expression in rat thymocytes were determined by the real-time PCR method.

Results

Comparing the gonad-intact and castrated control groups of both genders indicated a significant thymus weight increase in castrated non-treated males ($p = 0.02$) and females ($p = 0.001$). The DCA treatment causes a significant thymus weight decrease in DCA-treated gonad-intact males ($p = 0.001$) and DCA-treated gonad-intact females ($p = 0.001$) as compared with their controls. A significantly higher NKCC1 and SLC5A8 RNA expression were found in gonad-intact male control than female control ($p = 0.04$ and $p = 0.007$, respectively). The NKCC1 RNA expression was significantly higher in the gonad-intact female DCA-treated group than in the control ($p = 0.04$). Compared with the control, the NKCC1 RNA expression was found to be significantly decreased in the DCA-treated castrated males ($p = 0.004$). Comparing SLC5A8 expression among gonad-intact and castrated control rats of both genders showed a significantly lower SLC5A8 expression in the gonad-intact male ($p = 0.03$), gonad-intact female ($p = 0.04$) than in respectively castrated groups. The statistically significant SLC5A8 expression was lower in the castrated male DCA-treated than in their control ($p = 0.002$).

Conclusions

There are gender-related differences in NKCC1 and SLC5A8 RNA expression in gonad-intact rat thymocytes. The DCA effect on the NKCC1 and SLC5A8 RNA expression in rat thymocytes is gender and gonad hormone-dependent.

Genetic testing for primary immunodeficiencies: 2 years' experience in Latvia

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Objectives

Primary immunodeficiencies (PID) are a heterogeneous group of inborn errors of immunity. The phenotypical heterogeneity of PID leads to diagnostic difficulties. Pathogenic variants in over 430 genes can cause PID. Identifying a specific genetic cause of PID facilitates definitive treatment and contributes to our understanding of the human immune system.

The aim of the study was to characterize the results of PID genetic testing since the application of next generation sequencing (NGS) technique has become the first line genetic testing in Latvia.

Materials and Methods

Retrospective data from the Children's Clinical University Hospital Clinic of Medical Genetics and Prenatal Diagnostics during time period from 2018 till 2020.

Results

A total of 22 patients (median age 8 years, ranging from 3 month to 31 years) were sent for genetic testing due to clinical suspicions of PID. Clinically this is a heterogeneous group of patients with periodic fevers, recurrent severe infections as sepsis and osteomyelitis, severe autoimmune disorders etc. Twenty one patients were sent for the analysis of a selected PID genes panel (274 genes in 2018, updated to 298 in 2019), and one patient - for open exome analysis. In 16 (72%) patients, the testing results were negative, in two (10%) patients – a variant of uncertain significance was identified, and in four (18%) patients – pathogenic or likely pathogenic variants in different genes were identified: *PIK3CD*:c.1573G>A,(p.Glu525Lys) causing immunodeficiency-14; *CYBB*:c.676C>T,(p.Arg226*) confirming X-linked chronic granulomatous disease; *STAT1*:c.A>C,(p.Gln271Pro) causing immunodeficiency-31 and *SH2D1A*:c.5A>G,(p.Asp2Gly) confirming X-linked lymphoproliferative syndrome.

Conclusions

PID genetic testing is challenging and even after broad PID gene panel testing the genetic cause was found only in 4/22 (18%) cases. There is a need for better genetic diagnostic tools than currently available (e.g. whole genome and transcriptome sequencing, or multi-Omics approach) to uncover the genetic cause for the other PID patients.

Glycolysis, fatty acid oxidation or mitochondrial oxidative phosphorylation – what determines immune response in myeloid cells?

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Objectives

"Fast response" ability of immune cells is bioenergetically expensive and should be supported by a unique and flexible mechanism for the adjustment of cell energy metabolism to support functioning. Studies on immunometabolism suggested that pro-inflammatory immune cells have to reprogram from mitochondrial oxidative phosphorylation to glycolysis. However, it should be noted that a reduction in fatty acid oxidation (FAO) leads to the accumulation of metabolites that can induce mitochondrial dysfunction. So far, time-dependent alterations in metabolic choices of immune cells are not studied.

Materials and Methods

The monocytes from healthy donors were incubated with LPS for 2 and 24h. Glucose metabolism, FAO and mitochondrial function were evaluated. In addition, the effects of immunosuppressants, calcineurin (CN)-NFAT pathway inhibitors, on energy metabolism were tested. Furthermore, mitochondrial functionality and FAO oxidation were investigated in bone marrow-derived macrophages (BMDMs).

Results

After 2h in LPS-stimulated cells glucose uptake was increased without any changes in glycolysis rate. After 24h in LPS-treated monocytes, the glycolysis rate and intracellular lactate level were increased, while glucose transport was similar to that in non-stimulated cells. The FAO in LPS-treated cells was increased after 2h, but decreased after 24h, with subsequent changes in acylcarnitine profile. Interestingly, in LPS-treated monocytes, mitochondrial function was impaired after 2h and restored after 24h. Similar energy metabolism pattern was observed in BMDMs after 4h and 24h stimulation with LPS. Stimulated monocytes treated with CN-NFAT inhibitors had reduced glycolysis rate and disrupted timing of fatty acid metabolism balance, while mitochondrial functionality was not affected. Studies in BMDMs showed that accumulation of FAO intermediates, long-chain acylcarnitines, attenuates polarization of BMDMs to the anti-inflammatory phenotype.

Conclusions

There is a dynamic switch in energy metabolism pattern during the activation of pro-inflammatory response in myeloid cells. Furthermore, obtained data suggest that FAO rate or availability of FA intermediates could determine the ability of macrophages to exert pro-inflammatory/anti-inflammatory phenotype.

GPx, MDA, depression and risk of recurrence of stable coronary heart disease

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Objectives

The aim of the study was to investigate the relationships between oxidative stress (OS) level, depression (D) and risk of recurrence of Stable Coronary Heart Disease (SCHD).

Materials and Methods

A retrospective study was conducted on 174 participants, at the aged 45+ years old : 86 in- patients of the cardiology department with a recurrent SCHD and 88 in-patients of the cardiology department of the with a primary SCHD. The severity of depressive symptoms was assessed using the long 30-item form of Geriatric Depression Scale (GDS), valid Latvian version of GDS-LAT.

From each patient were taken the blood samples to measure oxidative stress parameters Malondialdehyde (MDA) and Glutathione Peroxidase (GPx).

Results

83.9% of the sample had high level of MDA. In 72.4% of the sample the GPx level was normal, in 17.8% it was high and in 9.8% - low. More than a half of the patients are experiencing a D (44.3% - mild D and 6.9% - severe D). GPx was found statistically differing between primary and recurrent SCHD ($p=0,003$). Patients with both D and high GPx had 10.6 times higher chances of recurrent SHCD compared to those without D and normal GPx. Patients with present D had high levels of MDA and GPx – more often than responders with no D, but this wasn't statistically significant ($p=0.51$):.

Conclusions

It could be supposed that GPx is more significant marker of risk of D and recurrence of SCHD. It was significantly higher in depressed patients with recurrent SCHD comparing to patients without D and to patients with primary SCHD and patients with both D and high GPx had higher chances of recurrent SHCD compared to those without D and normal GPx. The high level of MDA in most of both groups patients could evidence that increased OS is a risk factor for CHD in general.

Modulation of microRNA expression levels after asbestiform fibers exposure as a diagnostic biomarker of mesothelial neoplastic transformation

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Objectives

Fluoro-edenite (FE) is a silicate mineral identified in the lavic products of Monte Calvario from stone quarries located in the southeast of Biancavilla (Sicily, Italy). The FE fibers have been classified as carcinogenic to humans by the International Agency of Research on Cancer (IARC). Inhalation of FE fibers has been associated with a higher incidence of Malignant Mesothelioma (MM), a highly aggressive neoplasm of the serosal membranes lining the pleural cavity. Many diagnostic biomarkers have been proposed for MM. Several studies demonstrated that microRNAs (miRNAs) may be used as good non-invasive diagnostic biomarkers for cancer. The aim of the study was to identify *in silico* set of miRNAs involved in the development of MM and potentially used as diagnostic biomarkers. These results allowed the execution of functional *in vitro* experiments performed on pleural mesothelial cells (MeT-5A) and MM cells (JU77) in order to test the carcinogenetic effects and epigenetic modulation induced by FE exposure.

Materials and Methods

The selection of the miRNA expression profiling datasets was performed between normal/asbestos-exposed and MM samples through bioinformatics analyses. After FE exposure of MeT-5A, supernatant and pellet have been collected for the miRNAs expression analysis performed by droplet digital PCR (ddPCR) assay.

Results

The *in silico* analyses revealed a set of miRNAs strictly involved in MM. The *in vitro* results showed that the expression levels of hsa-miR-323a-3p vary significantly. Hsa-miR-101-3p in MeT-5A treated and JU77 cells showed different trends of expression. Hsa-miR-20b-5p has been shown a significant up-regulation in JU77 cells vs. MeT-5A.

Conclusions

Our results of correlation between miRNAs expression levels and mesothelial neoplastic transformation have opened new hypotheses to increase the research. As a future plan, translational analyses will be performed on a subset of patients chronically exposed to FE fibers to further verify the clinical role of such miRNAs.

Next-generation sequencing-based targeted-sequencing approach for the full-length CYP3A4 gene sequencing

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Objectives

CYP3A4 is regarded as the most important enzyme involved in drug metabolism, and variability of CYP3A4 gene is of high pharmacogenetic importance. The next-generation sequencing (NGS) technologies enable systematic investigation of specific genomic sites or entire regions, therefore enhancing the understanding of genetic aspects that may have clinically relevant consequences.

This study aimed to develop NGS-based targeted-sequencing protocol for the full-length CYP3A4 gene sequencing and apply this protocol for clinical sample analysis.

Materials and Methods

Human DNA samples (n=3) were received from national biobank and used to optimize PCR and sequencing library preparation steps. Performance of developed protocol was demonstrated by analysis of tuberculosis patient DNA samples (n=5) obtained from Centre of Tuberculosis and Lung Diseases. The protocol included: full-length CYP3A4 gene amplification; amplicon pre-treatment procedure; NGS on Illumina MiSeq platform (2x250 bp paired-end reads). Sequencing data were processed on Galaxy online-based platform; detected variants were annotated using wANNOVAR tool and public databases (ClinVar, dbSNP, PharmGKB).

Results

Nine primer pairs were designed to amplify 2836-5955 bp long fragments and obtain full coverage of CYP3A4 gene. The introduction of the amplicon pre-treatment step reduced the amount non-specific amplification products. The high-quality sequencing data were generated for all clinical samples (n=5); the overall base quality was ≥ 35 , mean read depth - 193, and sequence coverage ($\geq 10x$) 99.9%. Of the 40 single-nucleotide variants detected, 21 intronic and 1 exonic nonsynonymous variants were database-referenced, while 18 were novel and previously unreported. None of the identified variants were of clinical significance. All patients were wild-type CYP3A4*1 allele carriers (CYP3A4*1/*1 genotype).

Conclusions

The results confirm that developed NGS-based sequencing protocol can be used to identify variable sites dispersed throughout the entire CYP3A4 gene and holds future perspective to be applied in population-level pharmacogenetic studies.

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Protection of mice against challenge with murine adenocarcinoma cells by naked DNA immunization with reverse transcriptase domain of rat TERT

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Objectives

TERT – telomerase reverse transcriptase – is well known tumor-associated antigen. Overexpression of TERT was detected in majority of tumor cells on different stages of malignant transformation. Several clinical trials of TERT based anti-cancer vaccines are currently ongoing, but the immune correlates of their antitumor activity are still unclear. The aim of the study was to induce the specific immune response against heterologous TERT by DNA immunization and evaluate the protective effect of immunization against challenge with syngenic TERT-expressing tumor cells in a mouse model.

Materials and Methods

Expression optimized synthetic DNA for rat TERT or inactivated RT domain of TERT (RT-TERTin) was cloned into eukaryotic expression vector pVax1 and used to immunize BALB/c mice. Mice in groups of 5 received plasmid DNA of rat TERT, RT-TERTin, or empty vector by intradermal injection followed by electroporation on days 1 (prime) and 21 (boost). Ten days after the boost, mice got two subcutaneous injections of 5×10^3 tumorigenic cells expressing rat TERT, RT-TERT or parental adenocarcinoma cells labeled with luciferase. Tumor growth was followed by *in vivo* bioluminescence imaging (BLI) and morphometrically. Presence of metastasis in distal organs was assessed by *ex vivo* organ BLI, and confirmed by immunochemical staining.

Results

The tumor development was observed in all mice mock-immunized with empty vector. All the mice immunized with RT-TERTin got full protection against challenge from with tumor cells expressing TERT and RT-TERT, the grow of parental cells was limited comparing with vector group. The TERT immunized mice were rejecting TERT-expressing tumor cells, but developed tumors from RT-TERT expressing cells and parental cells. The formation of metastases in distal organs was restricted by TERT and completely prevented by RT-TERTin immunization.

Conclusions

The DNA immunization against inactivated RT domain of heterologous TERT provides full protection against tumor expressing the same TERT and grow limitation of tumor expressing endogenous TERT.

Sigma-1 chaperone protein and GABA-B receptor interaction modulates seizure threshold

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Objectives

Gamma-aminobutyric acid (GABA) is the principal inhibitory neurotransmitter in the brain, and, by binding to GABA receptors, it maintains an inhibitory tone that counterbalances neuronal excitation. There is a growing body of evidence that sigma-1 chaperone protein (S1CP) is involved in the modulation of seizures. To evaluate the possible interactions between S1CP and GABA receptors, this study aimed to compare the GABA receptor expression in different brain structures and seizure susceptibility in wild-type and S1CP knockout mice.

Materials and Methods

Quantitative PCR, Western blotting and immunohistochemistry of free-floating sections were used to assess the gene and protein expression of $\gamma 2$ subunit of GABA-A and R1 and R2 subunit of GABA-B receptor in different brain structures of CD-1 background wild-type and S1CP knockout male mice. Intravenous pentylenetetrazol (PTZ) and (+)-bicuculline (BIC) infusion-induced acute seizure models were used to compare the seizure threshold between wild-type and S1CP knockout animals.

Results

Western blotting and immunohistochemistry showed significantly decreased GABA-B R2 protein expression in the *Cornu Ammonis* 1 area of the hippocampus in S1CP knockout mice. The most significant decrease of staining intensity of the R2 subunit of the GABA-B receptor was found in the ventral part of the medial habenula of S1CP knockout animals. Compared with wild-type mice, S1CP knockout animals were more susceptible to tonic seizures in both PTZ- and BIC-induced seizure models. The tonic seizure threshold was significantly decreased in S1CP knockout animals by 28% and 22%, respectively.

Conclusions

Our study demonstrates that S1CP is involved in the balance maintenance between excitation and inhibition through GABA-B-ergic mechanisms and could be used as a valuable target for developing novel antiseizure drugs.

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Spinal muscular atrophy carrier screening in the population of Latvia using the highly sensitive Droplet Digital PCR system

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Objectives

Spinal muscular atrophy (SMA) is one of the most common inheritable neuromuscular diseases. It is an autosomal recessive, progressive disorder with neuronal degeneration, leading to muscle atrophy and respiratory failure (Verhaart et al., 2017a). SMA is frequently caused by homozygous exon 7 deletions of the survival motor neuron 1 (*SMN1*) gene on 5q, and its clinical course is influenced by the copy number of a nearby *SMN1* paralog, *SMN2* (Verhaart et al., 2017b). SMA carrier frequency for the common *SMN1* deletion varies between 1/40 and 1/100 depending on geographic origin and ancestry (Hendrickson et al., 2009).

Objective was to introduce a multiplex, droplet digital PCR (ddPCR) method for the simultaneous detection of *SMN1* deletions and *SMN2* copy number variation in laboratory practice in Latvia. The main goal is to determine SMA carrier frequency in the population of Latvia regardless of ethnicity.

Materials and Methods

SMN1, *SMN2*, and *RPP30* concentrations were simultaneously measured using a Bio-Rad QX200 Droplet Digital PCR system. About 180 volunteers from the Genome Database of Latvian Population were tested.

Results

Our pilot population study revealed 1 to 4 *SMN1* exon 7 copies detected in population controls from the Latvian national biobank. The frequencies of 1, 2, 3 and 4 copies of *SMN1* gene were 1,7%, 93,8%, 3,9% and 0,6% respectively. *SMN2* CNV ranged from 0 to 3. The frequencies of 0, 1, 2 and 3 copies of *SMN2* gene were 6,7%, 33,7%, 56,2% and 3,4% respectively.

Conclusions

We have introduced a multiplex ddPCR method that is considered to be sensitive, specific and applicable to both SMA carrier status determination and newborn screening. SMA carrier frequency for the common *SMN1* deletion was determined as 1/59 in the population of Latvia.

The correction method of bioelements contents disturbance in bone tissue of rats under the condition of affected them by cadmium ions

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Objectives

Confirmed properties of artichoke extracts, including antioxidant, membrane stabilizing and detoxifying effect, contributed to the production of domestic drug "Artichoke Health-Extract" (AHE).

To study the influence of Cd chloride and AHE on the content of calcium (Ca), magnesium (Mg), zinc (Zn) and copper (Cu) in the bone tissue

Materials and Methods

The experiment was conducted on white male rats weighing 180-220 g. Intoxication was carried out at a dose of \square LD₅₀ CdCl₂ for 10 days, and then injected AHE. Material (femurs, blood) was taken on the 28th day after completion of CdCl₂ introduction. In the ashes of bones were determined the content of Ca, Mg, Cu, Zn by atomic absorption method, and in blood – the concentration of Ca and Mg.

Results

On the 28-th day the content of main macro-nutrients of bone tissue Ca and Mg had decreased: Ca by 20.1%, and Mg by 25,4% accordingly, but under conditions of AHE application, approached the rates of intact rats. The level of osteotropic microelements Cu and Zn, in the bones of poisoned animals decreased by 31.1% and 22.5%, and with a correction of only 16.7% and 3.7% accordingly. The content of toxic Cd in the bones exceeded 10.3 times of the control level, and with the introduction of AHE only 1.4 times. The concentration of Ca in the blood under the conditions of cadmium increased by 1.38 times, and Mg decreased by 1.54 times. When using AHE, these indicators had approached the corresponding values of intact animals.

Conclusions

The results indicate that in affected by CdCl₂ animals, the content of Ca, Mg, Zn and Cu is decreasing in bones against the background of Cd accumulation, as well as an increase in the concentration of Ca and decrease in Mg in blood plasma. The use of artichoke extract was effective to correct these disorders.

The effect of caraway, chamomile, and artichoke bioextracts on the levels of intermetabolites in an in-vitro model

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Objectives

In recent years, the discovery of new economical active compounds for the correction of carbohydrate and lipid dysmetabolism has become a matter of high importance. Thus, there is a major interest in the identification and selection of plant bioextracts for the purpose of normalization of human metabolism and reduction of known side-effect.

The objective of this research is to study the influence of the aforementioned bioextracts on the levels of intermetabolites, pyruvate (PV) and cholesterol (CHOL), in an in-vitro model of human blood.

The research has been conducted as part of the LAAD project framework.

Materials and Methods

In our study, water-based extracts of caraway, chamomile, and artichoke (10%) were used in various volumes (50-2000 µL) on PV and CHOL containing blood models. The tests were conducted using standard biochemical methods: PV measurements were done with 2,4-dinitrophenylhydrazine colour spectroscopy, in normal and elevated PV models; CHOL - with the Liebermann-Burchard test. In hypo-, normo-, and hyper-CHOL-emia. Vitamin c concentrations were calculated in all extracts as well.

Results

All samples were induced with 100-2000µL of extract and showed increased PV levels in normal and elevated base PV levels. However, the most effective extract was the water-based caraway; by 298.8% and 127.4% respectively.

Though all extracts demonstrated a tendency to elevate CHOL levels, less activity was shown by the caraway extract; 6% in normal CHOL levels and 10% in hyper-CHOL-emia.

Vitamin C concentrations in all extracts were roughly the same at 1.4±0.8mg%.

Conclusions

Of the tested extracts, the water-based caraway extract demonstrated the highest PV elevation. Hypothetically, improved cellular energy levels via utilization of PV may be achieved with these extracts.

As vitamin c levels do not affect PV and CHOL levels, more detailed research should be conducted on the activity of polyphenols and other bioactive substances.

The influence of speed during stripping in Descemet membrane endothelial keratoplasty tissue preparation

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Objectives

To evaluate whether the speed of stripping a Descemet membrane endothelial keratoplasty graft influences the graft scroll width.

Materials and Methods

Human corneas suitable for research were selected for the study. Pairs of corneas were randomly divided into 2 groups: 1 cornea was stripped with a slow speed (group 1) and the contralateral with a fast speed (group 2). Slow speed was defined as the total time greater than 150 seconds or speed <0.057 mm/s. Fast peeling was defined as less than 75 seconds or speed >0.11 mm/s. The grafts acquired were evaluated by microscopy for the graft scroll width and endothelial cell density change pre- and post-preparation.

Results

Twenty corneas of 10 donors were included in the analysis. The mean donor age was 68.6 ± 7.58 years. The mean total time of the tissue preparation in group 1 was 282.7 ± 28 seconds and in group 2 was 126 ± 50 seconds (P-value = 0.0000047). The mean speed of stripping in group 1 was 0.045 ± 0.006 mm/s and in group 2 was 0.266 ± 0.093 mm/s (P-value = 0.000027). The graft width in group 1 was 6.4 ± 0.92 mm and in group 2 was 2.87 ± 0.32 mm (P-value = 0.0000014). The mean endothelial cell loss in group 1 was 389 ± 149 cells/mm and in group 2 was 186 ± 63.44 cells/mm (P-value = 0.00134).

Conclusions

We found a correlation between the speed of stripping, scroll width, and endothelial cell loss. Slow-peeled Descemet membrane endothelial keratoplasty grafts result in a wider scroll width but were associated with a greater reduction in endothelial cell density.

The significance of IL-21 and IL-22 concentration changes in different CRSwNP patients age groups

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Objectives

The aim of our study was to analyze the concentrations of inflammatory markers IL-21 and IL-22 in the nasal tissue of patients with CRSwNPs and to compare between different age groups.

Materials and Methods

A total of 59 patients with CRSwNPs treated in the Department of Otorhinolaryngology, Hospital of the Lithuanian University of Health Sciences Kauno Klinikos, were enrolled into this study. Analysis was performed across 3 different age groups (18–30 years, 31–50 years, and 51 years and more). Tissue biopsies from the sinus cavity for all study participants were taken and frozen at –80°C until use. The concentrations of IL-21 and IL-22 were quantified using a magnetic bead-based multiplex assay. Statistical data analysis was performed using the statistical package IBM SPSS 23.0. Data were compared using the Kruskal-Wallis test (multiple comparison by Mann-Whitney test).

Results

In the group aged 18–30 years, the level of inflammatory marker IL-21 was found 109.6 (74.6–144.2) pg/ml and IL-22 90.5 (75.1–167.1) pg/ml. Among 31–50 year olds, concentration of IL-21 was 112.2 (97.7–118.5) pg/ml and IL-22 132.8 (90.5–146.8) pg/ml. In the oldest group (aged 51 years and more) concentration of IL-21 was 92.1 (71.0–105.6) pg/ml and IL-22 136.7 (115.5–167.5) pg/ml. The concentration of IL-21 was significantly higher among 31–50 year olds compared with those aged 51 years and more ($p=0.013$)

Conclusions

The concentration of IL-21 was higher among patients with CRSwNP in the middle age group as compared with the oldest group. No significant differences in the concentrations of IL-22 between age groups were found.

Thermally processed leeks and their chemical-physical properties

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Objectives

Leeks (*Allium ampeloprasum* L.) are commonly used as vegetables and might provide various nutrients and bioactive components in our daily diet in fresh and processed form.

The aim of the research was to analyze and compare fresh, steam blanched (SB for 1.5 and 3.0 min), convective dried (CV), and microwave-vacuum (MV) dried, and SB followed by MV dried leeks.

Materials and Methods

The main parameters analyzed and used for the comparison were bioactive components (different types of phenolics), their antioxidant activity, sugars, carotenoids, and organic acids. Moisture, absorption, sorption, and color were analyzed in fresh and processed samples. For the experiment, gravimetric, spectrophotometric, and HPLC methods were used.

Results

Fresh leeks have a moisture content of approximately 88% and with the drying process, the moisture was decreased to 9% or lower for maintaining products' microbiological safety. Fresh and CV dried samples have lighter green color but steam blanching and MV processed followed by blanching darkens the sample. Carotenoid content increases with all thermal processes compared with fresh ones. The most common organic acids in the highest concentrations were oxalic, quinic, malonic, malic, and ascorbic acids. Phenolic compound content increases with the thermal processing- lower concentrations were observed in MV dried leeks but pre-processing with SB increases the concentration of phenolics. Using principal component analysis was observed that more organic acids and phenolics were determined in MV processed leeks. Analyzed sugars in leeks decreased with processing.

Conclusions

The integrated evaluation showed that SB followed by MV drying is the most suitable method for maintaining leeks' nutritional and biological composition. The processing of leeks helps to improve the availability and increases the concentration in a majority of thermally processed leeks. That might be explained, that different processing and storage factors significantly affect phytochemicals due to weakening the tissues which help to extract them and be more available.

Rare Disease Case Reports

A case report of the very rare intrathyroid thymic carcinoma

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A 51-year-old male had an incidental finding of a mass in the right lobe of the thyroid gland during a chest CT scan. Subsequently, a thyroid gland ultrasonography with fine-needle aspiration was performed; cytological material was suspicious for malignancy. A total thyroidectomy was performed.

Macroscopically, a solid, dense, white nodule (4,0 cm in greatest dimension) was identified on the surface of the right lobe of the thyroid gland. Microscopically, the tumor was composed of irregular nests and solid structures. It was unencapsulated, but well demarcated from surrounding thyroid tissue. Cells had scant cytoplasm, round to oval vesicular nuclei with prominent cherry-red nucleoli. Mitotic activity was low. Tumor had fibrotic stroma with dense lymphocytic infiltrate with germinal center formation. Focal comedo-type necrosis was present.

The tumor did not have the papillary-like nuclear features, follicular architecture or nuclear pleomorphism characteristic of the more commonly encountered thyroid neoplasms e.g., papillary thyroid carcinoma and its variants, follicular thyroid carcinoma, anaplastic thyroid carcinoma. Since the tumor was on the surface of thyroid gland, a parathyroid gland or thymic remnant neoplasm was also considered. Based on the similarities in morphology, an intrathyroid thymic carcinoma was suspected.

Immunohistochemically, the tumor was CD117, p63, CD5, BCL2 positive and TTF-1, thyroglobulin, calretinin negative. Ki67 proliferation index was 30%.

Thus, immunohistochemical findings confirmed the morphological suspicion of intrathyroid thymic carcinoma and a very rare histological diagnosis was made.

A child with congenital ichthyosis and Netherton syndrome

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Nerthenton syndrome (NS) is a rare autosomal recessive disease characterised by congenital ichthyosiform erythroderma, excessive desquamation, atopic diathesis (elevated serum IgE), specific hair shaft abnormality (trichorrhexis invaginata) and failure to thrive.

The incidence of NS is estimated to affect 1 in 200,000 children and, if this severe skin condition is missed, they have a high risk of secondary infection through skin lesions. This may lead to severe sepsis and death.

Patients with NS are usually treated at home by parents who are instructed to take care of the child's skin, with the supervision of a dermatologist.

We report a case of an infant girl with erythroderma since birth, who was diagnosed with congenital ichthyosis, a positive family history and suspected NS, which eventually was confirmed by genetic testing. The patient presented in an outpatient clinic of the Children's Clinical University Hospital in Riga, with very poor weight gain, generalised erythroderma and fine scales. The patient was immediately hospitalised, received proper feeding and skin care. The patient was discharged from hospital after 31 days in a generally good condition, with new instructions to parents who were recommended to have a dermatologist follow-up in two weeks.

No cure or satisfactory treatment of NS is currently available. NS should be a differential diagnosis in cases of elevated IgE and congenital ichthyosiform erythroderma. NS can be a life-threatening condition due to secondary infection and challenging nutritional status.

A mask of primary spontaneous pneumothorax, a clinical challenge

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27 years old woman has a history of recurrent episodes of spontaneous right-sided pneumothorax. First episode was in 2017 december - Right-sided primary spontaneous pneumothorax and the chest tube drainage was performed. In 2019 march there was the second episode of right side pneumothorax when the VATS talc pleurodesis was done. In 2019 - recurrent episodes of spontaneous right-sided pneumothorax. She is ex-smoker, works as a scientist and denies any chronic diseases. Medication history revealed combined oral contraceptive taking (Estradiol valerate/Dienogest) till 18.04.2019 and at that time patient didn't have menstruations. It is important to mention, that from may 2019 patient had a history of pneumothorax during menstruations. In 2019 surgical biopsy was performed and revealed granulomatous inflammation - noncaseous granulomas. According to the clinical manifestations and investigations data the main differential diagnosis were catamenial pneumothorax or pulmonary sarcoidosis. Pulmonary sarcoidosis was excluded according to the radiology (PET scan), fibrobronchoscopy with bronchoalveolar lavage, blood tests, lung functional tests, ecg, echocardiogram. Gynecological examination (gynecological ultrasound and magnetic resonance of pelvis) didn't show any evidence of endometriosis, but due to endometriosis probable clinical manifestations and supposed catamenial pneumothorax patient started to receive therapy with progesterone (Dienogestum 2 mg) from december 2019.

We still have 3 questions to answer: 1. Is the right diagnosis is catamenial pneumothorax? (There is no evidence of lung sarcoidosis.) 2. Do the further investigation should be a diagnostic VATS - endometriosis verification? 3. Do we need to continue treatment with progesterone hormone?

A rare clinical case of periodic fever in adult male

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Objectives

Autoinflammatory diseases refer to problems with the immune system causes your immune cells to attack your body by mistake. This can cause swelling that produces fever, rash, joint swelling, or serious buildup of a blood protein in your organs. Recently, the increased knowledge in the field of auto inflammation highlighted shared immune mechanisms in the pathogenesis of both classical monogenetic and multifactorial auto inflammatory diseases and a broad spectrum of chronic age-related inflammatory pathologies. The current increase in the prevalence of chronic inflammatory diseases makes this subject of topical interest.

Materials and Methods

Clinical case description.

Results

The patient, a 65-year-old man, complained of recurrent fever up to 38.5 C, muscle weakness, weight loss (12 kg in the last 2 years). The first symptoms of the disease were skin rash (evanescent, non fixed erythematous rash that accompanies fever spikes) which was mistakenly diagnosed as Deverger's syndrome. Laboratory tests show a marked inflammatory response, characterized by high white blood cell count, thrombocytosis, anemia, elevated levels of C-reactive protein and erythrocyte sedimentation rate, and finally, an increase in serum level of ferritin. CT screening showed no organic pathology or tumors other than splenic enlargement. Markers of systemic connective tissue diseases were also negative. In this patient, we found a unique *de novo* heterozygous missense mutation in the *PLCG2* gene, predicted to affect the PLC γ 2 structure.

Conclusions

The auto-inflammation and phospholipase Cy2 (PLC γ 2)-associated antibody deficiency and immune dysregulation (APLAID) syndrome is a rare primary immunodeficiency caused by a gain-of-function mutation S707Y in the *PLCG2* gene previously described in two patients from one family. The APLAID patients presented with early-onset blistering skin lesions, posterior uveitis, inflammatory bowel disease (IBD) and recurrent sinopulmonary infections caused by a humoral defect, but lacked circulating autoantibodies and had no cold-induced urticaria.

A second family with a multisystemic mitochondrial disease caused by *PTCD3* mutations

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Here we report two affected sibs from a non-consanguineous family. Both children were referred to geneticist due to horizontal nystagmus, nervus opticus atrophy, tremor, truncal and limb ataxia. Both patients lost ambulation after age of 25 and both are blind. At the last neurological examination they also showed pronounced rough tremor, spasticity and hyperreflexia. Symptoms in the brother are slightly more pronounced than in the sister and he also has complaints of occasional dysphagia, dysarthria and muscle weakness in legs. Despite severe neurological deficits the intelligence is retained.

Extensive genetic investigations in the past years, including full-length mtDNA sequencing, NGS panel sequencing of hereditary ataxia genes and testing for repeat expansion disorders, followed by WES, were negative. The investigation was continued in our research project using WGS technique. On WGS analysis both patients were found to be compound heterozygous for *PTCD3* gene variants c.1182T>A, p.(Tyr394Ter) and c.805C>T, p.(His269Tyr). One of which is a putative loss-of-function variant, whereas the other is a missense change and its effect on the gene functionality is not known.

The first case of a patient with Leigh-like syndrome caused by *PTCD3* mutations was published in 2019 (Borna NN et al. Their patient developed symptoms already at the prenatal stage. She had neuroradiological features consistent with Leigh syndrome, psychomotor regression, limb rigidity, nystagmus and optic atrophy. She died at the age of 16 months. Two compound heterozygous loss-of-function variants in *PTCD3* were shown to impair oxidative phosphorylation, namely by decreasing mitochondrial complex I and IV activities, oxygen consumption, ATP biosynthesis and generalized mitochondrial translation defects.

With this report we want to expand the phenotype caused by *PTCD3* mutations. Our patients' symptoms are less severe than in the previously reported child. Still, they are consistent with a multisystemic mitochondrial disorder. Further functional analysis is required.

Abdominal attacks as a first manifestation of hereditary angioedema: case report

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Objectives

Hereditary angioedema (HAE) is a rare, life-threatening, inborn error of immunity disease, characterized by recurrent episodes of subcutaneous or submucosal edema. HAE is caused by deficient or dysfunctional C1 esterase inhibitor (C1-INH), leading to overproduction of bradykinin and the development of massive local edema. Abdominal attacks are painful, of sudden onset and often mistaken for acute abdomen leading to unnecessary surgery.

Case report: A 54-years-old female at the age of 16 began experiencing recurrent episodes of severe abdominal pain combined with nausea and vomiting, as well as swelling in the extremities, face, genitalia and airways after years. The frequency of angioedema attacks varied from once a week to once a year, with the one episode lasting 1-3 days. The patient has been hospitalized several times due to extreme abdominal pain. She underwent a laparotomy in 1991 as well, but the cause of abdominal pain remained unknown. Also, no cause was found for episodes of swelling - allergic tests were negative. Therapy with antihistamines, glucocorticoids, spasmolytics and analgesics was ineffective. In January 2020, at the age of 53, she was diagnosed with HAE type I - complementary laboratory tests showed low C4 complement level (0.04 g/L), C1-INH level (<8 mg/dL) and low complement C1-INH activity (23%). Recombinant human C1-INH for on-demand treatment was initiated, with high efficiency and good tolerability. Genetic testing was performed – no pathogenic variants identified in *SERPINC1* (1-8 exons), *ANGPT1*(exon 9),*F12*(exon 9 and 10).

Conclusions

HAE should be considered in the differential diagnosis of patients with recurrent episodes of severe, unexplained abdominal pain. Thus, abdominal HAE attacks contribute significantly to the reduced quality of life of HAE patients. Moreover, the accurate diagnosis of the disease, especially in patients who present only with recurrent abdominal symptoms, remains a challenge.

Acute intermittent porphyria and its neurological manifestations: clinical case from Latvia

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Objectives

Clinical case – a 27 year old female presented to the Emergency Department of Riga East University Hospital complaining of vomiting and abdominal pain. Patient was uncritical, confused, she had several fall episodes because of stumble. Neurological consultation was made, objectively – patient had flaccid tetraparesis, bulbar syndrome. In the laboratory tests hyponatremia and hypokalemia were found. Consultation of gynecologist, fibrogastroscopy and computed tomography of the abdomen were made. In the Gastroenterology department the patient's general condition worsened and she was admitted to the Intensive care unit. Consultations of neurologists and gastroenterologists, MRI of the brain and spinal cord were made. Due to respiratory disturbances, the patient was intubated and later placed in a tracheostomy.

Materials and Methods

Urine analysis – urine became reddish-brown in color in sun light. Porphobilinogen express test was positive. Coproporphyrin 650 and delta-aminolevulinic acid 19 were found in urine. Nerve conduction study revealed motor-sensory axonal demyelinating polyneuropathy with greater axonal motor involvement in arms. Brain and spinal cord MRI was without pathological changes.

Results

Patient received intravenous hematin 4 doses of 250 mg given 3 days apart and intravenous glucose 10% 500ml per day. After the course of therapy and rehabilitation there was clinical improvement – tracheostomy was evacuated, abdominal pain and hyponatremia, hypokalemia disappeared, bulbar syndrome was no longer present, muscle power improved.

Conclusions

Porphyria is a rare disorder that requires early diagnosis because of a potential specific therapy. A physician should suspect porphyria if the patient has motor-predominant peripheral neuropathy, neuropsychiatric manifestations and gastrointestinal complaints.

Case report of Camptodactyly-Arthropathy-Coxa vara-Pericarditis syndrome in combination with autoimmune disease

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Objectives

Camptodactyly-Arthropathy-Coxa vara-Pericarditis (CACP) syndrome is a rare genetic disorder (prevalence <1/1 000 000) characterized by early-onset camptodactyly, noninflammatory arthropathy with synovial hyperplasia and occasionally progressive coxa vara deformity or noninflammatory pericarditis. It is caused by a mutation in the proteoglycan 4 (PRG 4) gene which encodes lubricin that is the main lubricant in synovial fluid and cartilage surface. Simultaneous autoimmune disease has never been described.

Case report: A 7-year old boy was admitted to Children's Clinical University Hospital in January 2016 with a history of Juvenile idiopathic arthritis (JIA), rheumatoid factor positive lasting for three years. The patient has been under the doctor's observation since the neonatal period, he was born prematurely, had a delay of psychomotor and language development, gait disturbances, and generalized muscle weakness. Deformities of knee and wrist joints without pain or morning stiffness were observed at the age of 4-year. As the diagnosis of JIA was made, he received appropriate therapy with NSAID, methotrexate, intra-articular glucocorticoid injections. Despite the therapy clinical condition aggravated, he had contractures of joints, hepatosplenomegaly, cardiomegaly, autoimmune thyroiditis, miopathy approved histologically and in EMG. Overlap syndrome was suspected with high ANA, ENA, anti-Ro, anti-La, Sm, RNP antibodies. In collaboration with Hamburg Centre for Pediatric and Adolescent Rheumatology biological therapy was initiated – initially with TNF inhibitor Etanercept which was ineffective, therefore was changed to Il-6 receptor inhibitor Tocilizumab. After repeated metabolic and genetic investigations in October 2018 diagnosis of CACP was confirmed. Although biological therapy is not effective in CACP syndrome, we observed significant clinical improvement after initiation of Tocilizumab, therefore this therapy is still ongoing.

Conclusions

The CACP syndrome is very rare and commonly misdiagnosed as JIA. The efficacy of Tocilizumab may indicate that in our case there is an ongoing autoimmune process alongside.

Case report of Eosinophilic cellulitis in children

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Eosinophilic cellulitis is a rare inflammatory skin condition of unknown etiology. It was first described by Wells in 1971. The skin condition still remains as a controversial diagnosis in specialists' opinion due to unknown nature of the disease.

The objective of this case report is to provide more clinical information about the disorder to promote future studies and understanding of the Wells syndrome.

In this case report is presented a 3-year-old male patient with a recurrent pruritic rash on palms and soles. It will overview the clinical presentation, etiologic factor exposure, diagnostic approach and criteria used for diagnosing the condition, histopathology and treatment of the patient.

Chronic myeloproliferative disorder and splenectomy leading to chronic thromboembolic pulmonary hypertension: case report

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Objectives

Chronic thromboembolic pulmonary hypertension (CTEPH) is a severely underdiagnosed form of pulmonary hypertension. Early diagnosis and treatment of CTEPH is essential for the outcome of the patients. The purpose of this study is to raise awareness to this rare disease by presenting a case report, where CTEPH is mimicking acute pulmonary embolism and discuss clinical symptoms and various manipulation data.

Materials and Methods

Invasive diagnostic criteria for CTEPH:

- Mean pulmonary arterial pressure (mPAP) > 20 mmHg,
- Pulmonary arterial wedge pressure (PCWP) < 15 mmHg,
- Elevated pulmonary vascular resistance (PVR) ≥ 3 Woods units,
- Evidence of chronic pulmonary embolism on CT or V/Q scan.

Results

A 68-year-old woman was admitted to the Cardiology unit of PSCUH due to progressive dyspnoea for last 2 weeks. Transthoracic echocardiography (TTEho) showed enlargement of right chambers with a right ventricular systolic pressure 60-70mmHg. Laboratory results showed thrombocytosis, hyperchromic macrocytic anaemia, slightly elevated inflammatory markers and high BNP. Anamnesis revealed a splenectomy procedure 27 years ago due to diagnosis of polycythemia vera. During USG imaging was found old deep vein thrombosis (DVT). Chest CT angiography results showed acute bilateral pulmonary embolism. Anticoagulation therapy of rivaroxaban was started. Patient had various risk factors for CTEPH (splenectomy, old DVT, polycythemia vera), thereby after 3 month patient was checked with TTEho and elevated RVSP was still found. Thereby patient underwent right heart catheterisation where mPAP was 37 mmHg with PCWP 5 mmHg and PVR 8,91 Wood units, thus confirming CTEPH diagnosis.

Conclusions

Scrupulous patient anamnesis is crucial in early CTEPH diagnosis revealing important risk factors for CTEPH manifestation. Keeping these risk factors in mind can help to make the right decisions in treatment earlier. Untreated CTEPH patient prognosis is poor, however, there are various treatment methods (medication, interventional, surgery) for these patients to improve patient prognosis.

Common variable immunodeficiency among Kyiv residents – heterogeneity of manifestations: clinical case

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Objectives

Common variable immunodeficiency (CVID) is a group of diseases, which are characterized by the low level of immuno- globulins, mainly IgG. Frequency of finding this condition is about 1:10000 in Western Europe and 1:50000 in countries of Northern America. Some of them could have manifestation of autoimmune processes like cytopenia because of heterozygous mutation of a TAC1 gene.

Materials and Methods

Analysis of foreign literature of diagnostics and treatment CVID and description of a CVID clinical case and structural analysis of its frequency between primary immunodeficiencies in adults.

Results

Clinical case. Patient M, 42 y. o., without any epi- sodes of pneumonia in his childhood and currently employed in woodworking factory complains of frequent pneumonia (3 epi- sodes in the last 3 years, mild course) and frequent cases of chronic pansinusitis. He was referred to the immunologist with suspected immunodeficiency for the first time. Tuberculosis, HIV, diabetes was excluded. For the last year, he has been registered with two cases of pansinusitis. On CT – splenomegaly there is an increase in abdominal lymph nodes, bronchiectasis. An immunological examination of peripheral blood was performed for the first time in his life: IgM <0.07 g/l; IgG <1.4 g/l; IgA <0.15 g/l; IgE <1.5 IU/ml; CD3+ cells -79.6%; CD3+ CD4+ - cells - 18.8%; CD3+ CD8+ cells - 50.3%; CD19+ cells - 9.6%; CD16 + CD56+ - cells - 10.6%; indicators of phagocytosis was without deviations. Further genetic testing found the mutation in RAG2 gene. According to the standards of treatment and resulted in clinical improvement and reduction of episodes of synopulmonary infections of this patient conducted treatment with immunotherapy replacement drugs of intravenous immunoglobulin (IVIG).

Conclusions

The description of this clinical case demonstrates an unusual manifestation of CVID and its combination with cell immune deficiency as a re- sult of RAG2 gene mutation in adult patient.

Fragile X syndrome and multifocal motor neuropathy coexistence: case report

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Objectives

Fragile X syndrome (FXS) is a rare genetic disorder. FXS patients is nearly always characterized in affected males by developmental delay and intellectual disability along with a variety of behavioral issues. FXS premutation females could have increased risk for other comorbidities as well as autoimmune diseases. Multifocal motor neuropathy (MMN) is a rare chronic progressive immune-mediated motor neuropathy, clinically characterised by progressive asymmetric weakness and electrophysiologically by partial motor conduction block. Anti-ganglioside antibodies are supportive for MMN diagnosis.

Case report: Twenty three years old male presented with slowly progressive weakness in left hand, without complains about sensory disturbances. In childhood patient was diagnosed (with genetic confirmation) with FXS due to mild psychomotor development delay and behavioral alterations.

Clinical findings: On examination patient had decreased muscle strength and muscle atrophy in left palm muscles within n.ulnaris innervation without sensory deficits. Otherwise without focal neurologic deficit.

Diagnostic assessment: Nerve conduction studies revealed decreased motor action potential as well as prolonged latency and velocity in n.ulnaris sin. motor fibres indicating axonal-demyelinating neuropathy, however without conduction block. Magnetic resonance imaging for spinal cord cervical-thoracal part was performed and showed no pathological findings. Blood analysis showed increased levels of anti-GM1 and anti-GM2 antibodies.

Discussion: FXS and MMN both are rare diseases, however, could be present simultaneously as presented in our case report. Male patients with FXS does not have increased risk for immune-mediated diseases, although could present with other disease coexistence.

Conclusions

Diagnosis of MMN was made and therapy with subcutaneous immunoglobulin was started. Due to recent initiation of therapy the effect is not known yet.

Incontinentia pigmenti

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1. Rīga 1st Hospital; Rīga Stradiņš University, 2. Rīga Stradiņš University; Children's Clinical University Hospital

Incontinentia pigmenti is an X-linked dominant genodermatosis, disorder that affects the skin, teeth, nails, hair, eyes and central nervous system. The classic manifestations are skin lesions that evolve through four stages. Disease is associated with alopecia, hypodontia, nail dystrophy, retinal changes and neurological findings-seizures, developmental delays and intellectual disability. Blistering in first months, followed by wart-like rash, then hyperpigmentation and blaschkoid hypopigmentation.

The aim of this clinical case report is to accent this disease for better understanding and faster recognizing that leads to adequate care and treatment.

11 days old female infant (born at 39 gestational weeks, birth weight 3620g, Apgar score 7/8) was admitted to the Children's Hospital Neonatology unit due to vesicular lesions that were present from birth and progressing. One month before delivery a mother had unspecified stomatitis (other infections she denies) Physical examination: baby's general condition was mild. T 36,8 C. Skin was very dry, hyperemic, with desquamation. On the left leg some small grouped pustules; no oedema. Other systems- without any pathology. Laboratory studies: normal

Skin culture: CONS, normal skin flora contaminant.

A consultation of dermatologist 2 days after hospitalisation: Skin lesions dynamics is negative. Skin was very dry, slightly erythematous, a little bit scaling. Multiple grouped, converging vesicles and pustules were located on the extremities, inguinal region and mons pubis

Recommended skin care program, continuous consultations- ophthalmologist (concl. neonatal conjunctivitis, dacryocystitis), neurologist (NSG without pathology), geneticist consultation.

A differential diagnosis – neonatal infection –, was initially considered because of progressing lesions after birth, mother's infection during pregnancy.

Conclusions: Disease can imitate neonatal infection due to skin lesions. It is important to remember about non-infectious etiology and recognize a genodermatosis of non-infectious cause. If the diagnosis is made precisely, the young patient would be protected from inadequate therapy.

Patau syndrome clinical case – multidisciplinary team work: view of ophthalmology

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1. Rīga Stradiņš University, 2. Children's Clinical University Hospital

Patau syndrome is caused by an extra copy of chromosome 13 and is the third most common autosomal trisomy in newborns. Incidence of trisomy 13 is approximately 1 case per 8,000-12,000 live births. Multiple large studies have detailed a poor prognosis of patients with Patau syndrome. Median survival is 7 to 10 days in live-born patients, and 90% live for less than 1 year.

Infants with trisomy 13 have numerous malformations. Patients often have congenital heart defects, brain or spinal cord abnormalities, polydactyly, cleft lip or palate, and hypotonia.

Ocular findings are present in 90% of Patau syndrome subjects. Typical inferonasal iris coloboma with sectoral cataract in the same location is highly suggestive of this syndrome. And other eye features are described.

We present a 6 years old girl, with Patau syndrome. The patient is regularly observed in a pediatric ophthalmology clinic since birth. The patient has typical habitus: congenital eye pathologies – microphthalmia, cataract, glaucoma, coloboma of the iris, dysgenesis of the cornea and iris. Congenital CNS pathologies, atrial septal defect, polycystic kidneys.

In this clinical report, we analyze patient pathologies over 6 years of her life, their development and treatment. Our main view is on the dynamics of her eye pathologies and the received and possible therapy.

We have done literature review of other Patau syndrome patients, to understand best possible treatment for eye pathologies in these patients.

Pelvic actinomycosis – a challenging radiological diagnosis

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1. Rīga Stradiņš University; Riga East Clinical University Hospital, 2. Rīga Stradiņš University, 3. Rīga East Clinical University Hospital

Objectives

The aim of the study was to present a case of pelvic actinomycosis – a rare disease which is difficult to diagnose. Case report: A 45-year-old woman was admitted to Riga East University Hospital for further investigation of possible cervical cancer.

Biopsy of the cervix and vagina, abrasion of uterine cavity was performed and there were no signs suggesting malignancy. Later, computed tomography (CT) of the abdomen with i/v contrast administration was performed, the radiologist's conclusion was: cervical cancer with extension to uterus and vagina and specific parailiac lymphadenopathy. Loop electrosurgical excision procedure was also performed and showed only active cervicitis, no signs of malignancy. Urine cytology examination suspected cells that might be of oncological origin. Cystoscopy was made, nothing abnormal was found. The diagnosis was unclear, so magnetic resonance imaging (MRI) of small pelvis was performed, the conclusion was: massive malignant cervical process with parametrial infiltration spreading to pelvic walls, extension to uterus and possible infiltration of urinary bladder, advanced specific lymphadenopathy. Patient had negative HIV, HCV, HBV, borrelia burgdorferi and treponema pallidum test results.

It was decided to perform a diagnostic laparotomy with intraoperative lymph node histological investigation, which showed only reactive changes. Surgeons decided to perform total hysterectomy and tubectomy, preserving the ovaries, due to their intact state. Histology of postoperative material revealed chronic granulomatous cervicitis in reactivation phase with no signs of malignancy. Biological material cultured from vagina tested positive for Peptostreptococcus anaerobius and Actinomyces odontolyticus. Taking into consideration all findings, the most probable diagnosis of actinomycosis was established postoperatively. Therapy with antibiotics was prescribed and future MRI follow ups should show its effectiveness.

Conclusions

Multidisciplinary approach is crucial to establishing this rare diagnosis, which mimics malignancy on radiological examinations.

Severe atopic dermatitis in patient with common variable immunodeficiency: case report

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1. Rīga Stradiņš University; Rare Disease Center's Support Unit, Riga East Clinical University Hospital, 2. Rīga Stradiņš University, 3. Rīga Stradiņš University; Pauls Stradins Clinical University Hospital

Objectives

Common Variable Immunodeficiency (CVID) is a rare inborn error of humoral immunity that is characterized by reduced or absent antibody production and recurrent infections. CVID is also associated with a higher risk of autoimmune and lymphoproliferative disorders. Currently, there is no curative treatment and only immunoglobulin replacement therapy is available to treat CVID patients. Atopy is not a common manifestation of CVID.

Case report: The patient, a 28-year-old female, had suffered from numerous pulmonary infections, severe atopic dermatitis, and boils since the age of 4. At the age of 16, her immunologic tests revealed a severe reduction of the IgG, IgM, IgE levels with a complete absence of the IgA, and she was diagnosed with CVID. After starting the immunoglobulin replacement therapy, her clinical condition improved. However, atopic dermatitis persisted and worsened over the next 10 years. Despite receiving treatment for atopic dermatitis, she was hospitalized 2-3 times a year with exacerbations and secondary bacterial infections. In 2019 she was involved in a six months clinical trial and received a treatment with anti-thymic stromal lymphopoietin monoclonal antibody Tezepelumab. Within two months her clinical condition significantly improved, no new exacerbations occurred during the study period. Before the treatment her EASI score was 54, after – 12, SCORAD before 46% and after 21%, and IGA before 4 and after 2. After the study, she continued to experience occasional flares of atopic dermatitis and gradual worsening of skin condition.

Conclusions

In CVID patients the presence of atopic disorders has not been completely understood due to low levels of total and specific IgE. In the case of recurrent infections and severe atopic dermatitis, an immunodeficiency should be included in the differential diagnosis. In patients with CVID and frequent exacerbations of atopic dermatitis, biological medications could be a promising pathogenetic treatment.

Shiitake mushroom flagellate dermatitis

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1. Children's Clinical University Hospital, 2. Health Center 4

The consumption of raw or undercooked *Lentinula edodes* or shiitake mushrooms can cause flagellate dermatitis characterized by linear erythematous eruptions - papules, papulovesicles, plaques and pruritus. The reaction is likely caused by lentinan - a polysaccharide found in shiitake mushrooms. The lesions typically appear 24-48 h following ingestion and resolve spontaneously within few days to few weeks. The diagnosis is clinical and based on the anamnesis. The treatment is symptomatic usually with antihistamines, local corticosteroids and in more severe cases - with systemic corticosteroids.

A 28 year old woman presented with intensively pruritic erythematous linear papules on her back, shoulders, arms, legs and forehead. She was otherwise healthy with no history of any skin, systemic disease or allergies. She admitted having eaten shiitake mushrooms in a restaurant the day before the rash started. Based on the clinical and anamnestic findings a diagnosis of shiitake flagellate dermatosis was made. She was treated with local corticosteroids and antihistamines, but, during the treatment, the lesions progressed to papulovesicles and the pruritus became more intense, so systemic corticosteroids were added. The rash and pruritus resolved 10 days after the start of the reaction.

Shiitake mushrooms are well known in Oriental culture. With the increasing popularity of these mushrooms in Europe, it is important for health care specialists and society in general to be aware of the reaction that can be caused by the consumption of raw or undercooked shiitake mushrooms.

The first case in Latvia, caused by mutation in the prion-related protein

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Here we report a family of two generations, where the proband, aged 39, started to manifest unspecified progressive CNS disease with parkinsonian syndrome and elements of cerebellar ataxia two years ago.

The whole genome sequencing was performed as a part of our research project. This revealed a heterozygous variant in the *PRNP* gene (ENST00000379440) c.679C>T, p.(Gln227Ter), which is a putative loss of function mutation.

This variant has previously been described by Jansen et al. in 2010, when two patients carrying two similar heterozygous truncating mutations p.Tyr226Ter and p.Gln227Ter, presenting with Gerstmann-Straussler disease (GSD) and PRNP-related cerebral amyloid angiopathy was described. In both cases the mutations resulted in the protein being C-terminally truncated and lacking the GPI anchor, therefore rendering it unable to localize to the plasma membrane. It has been postulated that the lack of this anchor predisposes to amyloid formation. The two patients described started presenting disease symptoms at 55 and 40 years of age and died 27 and 72 months after the onset respectively.

The GSD is a rare inherited prion disease, with the phenotype of memory loss, dementia and ataxia with adult onset as well as pathologic deposition of amyloid-like plaques in the brain. PRNP-related cerebral amyloid angiopathy is usually not a feature of prion-related diseases, however, in patients with truncating mutations in the *PRNP* gene, amyloid deposits within the walls of cerebral vessels have been observed.

Prion disease can be either naturally occurring, caused by an infection, or, as described here, inherited. Both forms are very rare entities, and therefore seldomly consider in the differential diagnosis for patients with rapidly progressive neurodegeneration. In the case of the family described here, clinical symptoms, electrophysiological investigations and brain scans lack pathognomic signs, thus emphasizing the diagnostic power of whole genome sequencing.

Visual function recovery after central retinal artery occlusion in a patient with primary diagnosed granulomatosis with polyangiitis

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On September, 2019 a 46 year old male complains of lasting febrile fever approximately 2 weeks, frequent diarrhoea, nose bleeding, weight loss, runny nose from June and nose deformity that appeared recent. After numerous examinations diagnosis is made: granulomatosis with polyangiitis a.k.a. Wegener Granulomatosis, acute renal insufficiency, nephritic syndrome, high AntiPR3 antibodies. Solumedrol pulse therapy was started with 500mg i/v for three days, followed by p/o prednisolone 60mg and cyclophosphamide 800mg per day and 5 plasmapheresis therapies. After five days patient complains about painless vision loss in his left eye. Visual acuity (VA) right eye = 0.6, OS = hand movements, TOU=18mmHg. Left eye had dilated non-reactiv pupil and fundoscopy revealed central retinal artery occlusion (CRAO). Therapy prescribed: acetazolamide 250mg for 13 days. Eyeball massage was performed. Due to acute ophthalmic complication additionally s/c heparin 5000 IU four times per day for six days in total was prescribed. After two days from initiated heparin therapy patient notice mild eyesight improvement. After 6 days his vision has renewed. Two weeks after the onset BCVA OS = 1.0, optic disc with visible margins, pinky, slight paleness in temporal quadrant, narrowed retinal vessels. Also digital perimetry shows mild peripheral visual field defect that is almost completely diminished 2 months after event.

Although cases like this are rare we should always consider systemic vasculitis if we detect ocular manifestation like CRAO especially among younger patients. Early detected vasculitis caused central retinal artery occlusion with previous prednisolone pulse therapy, cyclophosphamide, plasmapheresis, eye massage and early subcutaneous heparin administration after CRAO occurrence for a patient with Granulomatosis with Polyangiitis and severe end-organ damage can lead to excellent outcome in visual acuity although most of cases like this end's up with poor visual outcome due to late patient referral to the ophthalmologist.

History Of Medicine

Beware the lady with a green eyes: twelve years of Herta Hanzen in charge of the Museum of History of Medicine

Dr. Rita Grāvere¹

1. Pauls Stradiņš Museum of History of Medicine

Objectives

In 1961, four years after the official opening of Pauls Stradiņš Museum of History of Medicine, an official from Latvian SSR Council of Ministers Herta Hansen (1909-1972) was appointed as a museum director and she held the post for the next twelve years. The objective of this study is to explore this era in the museum history.

Materials and Methods

In this study the documents from Pauls Stradins Museum of History of medicine archives have been analysed. Periodicals and written memoirs have been used additionally.

Results

As described by contemporaries, Hanzen was a typical director of a soviet institution - a dogmatic that took the post till the day she died. She was not bothered by her own ignorance in the field of history of medicine. She started to build up the museum exhibitions as she found fit, but she was intelligent enough to respect Pauls Stradins visions in general.

Upon the opening of the museum there were 12300 objects in the storage, 9000 books. In 1961 - already 153 000 exhibits. On the museum five year anniversary there were 40 rooms with 12 exhibitions.

The museum copied paintings and sculptures from Hermitage, at the same time getting rid of some "inappropriate" local works (e.g. paintings of Vika). In Hanzen's time a valuable materials from People's Republic of China came were aquired as well as the famous transparent men from DDR.

Conclusions

One must agree to Jānis Stradiņš - Hanzen became the museum director in the most tense period of time shortly before completing the new museum exhibitions. Despite her political views, she somehow respected Pauls Stradiņš legacy. Largely due to her energy and organising skills the museum was opened to visitors in July20, 1961. She promoted the museum in scientific conferences and in popular press. She is the one who started the museum branding.

Foreign pharmaceutical companies in the Latvian market 1923–1939

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1. Rīga Stradiņš University, 2. Independent Researcher

Objectives

To study the role of foreign drug manufacturers in the Latvian market by analyzing publications and advertising in local pharmaceutical journals from 1923 to 1939.

Materials and Methods

Archives. Periodicals. Comparative historical research.

Results

Until 1923, there were no professional periodical pharmaceutical journals in Latvia. The magazine "Фармацевтический журнал" of the St. Petersburg Pharmaceutical Society and German pharmaceutical publications have had an influence on the local market. From 1923 to 1939 "Latvijas Farmaceitu Žurnāls" was published in total of 197 issues.

The magazine published information about foreign pharmaceutical companies:

Emanuel Merck, Darmstadt (founded in 1891) - a chemical factory, which provided pharmacies with raw materials for the preparation of medicines (zinc oxide, lactic acid, alkaloids, iodine salts). The company's representative in Latvia was the company *Carl Walter*, in Riga, Skolas 25.

Schering – Kahlbaum A.G., Berlin (founded in 1871). The company's representative in Latvia was *Albert Graben*, the representative office in Riga, Aspazijas boulevard 9.

Bayer – Meister Lucins, Leverkusen A. RM. (founded in 1863). Bayer's distributor in Latvia was *Baltpharma* located in Riga, Kungu 7 with representative *Theodor Neukirch* (born 1878).

F. Hoffmann – La Roche & Co. A.G. (founded in 1896), Swiss company from Basel with the chemical plant in Germany. Since 1921, the company's representative office in the Baltic States has been headed by long-time representative in St. Petersburg *Josef Aronstam* (1864-1929), who was later replaced by his son *Viktor Aronstam* (1893-1941).

Conclusions

The development of the pharmaceutical market in Latvia was facilitated mainly by large pharmaceutical companies from Germany and German-speaking countries. This tendency was observed until the First World War also in the European part of imperial Russia. This influence in Latvia was renewed after 1920.

The distribution in Latvia was formed by companies concluding agreements with local wholesalers and establishing their own marketing offices in Latvia.

Maintaining the collection of corrosion casts at Rīga Stradiņš University Anatomy Museum

Dr. Ieva Lībiete¹

1. Rīga Stradiņš University

Objectives

RSU Anatomy museum holds a collection of around 200 corrosion casts that were made by anatomical preparator Jāzeps Poļikēvičs (1891-1938). Such specimens are made from casting vessels, ventricles or airways first by injecting organs and then macerating the tissue away. Allegedly Poļikēvičs had elaborated his own unique recipe for injecting the specimens, which has not been preserved to the present day. The objective of this study is to detect the potential components of the substance that was used for injections. This is crucial for maintaining this fragile collection in the future.

Materials and Methods

The scientific publications from 1920s-1930s by the staff members of Anatomy institute of Medical Faculty of University of Latvia were analysed here.

Additionally, samples from three different casts were analysed by infrared spectroscopy (FTIR-ATR and FTIR-transmission).

Results

Corrosion casting as a method was mentioned in two papers: 1) *Gefäße der Lungen und Modus der Abzweigung der Bronchen* (G. Backman, 1924) and 2) *Lobierung und vascularisation der Leber der Säuger* (L. Jeruma-Krastiņa, 1929).

According to authors, corrosion casts were made by injecting Teichmann's mass (in Backman's work) or celluloid-acetone mass (in Jeruma-Krastiņa's work).

In spectroscopy - two samples showed the presence of cellulose nitrate, so the injection mass most probably was celluloid, as expected. The third sample also showed the presence of cellulose nitrate on the outside and triolein in the interior. This may be a Poļikēvičs modification of the standard methods.

Conclusions

Data retrieved from the literature and spectroscopic analysis supports the theory that at least part of the corrosion casts are made of celluloid. It is suggested to treat all types of museum corrosion casts as if they are composed of celluloid and try to limit the effects of the acidic breakdown products associated with these materials.

Professor Hubbenet and his roots in Latvia

Dr. Maija Pozemkovska¹

1. Institute for the History of Medicine

Objectives

Christian von Hubbenet (1821-1873) was a Baltic German physician, a professor in surgery at the University of Kyiv. Hubbenet was once renowned throughout the Russian Empire, but now he has been long since forgotten.

Materials and Methods

The purpose of this innovative research is to define the birthdate and place of the professor with precision and to find his grave in Latvia. Metrics from the Latvian Archive of State History could be used.

Results

Hubbenet was born at the Podsem Manor (Podzēni) in Livland on May 31, 1821. The family later moved to the Ulpisch Manor, where the dynasty lived for a longer period of time. He studied medicine at the University of Dorpat from 1839 until 1844. Hubbenet began his career in Kazan, returning to Dorpat after three years to earn his doctorate in medicine. He moved to Kyiv and directed the Department of Forensic Medicine at the University of St Vladimir. During a cholera epidemic in 1848-49, Hubbenet ran a treatment department at a military hospital in Kyiv while at the same time researching the dangerous disease. Results based on clinical observations and autopsies of more than 100 cadavers were published in St Petersburg, Leipzig and Riga. Hubbenet particularly distinguished himself during the Crimean War. He was the second most outstanding surgeon in Sevastopol after Nikolay Pirogov. After the war, Hubbenet chaired the Kyiv Medical Association for nearly 10 years. He took part in conferences in Western Europe and moved to St Petersburg in 1870. There he contracted typhoid and died suddenly on his way to Vilnius on July 3, 1873. His remains were brought through Riga to the Ulpisch Manor (now Stiene), where he was probably buried.

Conclusions

This year is the 200th anniversary of the distinguished professor's birth, so let us honour his investment in the history of medicine.

Scientific business trips abroad of the Riga Medical Institute employees in the last decade of the USSR

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1. Rīga Stradiņš University, 2. Independent Researcher

Objectives

To examine the qualitative and quantitative tendencies of scientific foreign business trips of the teaching staff and employees of research institutes and laboratories of the Riga Medical Institute (RMI) in the period from 1979 to 1991.

Materials and Methods

The National Archives of Latvia: the State Archive of Latvia - Fund 507, instructions "for restricted circulation only" of the Ministry of Health of Latvian SSR, interviews with eyewitnesses. Comparative historical research.

Results

The policy and practice of building international scientific and cultural relations at the level of state institutions in the USSR began to develop in the mid-1950s. The last decade of the existence of the USSR is a model of all ideological contradictions in the bureaucratic and repressive regulation of international cultural, scientific and technical relations between USSR and foreign countries. This is a period of political and ideological "cold war" confrontation between the USSR and the leading Western powers since the late 1970s and significant liberalization of foreign contacts during Gorbachev's "perestroika" from 1986 to 1991.

The RMI qualified among the best of the higher medical education institutions in the Soviet Union. As a leading state establishment in its field, the RMI was a suitable institution for a strictly controlled system of international educational and scientific relations between the USSR and foreign countries. This process was carried out in a "dosed" manner and under the strict control of the subordinated structures and the departments of external relations (*Upravleniye vneshnikh snosheniy*) of the ministries of health of the USSR (Moscow) and the Latvian SSR (Riga).

Conclusions

The study reveals the spheres and geography of medical international cooperation of the RMI until 1992, the leading influence and regulation by communist party and bureaucratic structures, as well as the role of personal contacts in international cooperation and scientific partnership with leading medical specialists in Soviet Union.

The personality of Prof. Haralds Voskis and his legacy in the collection of the Rīga Stradiņš University History Museum

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1. Rīga Stradiņš University

Objectives

To evaluate the museum materials that represent the personality of Haralds Voskis as well as Rīga Stradiņš University (RSU), where he studied medicine and later became a professor.

Materials and Methods

The RSU History Museum has received H.Voskis' (1928–2011) archive materials and the manuscript for his book *Applied Anatomy*. This is evidence which portrays an important personality in the history of RSU – a doctor, a lecturer, a scientist, the chairman of the RSU Library Council and an author.

The study compares the manuscript *Applied Anatomy* prepared by H. Voskis in 1991 with the textbook *Topographic Anatomy* published by H. Voskis, V. Timmermane, A. Mansone in 1975, the first textbook on this topic in Latvian. The latter was created in cooperation with leading Russian specialists in anatomy and surgery following the standards of scope, form, and length adopted by the Soviet Union. In contrast, *Applied Anatomy* was created at the time when Latvia regained its independence. The manuscript was created freely, showing no influence of any dominant persons or traditions. It reflects H. Voskis' profound understanding of human anatomy in all its diversity in the context of clinical medicine. To demonstrate this, a chapter on the hip joint from each book has been analysed. H. Voskis' candidate dissertation in medical sciences (1958) and doctoral dissertation in medical sciences (1981) are dedicated to the studies of the hip joint surgical anatomy.

This work employs methods of historical research and comparison.

Results

The museum's collection will be enhanced with more than 200 valuable artefacts that can serve for research on the history of higher education in Latvia, the history of personalities and their ideas, as well as medical history and applied anatomy.

Conclusions

Professor Haralds Voskis' archive materials will be significant benefit for researchers who study higher education in Latvia, medical history and applied anatomy.

Two notable pathologists in Latvia in the 20th century – Vitolds Kalinka and Ludmila Sokolova

Prof. Regīna Kleina¹, Dr. Ivanda Franckevica¹, Dr. Daina Lutinska¹

1. Department of Pathology, Rīga Stradiņš University

Objectives

Objectives are to reflect the contribution of two excellent doctors to the academic, scientific, and practical work of Latvian pathology.

Materials and Methods

For the research we used documents, photos of the Department of Pathology, RSU archive materials and testimonies of time members.

Results

Vitolds Kalinka (1923-2011) graduated from the Riga Medical Institute in 1953, then completed postgraduate studies at the Department of Pathological Anatomy and Forensic Medicine. He has been a lecturer at the 2nd Medical School, head of the Pathology department at Riga 1st Hospital, chair of the department of Pathological anatomy (1980-1981), assistant professor. From 1981 to 1987, he was an expert-histologist at the Forensic Medicine Examination Bureau of the Ministry of Health. He has published countless scientific articles about gastropathology.

Ludmila Sokolova (1937) began her career in the Department of Maternal and Child Protection at the Central Research Laboratory (RMI), with research on congenital pathology with geneticists. This was followed by the work of a children pathologist at Riga 5th Hospital and Pathology Office of CCUH. Assistant professor Sokolova was the head of the department of Pathological anatomy (1983-1988), her research was about placental and pediatric pathology. In the 1990s, residency at AML was established, where the great contribution of Sokolova to the education of future gynecologists' and pathologists should be noted.

When colleagues worked, teaching methods were different: the lecturers drew pictures on the board, morphology was demonstrated by slides, overhead projector films. Students created summaries of lectures, worked with microscopes, examined surgical and autopsy material which together with books in Russian were the only materials in pathological anatomy.

Conclusions

We want to emphasize the invaluable contribution of both colleagues in the work of various commissions of the Ministry of Health, Association of Pathologists of Latvia, as well as consultations of pathologists in rural hospitals and in the student's scientific research.

**Clinical Medicine
(Pulmonology,
Gastroenterology,
Nephrology,
Rheumatology A.O. And
Also Radiology,
Anaesthesiology A.O.)**

Analysis and evaluation of correlation for clinical, dermoscopic and histological signs of rare inverse localized paradoxal psoriasis: case report – 2 similar cases

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Objectives

TNF α inhibitors are widely used and highly effective in the treatment in number of chronic inflammatory diseases, including psoriasis. Although TNF α inhibitors block multiple pathways responsible for psoriasis, in 2% of cases they cause eruption of rash characteristic for this disease-specific rash known as paradoxal psoriasis. Aim of our report is identification and analysis for phenomenon of paradoxal psoriasis in patients treated with TNF α inhibitors.

Materials and Methods

In our report we describe 2 patients, women 16 and 42 years of age with inverse localization of psoriasis, which started less than a year after treatment for Crohn's disease with TNF α inhibitors was initiated. Unlike in our report, the paradoxal forms of psoriasis usually described in literature reviews include pustulosis of the palms of the soles, scalp psoriasis, as well as vulgare and guttate forms of psoriasis. The diagnosis of psoriasis for patients described in our case report was confirmed pathohistologically. Both patients had psoriasis-related comorbidities, respectively, Crohn's disease and spondylitis, why they received treatment of TNF α inhibitors. Reason of paradoxical psoriasis is delayed maturation of plasmacytic dendritic cells (pDC) due to abundant blocking of TNF α signaling, finally resulting in exaggerated IFN α response.

Results

Pathohistological examinations of the epidermis revealed the typical signs of psoriasis - parakeratosis, agranulosis and mitosis in the basal layer. However, although purulent exudative crusty scales were observed in both patients, neutrophils so characteristic for psoriasis were not detected in the dermis. And also tortuous capillaries typical for psoriasis were not observed in both the histological and dermoscopic patterns.

Conclusions

Although our described clinical manifestations induced by TNF α inhibitors were consistent with of psoriasis, discrepancies were found in the histopathological and dermoscopic patterns, indicating the distinct mechanisms of pathogenesis for classical and paradoxal psoriasis.

Anesthesiological management for merosin-deficient congenital muscular dystrophy patient undergoing emergency surgery

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Objectives

Total intravenous anesthesia (TIVA) with readiness of difficult airway management and wound local anesthetic infiltration has been accepted as safest anesthesia method for muscular dystrophy patients. Here, we report a case of a 20-year old male with hereditary muscle dystrophy of merosin deficiency who was admitted to Riga East University hospital due to testicular torsion.

The patient's physical status class (ASA) was III-IV, body weight 45 kg. While assessing anatomy, all parameters predicted difficult airways - impaired temporomandibular joint motion, mouth opening 2 cm, thyromental distance 3.5cm, Mallampati IV, macroglossia, long upper front teeth, restricted neck movements, thorax deformation. Additionally, patient reported daily assistance of CPAP devise due to sleep apnea.

Awake fiberoptic intubation approach with endotracheal tube (ID 7) was used after 2.5 mg of Midazolam administration intravenously (i/v). Depth-of-anaesthesia was monitored by Narcotrend index as electroencephalography measures. At awake patient had 95-100, during the surgery 55-65. TIVA was initiated with Propofol 2 mg/kg bolus following by continuous i/v infusion 1-3 mg/kg/h. Sedoanalgesia was continued with Phentanyl 50 mcg boluses. To reduce requirements of opioids, Ketamine 30-50 mg i/v was parallel used without myorelaxation. At the end of the surgery unexpected peripheral vein rupture occurred and Sevoflurane was inhaled (MAC 0.5-0.6) until a stable venous approach was secured. The general condition of patient remained stable. Extubation was performed when patient was fully awake. Anesthesia time was 1 hour, 45 minutes, surgery lasted 20 minutes. On the second postoperative day patient had signs of basal pneumonia which was successfully treated.

Conclusions

TIVA with low dose opioids combined for a short period with inhalation agent proved to be an effective and safe anesthesia method for the muscular dystrophy patients management.

Application of fluorescence image guided cholangiography for the assessment of biliary anatomy in patients with acute cholecystitis: review of a case series

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Objectives

Bile duct injuries (BDI) remain one of the most threatening complications during laparoscopic cholecystectomy (LC). In patients with acute cholecystitis (AC) the risk of BDI may increase up to 20 times. Near-infrared fluorescent cholangiography (NIRF-C) is a novel, noninvasive method for a real-time intraoperative biliary mapping. The aim of this study is to preliminary evaluate effect of NIRF-C for detection of biliary anatomy in patients with AC.

Materials and Methods

Urgently admitted patients with AC were considered for surgery using NIRF-C and included in study. The patients were stratified into two groups according to the *Tokyo Guidelines 2018*: Group1 mild; Group2 moderate AC. 12.5 mg of *Indocyanine green*(ICG) was administered intravenously 12 hours before surgery to avoid strong liver background and visualise extrahepatic bile ducts (EHBD). Fluorescence effect was scored both before and after the dissection according to *Critical View of Safety* principle. Adapted visualization scales: *Likert scale*, *Helpful score*, *Disturbed score* were applied to document significance of NIRF-C.

Results

A total 11 patients underwent LC with NIRF-C. Mild AC was diagnosed in 9 (82%) and moderate AC in 2 (18%) patients. The near-infrared visualization rate of the *cystic duct* (CD), *common bile duct* (CBD) and *common hepatic duct* (CHD) prior to dissection was 82%, 45%, 27% but after the dissection it improved to 91% (p=0.187), 73% (p=0.026), 73% (p=0.01), respectively. NIRF-C was considered to be helpful or highly helpful to detect CD in 9 (82%), CBD in 4 (36%) and CHD in 2 (18%) patients. Disturbed score showed that fluorescence of liver background did not disturbed detection of anatomy in 5 (45%), slightly disturbed in 4 (36%), and heavily disturbed in 1 (9%) patient. The mean operative time was 74±28.6 minutes. No postoperative complications were reported.

Conclusions

NIRF-C is easy applicable method for real-time visualization of EHBD that enhances surgeon's confidence performing LC.

Association between radiological characteristics of hemorrhagic pancreatic pseudocyst and endovascular embolization site

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Objectives

Hemorrhagic pancreatic pseudocysts (HPP) is a life-threatening complication. Endovascular embolization (EVE) of related visceral arteries plays an important role in treatment strategy. The aim of this study was to assess radiological findings of HPP and the association to the site of EVE.

Materials and Methods

In retrospective single center case control study patients with HPP and EVE of related visceral artery between years 2014 - 2019 were included.

Radiological appearance of HPP, location, potential source of bleeding was evaluated in computed tomography (CT). Correlation to EVE site performed by IBM SPSS program.

Results

52 patients: 80%(n= 42) - male, 20%(n=10) – female, mean 46,5 (range 27-78) years were included. HPP was significantly prevalent in patients with acute pancreatitis 80% (n= 42) (p< 0.05), 14% (n=7) had chronic pancreatitis, 6% (n=3) – defined as normal. Pseudoaneurysm found in 27% (n=14), in 73% (n=38) exact bleeding site was not detectable. Intracystic haemorrhage found in 52% (n=27), direct bleeding from HPP to gastrointestinal tract - 15% (n=8), intracystic + gastrointestinal tract bleeding -15% (n=8), retro- /intrapertoneal haemorrhage -15% (n=8), intracystic + intraabdominal hemorrhage - 2% (n=1). Anatomical distribution of HPP in pancreas : 25% - head; 27%- body, 48% - tail.

In HPP of pancreatic head EVE of *a.pancreaticoduodenalis* (46%, n=6) and *a.gastroduodenalis* (46%, n=6) most often performed. In HPP of pancreatic body EVE of *a.lienalis* - 79% (n=11) and *a. gastric sinistra* 14% (n=2); *a.gastrica sinistra+a.lienalis* - 7% (n=1). In HPP of pancreas tail EVE *a.lienalis* most often performed (84%, n=21). Statistically significant correlation between HPP in pancreatic body/tail and EVE of *a. lienalis* was found (p<0.05).

Conclusions

HPP more frequently occurs in patients with acute pancreatitis. Strong correlation between location of HPP in pancreas body/tail and EVE of *a. lienalis* was found thus showing the crucial relevance of preoperative CT.

Association of the clinical presentation and disease activity index in Sjogren's syndrome

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Objectives

Investigate the impact of different clinical presentation on disease activity in patients with primary Sjogren's syndrome.

Materials and Methods

The retrospective study including data about 40 outpatients who visited a rheumatologist in SIA "ORTO klīnika" from 2014 to 2020 with diagnosis defined as M35.0 by the ICD-10. Disease activity measured by EULAR Sjogren's syndrome activity index (ESSDAI).

Results

40 patients – 36 women and 4 men with mean age 55.5 years (± 2.14 ; SD=13.55). Average disease manifestation age – 48.4 years (± 1.93 ; SD=12.23), average disease activity index – 12.6 points (± 1.28 ; SD=8.1). Complains about dry mouth had 32 patients, dry eyes – 26, parotid gland enlargement or ultrasonographic inflammation – 23, articular involvement – 26, renal – 20, skin – 9, lungs – 9, neural – 7. Changes in complete blood count tests were common finding: lymphopenia was observed in 15 patients, anaemia -12, leukopenia or neutropenia -10, thrombocytopenia -3. Immunological changes were found in majority of patients: ANA had 39 patients, ENA -38, SS-A/Ro -36, SS-B/La -19, rheumatoid factor -29, polyclonal hypergammaglobulinemia -27, hypocomplementemia -12 (only 25 from 40 checked).

Higher disease activity index was in association with lymphopenia (16.6 vs 10.2 points; $p=0.014$), anaemia (18.1 vs 10.77 points; $p=0.011$), renal (14.85 vs 10.35 points; $p=0.017$) and lung (18.89 vs 10.77 points; $p=0.006$) involvement, lower disease activity – in association with articular involvement (10.54 vs 16.43 points; $p=0.026$).

Lymphocyte count ($k=-0.48$; $p=0.02$) and ANA ($k=0.51$; $p=0.002$) moderately correlates with disease activity index, rheumatoid factor level – have only weak correlation ($k=0.334$; $p=0.04$).

Conclusions

Anaemia, lymphopenia, renal and lung involvement associated with more severe disease course, but articular involvement – with less severe. High antinuclear antibody and rheumatoid factor level are characteristic for Sjogren's syndrome and important in the diagnosis, but are not strong markers of the disease activity.

Atherosclerotic plaque valnurability detection with new multiparametric ultrasound methods

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Objectives

There are several causes for cerebral ischemia and if risk factors are diagnosed timely, the risk of stroke can be reduced significantly. The unstable arterial atherosclerotic plaque is one of the main risk factors for cerebral ischemia. CEUS is a new noninvasive method, that may facilitate early detection of unstable carotid plaque (neovascularization) and may change patient management regardless stenosis grade concept in high stroke risk. The purpose of the study was to analyse multi-parametric US techniques ability to confirm the plaque's instability more precisely than the baseline investigation of Duplex US and find out correlation between the new multi-parametric US techniques results and histological findings.

Materials and Methods

During the prospective research, conducted in the period from 2018 to 2020, 75 patients with unstable plaque detected with duplex US, were included. Each patient was analyzed with B mode, Duplex US, SMI, CEUS and CTA methods. In 50 cases the results were histologically proven.

Results

Unstable plaque was diagnosed in 75 patients using Duplex US method and in 74 patients using CT method. Comparing both methods statistically significant correlation was found ($r_s = 0,781$; $p = 0,0001$). The neovascularization was diagnosed in 35 (46.7%) patients by CEUS - in 18 cases (51.4%) plaques showed neovascularization grade 1 and in 17 cases (48.6%) grade 2 plaques were detected. Using SMI method neovascularization were found in 17 (22.7%) patients, with statistically significant correlation between CEUS and SMI ($r_s = 0,701$; $p = 0,0001$). Comparing CEUS method and results of histology statistically significant correlation was found ($r_s = 0,61$; $p = 0,002$).

Conclusions

New ultrasound methods such as CEUS and SMI provide additional information to the atherosclerotic plaque instability and vasa vasorum detecting, with positive correlation to the grade of stenosis and histological results.

Bile duct injuries after laparoscopic cholecystectomy: single tertiary care center experience

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Objectives

The objective of this study was to systematize our experience with bile duct injuries (BDI) after laparoscopic cholecystectomy.

Materials and Methods

From 2014 to 2020 in total 33 patients with BDI were identified at the time of reference to our center. Data of injury type (Strasberg classification), intervention needed, and the results of treatment were recorded. Afterwards any subsequent times was recorded when patient was in hospital with complications of BDI.

Results

Average age at the time of cholecystectomy was 57.21 years (range 26 – 83). Based on type of injury we had type A – 7, type B – 1, type D – 5, type E1 – 6, type E2 – 3, type E3 – 4 and type E4 – 7 patients.

Two patients had late complications in form of liver abscess and had percutaneous drainage, 1 of those was unsuccessful and was managed surgically. Seven patients were managed only by endoscopic retrograde cholangiopancreatography (ERCP) or percutaneous transhepatic cholangiography (PTC).

In total 24 patient underwent surgical treatment. Five patients with less extensive damage had suturing of the lesion. But 19 patients with type E1-E5 damage required biliodigestive anastomosis modo Roux-en-Y.

One patient had major bleeding postoperatively, one patient – insufficiency of anastomosis that required surgical revision. Nine patients had stenosis of anastomosis on average 10 months after reconstruction (1-48 months), that required PTC. Six patients didn't have any complications after surgery. One patient died on 10th postoperative day due to thromboembolism.

Conclusions

Management of BDIs are complex based on diversity of injuries and the timing of diagnosis and require multidisciplinary approach. Although this is a rare complication, absolute count of these patients tends to accumulate over the years and have serious impact on long-term quality of life, based on repeated hospitalizations and need for invasive manipulations.

Bleeding after neck endocrine operations

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Objectives

Bleeding after neck endocrine operations is rare but can be life-threatening complication and requires immediate surgical intervention.

Materials and Methods

Retrospective 1726 patients' data operated from 2016-2020 were analysed. Bleeding with need of reoperation occurred in 24 (1.4%) of cases: 19/1368 (1.4%) after thyroid and 5/358 (1.4%) after parathyroid operations. Data were analysed regarding indications, type of surgery, time till reoperation, site of bleeding, comorbidities and outcome

Results

Indications for surgery: suspected or proven malignancy 9 (37.5%), compression symptoms 5 (20.8%), thyrotoxicosis 4 (16.6%), PHPT 4 (16.7%), SHPT and recurrent thyroid cyst 1 (4.2%) case each. Bleeding was more common in bilateral operations - 17 (70.8%) vs one side 7 (29.2%). Mean time till reoperation was 189 min (5-460), majority within first 4 hours - 16 (66.7%). More commonly bleeding site was noticed subcutaneously - 12 (50.0%) vs 9 (37.5%) in paratracheal space. In 3 (12.5%) patient site was not identified. Sixteen (66.7%) patients had anamnesis of arterial hypertension. Increased blood pressure during perioperative period was noticed in 21(87.5%) patients. Sixteen (66.7%) patients were discharged within 2 days after operation, 6 (25.0%) in 3-5 days, 1 on 10th day and 1 patient died on 8th postoperative day.

Conclusions

Bleeding after cervicotomy can equally occurred after thyroid and parathyroid operations, with highest prevalence in both side operations. Bleeding more commonly occurred within first 4 hours. Patients with arterial hypertension are at higher risk for postoperative bleeding.

Characteristics of PCR confirmed COVID-19 cases in patients with autoimmune rheumatic diseases in Latvia

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Objectives

The characteristics of coronavirus disease - 2019 (COVID-19) in patients with autoimmune rheumatic diseases (AIRD) have rarely been reported and the data from all countries are expected to manage COVID-19 for AIRD patients.

Materials and Methods

A retrospective observational study was performed in Pauls Stradins Clinical University Hospital and Riga East Clinical University Hospital outpatient departments from March 1 till December 31, 2020.

Results

Overall 3419 AIRD patients were consulted and 19 (0.55%) of them had COVID-19. SARS-CoV-2 was proved with PCR in swabs. There were 12 females (63.16%) and 7 (36.84%) males with median age 52 (IQR 30 – 71) in COVID-19 positive group. The most common clinical symptoms of infection were fever (14 (73.68%) patients), fatigue (12 (63.16%) patients) and cough (8 (42.1%) patients). COVID -19 pneumonia had 4 (21.05%) patients and they were hospitalized. 2 (10.53%) patients had no symptoms of infection. The profile of rheumatic diseases in the infected group (cases) consisted of 5 diseases: rheumatoid arthritis (11 (57.89%)), ankylosing spondylitis (4 (21.05%)), psoriatic arthritis (1 (5.26%)), granulomatosis with polyangiitis (1 (5.26%)), juvenile idiopathic arthritis (1 (5.26%)). Rheumatic disease remission or low disease activity was observed in 15 (78.95%) patients, moderate disease activity – in 2 (10.53%) patients and an active disease in 2 (10.53%) patients. Almost all patients stopped AIRD specific therapy during COVID-19, but 3 (15.79%) patients continued (sulfasalazine, etanercept, prednisolone). In 2 weeks after the last day of COVID-19 symptoms 17 (89.47%) patients resumed disease modified antirheumatic drugs. There were no data of AIRD exacerbation during or after COVID -19. Comorbidities had 11(57.89%) patients, the most common was an arterial hypertension (63.64%).

Conclusions

Preliminary data shows that patients with AIRD have low risk of critical COVID-19. Further studies are needed to confirm a risk degree for a critical COVID-19 development in AIRD population.

Clinical characteristics of patients with prolapsing haemorrhoidal disease

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Objectives

Hemorrhoidal disease (HD) affects 4,4 to 86% of the general population, peaking between age 45 to 65 years. Surgical treatment is indicated for HD grade III and IV. Surgery includes excisional hemorrhoidectomy following Milligan-Morgan or Ferguson's recommendations. Longo technique allows avoiding tissue trauma, severe pain, bleeding, and post-operative mucosal discharge characteristic of conventional hemorrhoidectomies. LigaSure™ vessel sealing system allows reduction of anal spasm and pain after excisional operations.

Materials and Methods

Medical records of 39 female patients (under (the 1st group –G1) and over (the 2nd group – G2) 45 years of age) with HD grade III and IV treated between September and November 2020 at Pauls Stradins Clinical University Hospital are being analyzed retrospectively.

Results

Twenty of 39 (51%) women (median age – 35.45) constituted G1, whereas 19 (49%) – G2 (median age – 65.26). Pain and discomfort in the anal area were common complaints 13 (68.4%). Bleeding was found in 16 (80%) and 9 (47.4%) cases for the G1 and G2, respectively. Perianal mass and mucosal prolapse were reported in 14 (70%) and 8 (42.1%) cases specified for G1 and G2, respectively, whereas defecation disorders – in more than 1/2 of G1 – 11 (55%) when compared to six cases in G2. G1 women exclusively complained about difficulties performing personal hygiene in 6 (30%) cases. Longo hemorrhoidectomy was used in 15 (75%) and 10 (52.7%), Milligan-Morgan – 3 (15%), and 6 (31.6%) cases for G1 and G2, respectively, whereas LigaSure™ – in two G2 patients, Ferguson – in 9 (10%) and 1 (1.3%).

Conclusions

Bleeding and defecation disorders are pathophysiology-related complaints. The etiology-based Longo technique is the most suitable treatment of HD.

Comparison of anatomical landmark technique and pre-procedural lumbar spine ultrasonography in identification of subarachnoid space and precision in spinal anaesthesia

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Objectives

Aim of this study was to compare anatomical landmark technique and pre-procedural lumbar spine ultrasonography (US) in choosing the L4-L5 interspace, precision in determining midline and measuring subarachnoid depth (SAD) and actual needle depth (ND) when performing spinal anaesthesia.

Materials and Methods

In this prospective observational study we included 31 patients with planned lower limb orthopaedic surgery with spinal anaesthesia. Before lumbar puncture L4-5 interspace and midline were marked using landmark technique, then the lumbar US was performed. Deviation from planned interspace was analysed using paramedian sagittal plane and shift from midline was determined using median transverse plane (TP). Then the SAD was measured using best echogenic window in TP. After performing spinal anaesthesia actual ND was measured. The agreement between measurements were analysed using Bland-Altman test. US visualisation quality of posterior complex was recorded.

Results

Median patient age was 61 (53-64) years, 11 (35%) male and 20 (65%) female patients were enrolled in this study. Median BMI was 27,5 (24,7-30,6). Deviation from L4-5 interspace occurred in 26% (8/31) cases of which 19% (6/31) were L3-4 and 6% (2/31) L5-S1 interspace. Mean (SD) deviation from midline was 1,3 (1,5) mm. The mean US measured SAD in TP and actual ND was 5,1 (0,8) cm and 6,2(0,9) cm respectively ($p < 0.001$). In 29% US visualisation of posterior complex was good, in 65 % - sufficient, but in 6% of cases visualisation of posterior complex was impossible.

Conclusions

Anatomical landmark technique was imprecise in identifying L4-5 interspace in 26% of cases, but deviation from midline was minimal. However, measured SAD was significantly smaller than actual ND. We would recommend usage of pre-procedural lumbar spine ultrasound to assess the midline and planned interspace to increase precision before performing lumbar puncture in spinal anaesthesia.

Comparison of intraocular pressure measurements between icare tonometer and transpalpebral tonometer "EasyTon" in patients with and without glaucoma

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Objectives

The iCare is portable rebound tonometer that doesn't require anesthesia and may prove most useful for measuring IOP in adults who are uncooperative with Goldmann applanation tonometry. The EasyTon is portable transpalpebral tonometer that provides quick and hygienic intraocular pressure measurement by vibration through the eyelid to calculate the most accurate IOP. It improves safety of IOP measurement by eliminating contact of the cornea with air stream or diagnostic tools. The aim of our study was to assess the accuracy of transpalpebral tonometer EasyTon IOP measurements by comparing them against iCare tonometer in patients with and without glaucoma.

Materials and Methods

33 patient's (66 eyes) IOP were examined using iCare and EasyTon tonometers. The mean age was 72,79 years. Patients were divided in 2 groups – with glaucoma (10/33) and without glaucoma (24/33). iCare tonometry was performed first, followed by EasyTon tonometry. Normal IOP was considered 10-21 mmHg. Data was analysed using Microsoft Excel and IBM SPSS.26.0 (Pearson's correlation coefficient).

Results

Mean IOP for iCare tonometer in the right eye was 12.97 mmHg (SD +/- 2.81) but in the left eye – 13.78 mmHg (SD +/- 2.96). Mean IOP for EasyTon tonometer in the right eye was 12.81 mmHg (SD +/- 2.61) but in the left eye 13.75 mmHg (SD +/- 2.25). The mean difference between iCare and EasyTon IOP's in the right eye was 0.151 mmHg (SD +/- 1.74) but in the left eye – 0.069 mmHg (SD +/- 1.99).

The Pearson's correlation coefficient r between iCare and EasyTon IOP's in the right eye was 0.797 ($p < 0.001$) but in the left eye 0.640 ($p < 0.001$). There was no statistically significant difference found between IOP measured by iCare and EasyTon in the right eye ($p = 0.467$) and in the left eye ($p = 0.897$) for glaucoma patients.

Conclusions

Compared with iCare tonometry, the EasyTon tonometer allows clinicians to estimate IOP with a portable and noninvasive method with similar reliability to that offered by iCare tonometer. It can also be used when iCare tonometer is contraindicated for patients. Both tonometers can be used in patients with glaucoma because there were no statistically significant difference found between IOP's.

Comparison of two bowel cleansing regimens in patients with subsequent colonoscopy

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Objectives

For successful detection of premalignant colorectal lesions appropriate bowel preparation is a gold standard. The aim of this study was to compare two bowel cleansing regimens.

Materials and Methods

Adult out-patients who received colonoscopy were included in the study from Sep 1 2020 to Nov 30 2020. Patients were divided into two groups: first received 4-L split dose sodium picosulfate regimen, second – 4-L unsplit dose polyethylene-glycol (PEG).

To describe colon cleanliness Boston Bowel Preparation Scale (BBPS) was used. Poor cleanliness were defined as total BBPS score from 1-3, medium- from 4 - 6, good- from 7-9.

Patients were also divided: under and over 50 yo.

Data was pooled and analyzed using IBM SPSS 22.0.

Results

In total, 449 patients – 61,2 % female and 38,8 % male, patients aged 16 – 87, with the mean age of 47,38 +/- 14,21 were enrolled in the study.

160 (65,4 %) were preparing with first regimen, 67 (27,6 %) were preparing with PEG. First regimen medium BBPS score were 7,24 +/- 1,498, PEG medium BBPS score were 6,33 +/- 1,330. First regimen total BBPS 1 - 3 were 6, 3,7 %, 4 – 6 were 27,16,9 %, 7 – 9 were 127, 79,4 % . PEG total BBPS 1 – 3 were 3, 4,5 %, 4 – 6 were 35, 52,5 % , 7 – 9 were 29, 42 %. Patients under age 50 median BBPS were 6,60 +/- 1,538, patients over age 50 median BBPS were 6,36 +/- 1,383. Using Pearson correlation analyze, was concluded, that between age and BBPS exists negative and statistical significant correlation. ($r = - 0.108$; $p = 0.024$, $p < 0.05$).

Conclusions

Medium BBPS is higher in patients, who received 4 L split dose sodium picosulfate. Between age and BBPS exists negative and statistical significant correlation.

Delayed renal graft function – risk factors and impact on early posttransplant results

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Objectives

Poor kidney graft function in kidney transplantation (KT) is often associated with worse long-term outcomes. The aim of this study was to identify donor, graft and recipient risk factors associated with delayed graft function (DGF).

Materials and Methods

This retrospective study includes all consecutive deceased donor kidney transplantation cases performed in Latvian Transplantation Center during the period from 01.01.2011 till 31.12.2012 (n=147). Exclusion criteria: deceased donor (DD) age > 55 years old, moderate or severe hypertension in DD anamnesis; recipients and donors younger than 18 years; recipients with 3rd and 4thKT; recipients PRA>10%; abnormal graft vascular or ureteral anatomy; surgical complications in early post-transplant period. After the selection procedure study included 80 transplantation cases from 58 deceased donors. All cases were divided into two groups: patients with primary graft function (PGF) (n=62), and patients with DGF (n=18).

Groups were compared for the following factors: donor and recipient gender, age, weight, body mass index (BMI); donor HCT (as hydration marker) and cold ischemia time (CIT); serum creatinine concentration before transplantation and 1st, 2nd, 3rd, 4th, 5th, 7th, 14th day after transplantation; diuresis amount ml from 1st till 14th day after transplantation.

Results

DGF was performed in 18 cases (22.5%) and showed association with higher donor HCT (42.1±7.1% in DGF vs. 33.8±8.3% in PGF, p<0.05), recipient male gender (34% vs 13% in females, p<0.05) and recipient weight (82.7±14.4 kg in DGF vs. 70.9±13.5 kg in PGF, p<0.05).

DGF was associated with higher CIT (22.7 ± 3.7 hrs in DGF vs. 17.8 ± 3.7 hrs in PGF, p<0.001).

Conclusions

Prolonged cold ischemia time, recipient male gender and donor lower hydration level in pre-explantation period were associated with higher DGF rate. CIT and donor hydration level are those modifiable factors that can be improved in donor management and coordination logistics.

Diagnostic value of transperineal MRI/US Fusion biopsies in patients with risk of prostate cancer and prior negative biopsies

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Objectives

Transrectal prostate biopsies provide false-negative results in 20-30% of cases. The aim of the study was to evaluate efficacy of transperineal MRI/US Fusion biopsies using multiparametric magnetic resonance imaging (mpMRI) in patients with prior negative prostate biopsies who are at risk of prostate cancer (PC).

Materials and Methods

Patients from one clinical center during year 2019 to 2020 with high risk of prostate cancer, prior negative prostate biopsies, prostate mpMRI examination with PIRADS score 3 or higher and prostate biopsy using transperineal MRI/US Fusion approach were included in our retrospective analysis. Patient's age, PSA blood levels, mpMRI data (number of lesions, prostate volume), biopsy data (time of procedure) were analysed. All patients were divided in three categories according to PIRADS score. IBM SPSS 22 was used for statistical analysis.

Results

Our group consisted of 96 patients with average age of 66,8±SD 7,2 years, with average PSA of 11,3 ±10,2 ng/ml and prostate volume of 63,7±35,6 cm³. 55,2% (n=53) of patients had one lesion, 30,2% (n=29) had two lesions, 12,5% (n=12) had three lesions, 2,1% (n=2) had four lesions. Average time of transperineal biopsy procedure was 28,5±13,6 minutes. Mean number of targeted biopsies per patient was 7,5±3,1. 60,4% of all patients (n=58) had PC, with 39,6% (n=38) clinically significant PC. In PIRADS 3 group PC was found in 22,2% (n=4) cases, clinically significant PC 11,1% (n=2), in PIRADS 4 group 53,8% (n=21) and clinically significant PC 30,8% (n=12) respectively, in PIRADS 5 group 87,2% (n=34) and clinically significant PC 61,5% (n=24).

Conclusions

In our study group transperineal biopsy procedure identified clinically significant prostate cancers in all PIRADS score categories, especially in PIRADS 5 group. Therefore transperineal biopsies using MRI/US Fusion biopsy provides additional diagnostic value in patients with previous negative biopsies and risk of prostate cancer.

Do cytokines affect development of fatigue in rheumatoid arthritis patients?

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Objectives

Chronic illnesses are associated with an increased risk of fatigue. Rheumatoid arthritis (RA) is a chronic autoimmune disease that is associated with accumulation of inflammatory mediators in the joint space. Fatigue is a common comorbidity disorder with RA, which leads to worsened health outcomes, and is hypothesized to be strongly associated with systemic inflammation, particularly with dysregulation of the cytokine network. This study aimed to determine the development of fatigue depending on different proinflammatory cytokines.

Materials and Methods

Overall 30 RA patients were included in the study: 23 females (76.7%) and 7 male (23.3%) with the average age 59.5 ± 11.2 (ranging from 39 to 79). To achieve the goal, patients were interviewed using adapted semi-structured interview questions created by Minnock et al. (2016) and cytokine panel (TNF- α , INF-g, IL-2, IL-6, IL-17A, IL-21, IL-23) was created to determine the differences in their levels using the Luminex200 system.

Results

Based on the results of the survey, RA patients were divided into two groups - with and without fatigue. In both the fatigue and non-fatigue RA patient groups, a positive association was found between IL-17 and INF-g, IL-17 and IL-2, and also between INF-g and IL-2, IL-21 and IL-23 levels (in all cases $r > 0.7$, $R^2 > 0.5$). In the fatigue group of RA patients, INF-g was positively correlated with IL-21, IL-23 and TNF- α levels, as well as IL-23 with IL-2 and IL-2 with TNF- α . In turn, both positive (with IL-2) and negative (with TNF- α) association was detected in IL-21 ($R^2 > 0.5$ for all pairs). In the group of RA non-fatigue patients, a positive association was found only between IL-17 and IL-21, IL-17 and IL-6, as well as between INF-g and IL-6 levels ($R^2 > 0.5$).

Conclusions

The presented data suggest that only IL-6 doesn't significantly affect the development of fatigue in RA patients.

Donor hydration level influence on kidney graft function in early posttransplant period

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Objectives

Poor kidney graft function in kidney transplantation (KT) is often associated with worse long-term outcomes. The aim of this study was to identify impact of deceased donor (DD) hydration level on kidney graft function in early period after kidney transplantation (KT).

Materials and Methods

This retrospective study includes all consecutive deceased donor kidney transplantation cases performed in a single transplantation centre during the period from 01.01.2011 till 31.12.2012 (n=147). Exclusion criteria: DD age > 55 years old, moderate or severe hypertension in DD anamnesis; recipients and donors younger than 18 years; recipients with 3rd and 4th KT; recipients PRA>10%; abnormal graft vascular or ureteral anatomy; induction immunosuppression by ATG or maintenance immunosuppression different from standard triple immunosuppression (tacrolimus, mycophenolate mofetil, steroids); surgical complications in early post-transplant period.

After selection study included 80 kidney transplantation cases from 58 deceased donors. We analysed association of DD Haemoglobin (HGB) concentration and donor Haematocrit (HCT) with the following kidney graft function indicators: serum creatinine (s-Crea) concentration before transplantation and at 1st, 2nd, 3rd, 4th, 5th, 7th, 14th days after KT; s-Crea reduction ratio at 1st, 7th and 14th posttransplant days; 24 hours fluid intake and diuresis volumes during 14 days after KT; incidence of delayed graft function (DGF, defined as need for hemodialysis during the first week after KT).

Results

DD HCT index before organ explantation within the range 25 to 36% and HGB concentration 80 to 120 g/L were associated with better kidney graft function and reduced DGF development rate (p<0.05 for all).

Conclusions

Adequate donor hydration was associated with better kidney graft function, showing the need to ensure adequate hydration level in potential deceased kidney donors.

Early and late corneal astigmatism outcomes after pars plana vitrectomy for replacement of dislocated intraocular lens to iris-clips

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Objectives

Intraocular lens dislocation is a relatively common late-complication after routine cataract surgery. In a case of absence of capsular support the exchange of dislocated intraocular lens (IOL) with iris-clip lense is one of the first-choice treatment, but with surgery – induced complications which are changing over the postoperative period.

The aim of the study was to evaluate and compare the early and late outcome of pars plana vitrectomy for replacement of dislocated IOL to iris-clip IOL by measuring the changes of corneal astigmatism in a pre- and postoperative period.

Materials and Methods

Prospective study included 31 eyes of 31 patients (mean age: 77,61 ± 1,29(SD) years; range: 65-87 years), who underwent pars plana vitrectomy surgery for replacement of dislocated IOL to iris-clip IOL in Pauls Stradins Clinical University Hospital between 2018 and 2020. Data were collected by measuring corneal astigmatism using anterior segment optical coherence tomography at the preoperative examination and at the postoperative follow-up visit up to 24 months after surgery.

As an early outcome of corneal astigmatism was classified measurements made up to 1 year after surgery, but as a late outcome was classified examination performed after 1 year since surgery.

Results

The mean surgery induced corneal astigmatism value for all cases was 3,88±0,60 (SD) dioptries. The mean increase of corneal astigmatism for patients who were examined up to 1 year after surgery was 5,57±0,74(SD) dioptries, while for the patients who were examined after 1 year since surgery – 1,34±0,35(SD) dioptries. Statistically significant difference between early and late corneal astigmatism outcome was detected ($p < 0.001$; unpaired t-test).

Conclusions

1. The early outcome revealed a high surgery induced corneal astigmatism.
2. The corneal astigmatism is decreasing during postoperative period.
3. The corneal astigmatism is statistically significant lower after 1 year since surgery.
4. The postoperative recovery period lasts over 1 year.

Endovascular revascularization of "swing segment" basilic vein stenosis in patient with failing arteriovenous hemodialysis fistula: case report

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Objectives

Swing segment stenosis of basilic vein is a frequent complication in hemodialysis patients with brachial-basilic arteriovenous fistula (AVF) with overall prevalence up to 45% and significant impact on functionality of AVF, thus increasing hospitalization and failed hemodialysis rate. In history "swing point" stenosis were treated with cutting ballons or balloon-expandable stentgraft, but early restenosis was frequently noted. A covered self-expandable stentgraft may prevent or limit restenosis related to intimal hyperplasia, but also can adapt to mobility of the arm thus decreasing the rate of stentgraft fracture.

A case report: 30 year old woman with diabetes mellitus (type I) and secondary end-stage chronic renal disease (ESRD) with previous history of failed femoral and right jugular hemodialysis catheter and occluded right subclavian vein underwent brachial-basilic AVF operation in left arm. After only one successful hemodialysis through AVF brisk arterial backflow was noted during AVF puncture leading to failure of procedure. CT angiography revealed stenosis of proximal basilic vein. Upper extremity swelling was absent. Ultrasonography showed wall thickening of proximal basilic vein and turbulent blood-flow on duplex ultrasound. The digital subtraction angiography approved the diagnosis of swing segment stenosis of 80% in basilic vein. Transvenous/transfemoral angioplasty of left basilic vein was performed through 10F sheath guiding catheter with new generation of AVF dedicated self-expandable covered stentgraft 12x60mm. Flexion test of the arm also performed on operation table showing good adaptation of the stent to the vessel wall. In result next hemodialysis session through AVF was successful and uneventful.

Conclusions

Poorly functioning AVF frequently have impaired outflow vein at the surgical vein mobilization site. These "swing point stenoses" can be effectively treated by PTA with new generation of self-expandable stentgrafts, which is a safe and effective treatment for prolonging AVF patency and function.

Evaluation of dose-area product received by patients undergoing iliac and peripheral leg artery angioplasty with two different angiography machines

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Objectives

Radiation safety is turned into a cornerstone of patient safety during interventional radiology (IR) procedures. With increasing number of IR procedures, consequences and amount of radiation dose received by patients is becoming an essential question. A study was carried to evaluate the difference of dose-area product (DAP) between two fluoroscopy machines in one of IR departments in Latvia.

Materials and Methods

Study included patients, who underwent iliac artery and peripheral leg artery IR procedures – iliac artery percutaneous transluminal angioplasty (PTA), femoral artery PTA, a.poplitea PTA, crural artery PTA. Directly measured DAP (mGy/cm²) from two different generation angiography machines, Philips Allura Xper FD 20/10 and Philips Azurion Clarity 7 B20/15, time and type of procedure in interventional radiology department during 2019 year were used for retrospective analysis. Descriptive and analytical statistics were performed using the SPSSv26 software.

Results

Our study group comprised 290 patients: 139 in iliac PTA group, 96 in femoral and popliteal PTA, 55 in crural PTA. Median DAP between modern and former generation machines in iliac artery PTA was 80.00 [Confidence interval: 56.60-116.00] and 250.23 [177.24-294.25] respectively (p=0.0001), in femoral and popliteal artery PTA 57.32 [43.36-70.64] vs 61.00 [48.11-81.67] respectively (p=0.0001), in crural artery PTA 45.40 [19.65-102.54] vs 76.69 [58.40-109.92] respectively (p=0.0001). Correlation between DAP and operator was found only in femoral and popliteal PTA group (p=0.037). There was no significant correlation between time of procedure and different machines in all three groups.

Conclusions

To our knowledge, there were no previous studies exploring peripheral artery procedure DAP in Latvian facilities. We have found significant DAP difference between two angiography machines, which was not affected by the time of procedure or operator in iliac and crural PTA groups.

Evaluation of the neck with computed tomography in the emergency setting

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Objectives

Retrospective analysis of Computed tomography (CT) role in the Neck soft tissue pathologies in emergency setting and correlation with clinical and laboratory data

Materials and Methods

In retrospective study 208 patients presenting to emergency department with neck soft tissue pathologies were enrolled within 2 year period, all of which received Neck CT examination with or without contrast enhancement. Post-contrast examination up to 3 series was performed, depending on the initial diagnosis (trauma, inflammation or oncology).

Results

Neck soft tissue pathology was found in 175 of all cases - 105 inflammatory, 54 oncology and 19 cases of other pathology.

Pharyngeal mucosal space was involved in most cases (n=100), parapharyngeal space(n=81), parotid space(n=28), masticator space(n=21).

Out of all histologically examined tumours, most common was laryngeal tumour(n=15), palatine tonsil tumour(n=10), basis of the tongue tumour(n=9).

Non-specific, reactive, enlarged lymph nodes were found in 90 cases and specific oncology related histologically proven lymph nodes in 18 cases out of 108 cases of lymphadenopathy.

C reactive protein(CRP) values were higher in abscess cases (Me=125 mg/l) than in trauma(Me=15 mg/l) or tumour(Me=46.36 mg/l), $p < 0.05$.

Defining anatomical localization of the pathology in the interfascial spaces is important, but it does not narrow the radiological differential diagnosis ($p > 0.05$).

Conclusions

Neck CT examination is available and effective at the emergency department for early diagnosis of the type of pathology, prevalence, complications and subsequent planning of treatment tactics.

For evaluation of soft cervical tissues in patients with clinical suspicion of oncology, adjustable extended 3-series CT test protocol is advised to accurately assess the extension and vascularization characteristics, in other cases non-enhanced and late phase 100th second CT scan after contrast administration should be performed, according to the standardized protocol - to reduce the radiation dose for the patient. CRP level is essential for the choice of best suitable imaging CT protocol.

Evaluation of urodynamic parameters in patients with benign prostatic hyperplasia (BPH) and lower urinary tract symptoms

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Objectives

Lower urinary tract symptoms (LUTS) are suggestive of BOO secondary BPH, a surgical treatment is the method of choice. Urodynamic examination is the gold standard for diagnosis of BOO. The aim of the study is to evaluate the effect of BOO on *M.Detrusor* before and after surgical treatment of BPH.

Materials and Methods

The subjects of this study were 20 patients with BPH and LUTS who had urodynamic tests before and after TURP (transurethral prostatic resection) or open prostatectomy in 2019.

Results

58 patients underwent urodynamic tests prior to planned surgery for BPH, 20 patients confirmed participation in the study. 12 patients underwent TURP (Group I), 8 patients - open prostatectomy (Group II). Transrectal prostate ultrasonography was performed to determine the prostate size and volume. The average prostate volume was 68.25 ml in the Group I, and 144.62 ml in the Group II. Post - void residual urine (> 100 ml) was present in 11 patients. The mean IPSS before surgery in both groups was 22.8, which corresponds to severe symptoms according to the International Prostate Symptom Score. After surgery - 3.3. The average flow rate (Q max) before surgery was 7.1 ml / s in the Group I, after surgery 18.8 ml / s. In the Group II Q max was 4.8 ml / s, after surgery Q max was 17.8 ml / s. The mean bladder outlet obstruction index (BOOI) in the Group I before surgery - 52.6, in Group II 82.3. In a repeat examination, no patient had a BOOI greater than 30. Preoperative *M.Detrusor* hyperactivity was in 12 patients. Repeated urodynamic tests in these patients didn't reveal *M.Detrusor* hyperactivity after surgery.

Conclusions

Patients with clinically and urodynamically proven *M. Detrusor* hyperactivity after surgical treatment of BPH reduces the symptoms of overactive bladder, which significantly improves quality of life.

Fluid and vasopressor therapy in Intensive Care Unit patients with community acquired pneumonia induced septic shock

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Objectives

The aim of this study was to estimate effect of infusion and vasopressor therapy on a mortality of Intensive Care Unit (ICU) patients admitted with community acquired pneumonia (CAP) induced septic shock.

Materials and Methods

A data of 25 patients with a CAP induced septic shock admitted to the ICU of Pauls Stradins Clinical University hospital at 2019 was retrospectively analysed. Dynamic of the administered fluid volumes, vasopressor doses, clinical and laboratory variables within the first 3 days from admission were compared between survivors and non-survivors. For statistical analysis IBM SPSS Statistics 26.0 was used.

Results

Surviving group included 10, non-surviving group included 11 patients. Data of 4 patients who passed away in the first 24 hours from admission were excluded from analysis. Surviving patient group were statistically significantly younger than non-surviving group. Administered fluid volumes were similar in both groups. Surviving patients received lower vasopressor median doses and vasopressor support was declined within study period. Initial lactate levels were lower in the surviving group and in dynamic decreased more than in the non-surviving group.

Conclusions

Age, initial lactate level and lactate dynamic is important predictors for the outcome in the ICU patients with CAP induced septic shock. Required vasopressor doses and magnitude of the dose dynamic are associated with ICU mortality. Administered fluid volume does not contribute significantly to ICU mortality.

Fluorescence image guided cholangiography in a patient with grade II acute cholecystitis: case report

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Objectives

Laparoscopic cholecystectomy (LC) is the standard treatment method in patients with acute cholecystitis (AC). In the case of AC, bile duct (BD) and vascular anatomy can be changed due to perivesical inflammation and/or infiltration in hepatoduodenal ligament which can lead to bile duct injury (BDI) during the surgery. In order to ensure a better visualization of BD anatomy and perform safe LC an innovative technique called Fluorescence Image Guided Cholangiography (FIGC) has been introduced.

Case report: A 63 year old woman was admitted to the surgical department with AC. The overall anamnesis was 3 days. Laboratory findings showed signs of prolonged inflammation - WBC 19400/mm³, CRP 112mg/dL, total bilirubin 6mg/dL, ALT 12U/L, and AST 10U/L. An ultrasound revealed a thickened gallbladder wall 7 mm, common bile duct 6 mm. Conservative treatment was not effective. 48 hours after the admission the patient was scheduled for an emergency LC and FIGC. To avoid strong liver background and visualize extrahepatic bile ducts(EHBD) indocyanine green 12.5 mg was administered I/V 12 hours before the surgery. The operation time was 50 min and FIGC took 2 min which was performed both before and after maintaining *Critical view of safety* (CVS) principle in order to visualize the EHBD, thus decreasing the risk of BDI. The visualization was assessed according to an adapted *Likert scale, Helpful score and Disturbed score*. Visualization of EHBD, 1.before dissection: Cystic duct (CD)- good, Common bile duct(CBD)-good, Common hepatic duct(CHD)-fair, CD and CBD confluence-fair; 2.after dissection: CD-excellent, CBD-excellent, CHD-good, CD and CBD confluence-good. The postoperative course was uneventful and the patient was discharged on the fourth day.

Conclusions

FIGC is a safe and effective method for better visualization of EHBD, even more it allows the surgeon to be more confident in situations when it is difficult to clearly understand biliary anatomy.

Goodpasture syndrome and COVID-19 infection management in Rezekne Hospital during national emergency

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30 year old previously healthy male was admitted to hospital on 24.11.2020. with complaints of nausea, vomiting, edema, fever up to 38.0°C. Laboratory findings: Creatinine - 1766 μmol/L, hemoglobin 7.9 g/dL, proteinuria, microhematuria. No probable kidney damage cause visible on ultrasound.

Hemodialysis was initiated and continued three times per week. Elevated body temperature of 37.8-38.0°C persisted, SARS-CoV-2 RNS test was negative. CT scan of lungs and abdomen showed TB like changes in upper segments of the lungs. Patient underwent bronchoscopy. No changes in bronchi were detected, previous nose bleeds observed. GeneXpert test for TB was negative.

Initially patients diuresis was preserved, but during 4-7.12. oliguria developed and persisted. On 8.12. initial immunology tests came back negative, re-testing for SARS-CoV-2 came back positive.

Patient was transferred to infectious unit for further treatment. During SARS-CoV-2 infection patient showed no respiratory distress, didn't required any oxygen support. On 10.12. patient was tested for Goodpasture syndrome, lab results came back positive (Anti-GBM IgG >200.0 U/ml). After consulting with nephrologist, pulse therapy with Solumedrol was initiated, patient received five plasmapheresis procedures with 2000ml plasma exchange each. Kidney biopsy was not performed due to clinical condition and SARS-CoV-2 infection.

On 23.12. patient was transferred back to therapy unit. Treatment with Cyclophosphamide was initiated. Overall condition improved, body temperature normalized, but diuresis remained around 200ml per day. On 28.12. patient had lung and abdomen CT that showed signs of double side pneumonia, right side colon inflammation. Patient had complaints of loose stools. Patient was discharged on 2.1.2021.

Patient was hospitalized on 12.1.2021. for next Cyclophosphamide infusion. CT scan on 14.1. showed ascites, colon inflammation with high density foreign bodies in it. Colonoscopy is planned to re-evaluate inflammation. Hospitalization in specialized nephrology ward is planed after general condition is stabilized.

Hypertrophic scar treatment by polydeoxyribonucleotide intralesional injections in combination with corticosteroid, laser and silicone effects

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Hypertrophic scars can lead to significant quality-of-life impairment like an aesthetically displeasing, psychosocial, physiological factors. Invasive and non-invasive methods from evidence-based recommendations are available. The aim of this case report is the evaluation of injectional correction of a permanent linear scar with deoxyribonucleotide polymer (polydeoxyribonucleotide (PDRN)) by its regenerative properties with addition of corticosteroid, laser resurfacing and silicone therapy effects.

A woman (33 y.o.), presented with matured, linear, hypertrophic scar in abdominal wall, located along *linea alba* from the umbilicus till the pubic tubercle. Medical history include bladder aplasia and multiple reconstructive surgeries. After the last and most extensive surgical intervention was performed, an abnormal scar appeared. Wide-spread tissues provoked itching, sense of tension, stiffness, pain, disruption of daily activities and depressed emotional well-being. The course of intralesional injections, CO2 laser procedure, silicone application was implemented.

The scar was 19 cm long, 1-3 cm wide, rigid, stiff. Color reddish-brown, pink. The therapy was started with PDRN solution in standard concentration of 5,625 mg/3 ml. For one procedure 3 ml were used once a week (12 weeks). Intralesional corticosteroid injections were started with Triamcinolone in standard concentration of 40 mg/ml, 2 ml once a month (5 months). In the result, tissue softening and relaxation were achieved, but simultaneously color changes and telangiectasias manifested. Scar surface correction was proceed with CO2 laser (1064 nm) 3 times and silicone applications (6 weeks). Intermediate results were fixed by photo-reports every month. The thickness, width, rigidity, soreness decreased, color became pale, no telangiectasias, erythema observed. In case of mature, hypertrophic scar it is possible to improve visual, functional condition predominantly by healing PDRN effects with additional use of well-accepted, evidence-based methods.

Hypocomplementemia and clinical manifestations in patients with systemic sclerosis

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Objectives

Hypocomplementemia has been observed in systemic sclerosis (SSc). Although complement activation is not commonly thought to be part of the pathogenesis of SSc.

Hypocomplementemia is included as one of items in two frequently used SSc disease activity indexes. There is negotiation about their usefulness to assess disease activity. Correlation between clinical manifestations and hypocomplementemia is still not fully studied and only few data are available.

This study evaluated correlation of complement components C3 and C4 levels with clinical features in patients with systemic sclerosis.

Materials and Methods

Study subjects consisted of those who met diagnostic criteria for SSc (The ACR/EULAR 2013). Retrospective data of clinical histories and immunological blood tests were analysed of these patients during 2017-2020.

Results

A total 82 patients were enrolled in this study. Complement components (C3 and C4) were evaluated in 53 patients during their stay in hospital. Patients were divided in 2 groups – 1st group (9 patients, all were women) with low C3 or C4, 2nd group (44 patients, females 86%, males 14%) – with C3 and C4 in normal ranges. Average age when serum complements were evaluated in 1st group was 67,8 years, in 2nd - 59,95 years. In 1st group positive antinuclear antibodies were observed in all patients (100%), in 2nd group – only 86%, 14% were ANA negative. In the 1st group 5 patients had pulmonary hypertension (55,6%), 100% - Raynaud's syndrome, 22%(2/9 patients) had interstitial lung disease. In the 2nd group – 29,5% had pulmonary hypertension, 84% had Raynaud's syndrome and 48% had interstitial lung disease.

Conclusions

Unfortunately, serum complement levels are infrequently evaluated in patients with SSc. Hypocomplementemia was observed only in patients with positive ANA. We found higher prevalence of pulmonary hypertension and Raynaud's syndrome in patients with hypocomplementemia, that requires further investigation of complement activity in these patients.

Influence of allocation factors on deceased donor kidney graft function in early posttransplant period

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Objectives

Poor kidney graft function in kidney transplantation (KT) is often associated with worse long-term outcomes. The aim of this study was to identify impact of allocation factors on kidney graft functional indicators in early period after KT.

Materials and Methods

This retrospective study included all consecutive deceased donor (DD)KT cases performed in one transplantation centre during the period from 01.01.2011 till 31.12.2012 (n=147). Exclusion criteria were: DD age > 55 years old and moderate or severe hypertension in anamnesis; recipients and donors age < 18 years; recipients of 3rd or 4th KT; recipient PRA>10%; abnormal graft anatomy; induction immunosuppression by ATG; surgical complications in early post-transplant period. After selection study included 80 KT cases from 58 DD. We analysed impact of cold ischemia time (CIT), recipient BMI, donor-recipient BMI matching and need for dialysis immediately before KT on the following kidney graft function indicators: serum creatinine (s-Crea) concentration before transplantation and during the first week and day 14 after KT; s-Crea reduction ratio at 1st, 7th and 14th posttransplant days; 24 hours fluid intake and diuresis volumes during 14 days after KT; incidence of delayed graft function (DGF).

Results

Poor graft function and higher DGF rate was associated with CIT > 20 hours (observed in 27.5%, p<0.05), recipient BMI > 30 kg/m² (observed 13.7%, p<0.05), need for HD immediately before transplantation (performed in 20 cases (25%), p<0.05).

Donor BMI higher than recipient BMI more than 5 kg/m² was observed in 20 cases (25%) and associated with better transplant outcomes (P<0.05).

Conclusions

Cold ischemia time more than 20 hours, recipient obesity, recipient HD before transplant showed association with a poor kidney graft function and higher DGF rate. Allocation of kidneys from donors with higher BMI into recipients with lower BMI may improve early KT results.

Is hyomental distance ratio a good predictor of the difficult intubation?

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Objectives

There is a wide range of complications connected to failed intubation. The major concerns for airway assessment methods are low predictability and high interobserver variabilities. Point-of-care ultrasound is gaining popularity in anaesthesiology. The procedure of sonographic measurement of hyomental distance is easy to learn and fast to perform. In this study we were aiming to find the sensitivity and specificity of hyomental distance ratio (HMDR) <1.2 as a predictor for difficult intubation (DI).

Materials and Methods

In our prospective cohort study were included patients scheduled for elective surgery requiring general anesthesia and tracheal intubation in The Riga East clinical hospital Gailezers. Before the operation a sonographic measurement of hyomental distance in neutral (HMDn) and extreme head extension (HMDe) positions was performed. Then the HMDR calculation was produced by dividing hyomental distance in extreme head extension by hyomental distance in neutral head position. The efficacy of HMDR for predicting the difficult laryngoscopy (Cormack Lehane (CL) grade 3,4) was defined as primary outcome. Experienced anaesthesiologist evaluated the CL grade. Statistical analysis was performed, using IBM SPSS Statistics v.23.

Results

56 patients met inclusion criteria, 28(50%) were males, 28(50%)-females. DL was present in 15(27%) patients. In DL group mean age was 51.3 (± 11.3), in EL -53,9 (± 14.5), BMI in DL group was 34.3(± 9.1), in EL group 28.5(± 5.7). Mean HMDn in DL group was 5.28 \pm 0.57cm, in EL group 5.04 \pm 0.5cm, mean HMDe in DL group was 5.9 \pm 0.56cm, in EL group 6.26 \pm 0.0.59cm, HMDR in DL group was 1.12 \pm 0.04, in EL group - 1.24 \pm 0.06. There was no statistically significant difference between the groups except for BMI and HMDR. In DL group 6 (40%) patients required 1 attempt, 6 (40%) - 2 attempts and 3(20%) required 3 attempts for successful intubation. Modified Mallampati score had sensitivity 66,7% and specificity 53,7%($p > 0.05$). HMDR had sensitivity 86.7% and specificity 85.4%($p < 0.01$).

Conclusions

HMDR is a good predictor of difficult laryngoscopy.

LRG-1 as a tubular dysfunction marker in kidney transplant recipients

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Objectives

Kidney transplantation is the treatment of choice for most of the patients with end stage renal disease. To improve patient and transplant survival, early diagnostics of different pathologies is important. Renal tubular damage plays an important role in deterioration of renal function. Leucine rich alpha-2-glycoprotein-1 (LRG-1) is an innovative, non-invasive biomarker that is elevated in case of angiogenesis, inflammation, kidney injury and oncology. Aim was to evaluate biomarker LRG-1 level in serum and urine in kidney transplant recipients in accordance with tubular dysfunction markers and oncological disease.

Materials and Methods

Review of 35 kidney transplant recipients. We detected serum and urine LRG-1 levels, using the ELISA method. We performed correlation between LRG-1 and tubular dysfunction markers (NGAL, FENa), and proteinuria. Also, we divided patients in groups (patients with and without oncological disease).

Results

Higher level of serum LRG-1 correlates with the higher level of urine LRG-1 ($r=0,42$, $p=0,01$). Urine LRG-1 correlates with NGAL level in urine ($r=0,44$, $p<0,01$) and with proteinuria ($r=0,58$, $p<0,01$). There was no LRG-1 correlation with FENa ($r=0,14$; $p=0,43$). Comparing kidney transplant recipients with and without oncological disease, no statistically important differences were found in serum LRG-1 levels ($p=0,28$).

Conclusions

Urine LRG-1 can be a useful biomarker for tubular dysfunction in patients after kidney transplantation.

Multiparametric magnetic resonance imaging and MRI/US fusion biopsies as a method of choice for early detection of prostate cancer in biopsy-naïve men. Initial experience

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Objectives

At the moment the gold standard for prostate cancer (PC) diagnostics is transrectal ultrasound guided biopsy. In recent years there is a growing interest in MRI/US fusion biopsies which could increase accuracy of PC early detection. The objective was to evaluate efficacy of multiparametric magnetic resonance imaging (mpMRI) and transperineal MRI/US fusion biopsies for biopsy-naïve men who are at risk of PC and compare these results with leading research papers in the field.

Materials and Methods

Retrospective - one center experience. Data gathered from year 2019 to 2020. All patients who had clinical suspicion of PC had mpMRI. Ones with PIRADS score of 3 and higher underwent transperineal MRI/US Fusion biopsy using BK Fusion technologies. All subjects were divided in 3 PIRADS groups and analyzed. Patients' age, prostate specific antigen levels, mpMRI data (number of lesions, prostate volume) and biopsy data were analyzed. For statistical analysis IBM SPSS 22 was used.

Results

82 biopsy naïve men were included. Average patients age was 62.8 SD ± 7.28 years, with average PSA of 9.13 ± 9.55 ng/ml and prostate volume of 50.17 ± 20.1 cm³. 53.6% (44) of patients had only one lesion, 39% (32) had two lesions. The mean number of targeted biopsies per patient was 6.87 ± 2.7. Out of all patients 59.7% (49) had PC and 25,6% (21) had clinically significant PC. In PIRADS 3 group PC was found in 28.5% (6) cases, clinically significant 16.6% (1). PIRADS 4 group 58.8 (20) of cases PC was found, clinically significant 30% (6). PIRADS 5 group 85.8% (23) had PC, clinically significant PC 60.8% (14).

Conclusions

We concluded that as the PIRADS score increase, the detection rate of MRI/US fusion biopsies also increase. Therefore use of mpMRI and MRI/US fusion biopsies improve diagnostic accuracy. Our data is comparable to leading research in the field.

Neuromuscular blocking agents for open surgical tracheostomy in the Intensive Care Unit

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Objectives

Open surgical tracheostomy is one of the most frequent invasive procedures in critically ill patients. Surgical tracheostomies require anaesthesia, analgesia, but there is little information regarding paralytic agents effects among patients receiving tracheostomies. Our study aim is to evaluate whether the use of neuromuscular blocking agents (NMBA) in critically ill patients following tracheostomy is associated with increased rates of complications, increased hemodynamic instability.

Materials and Methods

This is a single-center prospective study at Pauls Stradins Clinical University Hospital in the general intensive care unit. The study included 43 critical care patients who were intubated and scheduled for surgical insertion of a tracheostomy. Patients were randomised into two groups: 1. NMBA (with neuromuscular blocking agents) 2. No-NMBA (without neuromuscular blocking agents). We recorded demographic data, hemodynamic instability time (min), total consumption of analgesic, sedative agents catecholamine consumption and early complications.

Results

Out of 43 included patients, 22 received NMBAs during the procedure. Patients who did not receive NMBAs showed higher consumption of propofol ($p=0.032$) and Sodium Oxybutyrate ($p=0.008$) for sedation than patients who received NMBAs and were more likely to develop coughing ($p=0.00$). There were no statistically significant difference between groups in fentanyl consumption ($P=0.926$) and Surgeon's assessment about procedure. Hemodynamic instability time ($P=0.611$), catecholamine consumption ($P=0.673$).

Conclusions

Neuromuscular block reduces the risk of early complications - cough and reduces needs for sedative agents.

Paraneoplastic syndrome presenting as a fever of unknown origin

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A 71-year-old male patient was admitted to the hospital with a 3-week history of fever, weight loss, mild headache, pain and numbness in both thighs. Laboratory assays revealed severe leukocytosis $28.5 \times 10^9/L$ and significant elevation of C-reactive protein (CRP) 291.65 mg/l. The patient was treated with intravenous ceftriaxone, gentamicin, vancomycin, mereponem with no positive effect. Laboratory tests for infections, including HIV, viral hepatitis, tuberculosis, neuroinfections returned negative. The serial blood and urine cultures were negative. The total body computed tomography excluded abscesses, occult neoplasia, or lymphadenopathy. However, the patient remained febrile during the hospital stay. Duplex sonography of the temporal arteries showed a dark halo around the arteries (sign of giant cell arteritis). Due to atypical presentation of the disease (patient had only mild headache, severe leukocytosis and significant elevation of CRP), a diagnosis of temporal arteritis as part of paraneoplastic syndrome was then considered. Upon further investigation a malignant tumor of caecum was found during colonoscopy, and histopathological examination determined tubulovillous adenoma with high grade dysplasia. Corticosteroids (intravenous methylprednisolone 1 mg/kg/day) were administered for three days, followed by an oral steroid (methylprednisolone 32 mg/day) in tapering doses. Patient also received NSAIDs (Dexketoprofen 50 mg intravenously for 7 days). He improved on methylprednisolone therapy rapidly with significant reduction of presenting symptoms. The methylprednisolone dose was tapered to 12 mg/day. The patient was further referred to a surgeon to schedule an operation.

Malignancy and paraneoplastic syndrome should always be considered as differential diagnosis in patients with fever of unknown origin, however these cases are uncommon. Types of malignancy-associated vasculitis described in the literature include temporal arteritis, although reports of cutaneous leukocytoclastic vasculitis and granulomatosis with polyangiitis are more frequent. The aim of this report was to present a case of paraneoplastic temporal arteritis as a cause of fever.

Percutaneous gastrostomy tube placement under regional anaesthesia in Riga 1st hospital

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Objectives

The influence of the mode of anaesthesia on outcome of polymorbid patients is a controversial issue in the medical literature. In the light of an ageing society, a conclusive answer to this question is of growing importance. If general anaesthesia can lead to death of the patient, regional anaesthesia might be chosen as an alternative. The case report of 59 years old woman who was admitted to Riga's 1st hospital for percutaneous gastrostomy tube (PGT) placement due to hypopharynx carcinoma, malnutrition and difficulty with swallowing solid food nor liquid. The need for PGT placement in operating room was established due to failure to perform percutaneous endoscopic gastrostomy. The serious problem was patient's airway obstruction due to the hypopharynx carcinoma, followed by desaturation under 1.2mg/kg intravenous propofol sedation. The anaesthesia of choice was quadratus lumborum block type 2 (QLB2). The left side QLB2 was performed under ultrasonographic control with curvilinear probe with 100 millimetre plexus needle. The anaesthetics of choice were ropivacaine 7,5 milligrams (mg) and lidocaine 100 mg. Total volume of 20 millilitres were injected. Intraoperatively the patient received the total of 200 mcg of fentanyl by fractions of 50 mcg and ketamine total dose of 50 mg. No local infiltration of skin or other tissues was performed by the surgeon. The length of the surgery was 10 minutes. Intraoperatively the patient reported sensation of pain in numeric rating scale (NRS) from 1 to 10. Postoperatively the patient received multimodal analgesia with acetaminophen, metamizole and NSAIDs. Reported immediate (0–2 hours) postoperative pain was NRS 4, after 6 hours – NRS 3, after 16 hours – NRS 2-3.

Conclusions

Quadratus lumborum blocks are fascial plane blocks that have the potential to improve analgesia following percutaneous gastrostomy.

Perineural dexmedetomidine as an adjuvant to axillary plexus block for wrist surgery

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Objectives

Various adjuvants are used to prolong the duration of plexus block. Dexmedetomidine, an α_2 adrenergic agonist, could be evaluated as an adjuvant to regional anesthesia. We aim to evaluate the effect of perineural dexmedetomidine on the duration of sensory and motor block and side effects during axillary plexus brachialis block.

Materials and Methods

The study included 84 patients undergoing wrist surgery under axillary plexus brachialis block. Patients were divided in 2 groups - control group (CG; N=42) and dexmedetomidine group (DG; N=42). Axillary plexus brachialis block was provided with 0.5% 20 mL bupivacaine and 1% 10 mL lidocaine. Patients in the DG group also received 100 mcg of dexmedetomidine perineurally in addition to local anesthetic. Depth of sedation was assessed using Ramsay sedation scale (RSS). Postoperative pain intensity was assessed using VAS.

Results

In the DG group, sensory block occurred within 10.1 minutes and motor block within 13.1 minutes. In the CG group, sensory block occurred within 15.4 minutes and motor block within 20.8 minutes ($p < 0.001$). The duration of sensory block in the DG group was 12.74 h, duration of motor block was 13.67 h. In the CG group, sensory block lasted 7.35 h, motor block lasted 8.06 h ($p < 0.001$). In the DG group 71.42% had an RSS score of 4 during surgery. Bradycardia and hypotension were not observed in CG group. Two patients had bradycardia and three patients had hypotension during surgery in the DG group. No postoperative adverse effects were observed in both groups.

Conclusions

Perineural administration of dexmedetomidine alongside local anesthetics for wrist surgery increases the speed of onset and nearly doubles the duration of sensory and motor block. Perineural dexmedetomidine allows a faster initiation of surgery, prolongs postoperative analgesia, and provides a sedative effect. Postoperative adverse effects of dexmedetomidine administration were not observed and intraoperative adverse effects were rare.

Predominantly antibody deficiencies in children and adults in Latvia 1994–2020

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Objectives

Predominantly antibody deficiencies (PAD) are the most common primary immunodeficiencies in children and adults. Clinical manifestations of these conditions are variable, including predisposition to recurrent or unusual infections, autoimmunity, autoinflammatory diseases, atopic diseases, polyclonal lymphocytic infiltrations, and malignancy. The aim of the study was to analyze patients with predominantly antibody deficiencies in population of Latvia.

Materials and Methods

We retrospectively analyzed data from Children's Clinical University Hospital and Pauls Stradins Clinical University Hospital during time period from 1994 till 2020.

Results

After exclusion of patients with selective IgA deficiency, transient hypogammaglobulinemia of infancy, and patients who were followed up by hematologists, a total of 39 patients were diagnosed with predominantly antibody deficiency. Two pediatric male patients were diagnosed with X-linked agammaglobulinemia, both cases were genetically confirmed to have a mutation in the BTK gene. Common variable immune deficiency (with no gene defect specified) was diagnosed in 27 patients, 13 of whom were diagnosed before the age of 18, and 14 in adulthood. The median age of diagnosis was 35.0 (IQR=29.0) years of age, 15 of these patients were male (55.6%). All patients are treated with immunoglobulin substitution therapy. Six of these patients deceased during the study period, at the age median age 38.7 (IQR:23.8). Two pediatric patients – a boy and a girl - were diagnosed with Activated p110 δ syndrome. The gain of function mutation in the PIK3CD gene was confirmed in both cases. Isolated IgG subclass deficiency was found in two females, and IgG subclass deficiency in combination with selective IgA deficiency was found in three female adult patients. Three pediatric patients had an unclassified antibody deficiency.

Conclusions

Primary antibody deficiencies could be diagnosed at any age. Timely diagnosis of antibody deficiency is important for prognosis and monitoring of these patients in order to predict the possible complications. Latvian Council of Science project lzp-2020/1-0269

Preliminary results of comparative analysis of peri-capsular nerve group block versus fascia iliaca block for hip arthroplasty

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Objectives

Still the best regional anaesthetic block in hip arthroplasty is not known. Femoral nerve and fascia iliaca (FI) blocks do not cover obturator nerve. Pericapsular Nerve Group (PENG) block is new approach which blocks articular branches to the hip including obturator nerve. We compared the efficacy of PENG and FI blocks in hip surgeries.

Materials and Methods

In preliminary analysis data of prospectively included 14 patients undergoing hip arthroplasty in Riga East University Hospital were analysed. All patients received standard general anaesthesia combined with FI block (FI group, n=5), PENG block (PENG group, n=6) or without block (Control group, n=3). At the end of surgery PENG or FI block with Bupivacaine 0.5%-20ml and Epinephrine 200 mkg was performed. Pain intensity assessed by numerological pain score (NPS) 1, 8 and 24 hours after surgery was recorded parallelly with opioid requirement.

Results

14 patients (5 males, 9 females) with average age $62 \pm 10,4$ years were divided into three groups: n=6 (PENG), n=5 (FI), n=3 (Control). Mean NPS 1 hour after surgery was similar in PENG and FI block groups 3.3 ± 1.23 vs. 4 ± 1.26 ; $p=0.37$, but significantly lower compared to control group 7.3 ± 0.47 with PENG ($p=0.001$) and FI ($p=0.005$). Although, mean NPS 8 hours after surgery was similar in PENG, FI and Control groups 2.2 ± 0.68 vs. 2.2 ± 0.4 vs. 3 ± 0.82 ; $p=0.18$, all patients in control group received Phentanyl for pain relief. Twenty-four hours after surgery statistically less pain was observed in PENG and FI block groups 1.8 ± 0.68 and 1.8 ± 0.4 vs. control group 2.7 ± 0.47 ; $p=0.03$. In FI and PENG groups, 2 patients, but in control group all patients received Phentanyl.

Conclusions

The use of blocks allows to reduce the need for opioids in the postoperative period, but there is not a conclusive difference in pain intensity and opioid use between the FI and PENG blocks for postoperative analgesia.

Preoperative multiparametric ultrasound correlation with morphology in patients with primary hyperparathyroidism

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Objectives

Aim of prospective study since February 2019 was to evaluate sensitivity and specificity of multiparametric ultrasound and its morphological correlation in patients with primary hyperparathyroidism.

Materials and Methods

Fifty-seven patients (18-77 age, 48(84%) females) with primary hyperparathyroidism prior to parathyroidectomy were enrolled in the study compared with postoperative morphology. Preoperatively, B-mode ultrasound, Colour-Doppler (CD), Superb Microvascular Imaging (SMI), Strain Elastography (SE), Strain Ratio (SR nodule/thyroid tissue), 2D Shear-Wave Elastography (SWE) in nodule and thyroid tissue and contrast-enhanced ultrasound (CEUS – SonoVue 2 ml + Sol. NaCl 0,9% 10 ml intravenous bolus) were performed with postprocessing of acquired data using VueBox application.

Results

Forty-eight (84%) patients presented with solitary adenomas, 5 (9%) single hyperplasia, 4 (7%) multiglandular disease – one double adenoma, one with 4 hyperplasias and adenoma, two patients - 1 hyperplasia and 1 adenoma. The morphologic subtypes of adenomas included chief cell, oxyphilic cell and clear water cell adenomas, with chief cell being the most common morphological subtype.

Characteristic ultrasound features of parathyroid adenomas were hypoechoic, well defined lesions with increased central echogenicity (82%), peripheral-central vascularization (66%) with feeding vessel (100%), median size of adenoma 10 mm (2-29 mm). Hyperplasias were smaller lesions vs. adenomas ($p=0,007$). Adenomas presented as soft lesions on elastography (SE 1.8(0.5–2.3)), 2D-SWE 35kPa(11-46kPa). CEUS showed median hypervascularity in early arterial phase - 9s, peak contrast time median value - 15s, median early washout 29s in both - adenoma and hyperplasia. There was weak association between morphological subtypes of parathyroid lesions and washout time (Cramer's V 0,33, $p=0,125$). Multiparametric ultrasound had sensitivity and specificity of 90% (95% CI 81.24–96.06) and 64% (CI 42.52–82.03), PPV 88% (CI 81.22–92.56), NPV 69% (CI 51.58–83.06), respectively.

Conclusions

Multiparametric ultrasound showed high sensitivity for confirmation of parathyroid lesion but did not show difference between adenoma and hyperplasia.

Psoriasis in Latvia from year 2015 till 2020, epidemiology, systemic therapy tendencies

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Objectives

Psoriasis is chronic inflammatory skin disease mediated by the immune system, which affects the skin, nails, and joints. A characteristic feature of *psoriasis vulgaris* is an erythematous, scaling plaque on the scalp, lower back and extensor surface of elbows and knees. The reported prevalence of psoriasis worldwide ranges between 0.09% and 11.43%, an incidence of psoriasis of 2.30–3.21 cases per 1000 person-years [Michalek *et al.*, 2016]. In Latvia the occurrence of the disease has not been previously investigated.

Materials and Methods

Data was obtained from the Latvia National Health Service (NHS). We analysed data for psoriasis patients (ICD code L40) who during the period from year 2015 till the end of September 2020 attended doctors, working within NHS system. We report incidence, the spread of the disease by age group, gender, and national distribution. The prescribed psoriasis treatment was analysed as well. Information about population annual data was retrieved from the Central Statistical Bureau of Latvia.

Results

The annual psoriasis incidence rate in Latvia was constant throughout the analysed period and was 2.1-2.2 cases per 1000 person-years. We observed significant increase of psoriasis incidence in comparison to period from year 2005 till 2014, when incidence was 0.6 – 0.8 cases per 1000 person-years. Incidence of psoriasis appears to be slightly more prevalent among women than among men. The largest number of people diagnosed with psoriasis annually was in Riga, followed by Daugavpils, Liepaja, Jelgava and Ventspils. Use of systemic therapy increased every year since year 2015, especially starting from year 2018.

Conclusions

Since year 2018, when biologic medications in Latvia were included into reimbursed medicines list for moderate to severe psoriasis, prescription of systemic conventional medications has significantly increased.

Pulmonary complication frequency after cardiopulmonary bypass

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Objectives

There are many factors that influence and predict outcomes following cardiopulmonary bypass (CPB). According to latest publications postoperative lung complications such as atelectasis, pleural effusions, pneumonia and pulmonary oedema shows strong impact on patients outcome after (CPB) and can be identified in more than 50% of patients.

Aim of this study was to identify lung complications following CPB, evaluate its impact on patients time in intensive care unit (ICU) and hospital stay.

Materials and Methods

254 patients who underwent elective open heart surgery were included. Their chest radiograph examinations 6 and 12 hours after surgery were examined. Pathologic chest radiograph findings such as pleural effusion, atelectasis, lung congestion and hypoventilation were classified as postoperative lung complications. Hospitalisation time and time spent in ICU were analysed.

Results

Pathologic findings on chest radiograph 6 hours after surgery were identified in 109 (42,9 %) patients and on chest radiograph 12 hours after surgery in 129 (50,8%) patients. Most common finding was pulmonary congestion in 55 (21,7%) patients followed by hypoventilation in 45 (17,7%) and pleural effusion in 43 (16,9%) patients respectively.

Patients without pathological findings on chest radiograph spent less time in ICU comparing to patient group with pathologic chest radiograph (1,2; SD 1,3 vs 1,7; SD 2,1; $p = 0,015$). Hospitalisation time was shorter (8,9; SD 4,0 vs 10,4; SD 5,4; $p = 0,20$) for patients without changes on chest radiograph.

Conclusions

Our study showed similar lung complication frequency in our center comparing with data in literature worldwide. Lung injury after CPB remains common complication and has a major role on patient recovery.

Quality of life of the patients with balanitis

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Objectives

Balanitis is an inflammation of the glans penis that can be caused by a range of conditions and sometimes runs a chronic course. Male genital dermatoses are often neglected by the physician and therefore are underdiagnosed [You et al., 2016]. It is known that genital psoriasis has a significant negative impact on the quality of life of patients, however there is lack of data on other balanitis [Ryan et al., 2015]. The study aims to evaluate the quality of life in patients with chronic inflammatory balanitis and compare it between different nosologies.

Materials and Methods

The study was approved by the Ethics Committee of Rīga Stradiņš University. Twenty-nine patients with histopathologically confirmed psoriatic (N=7), lichen planus (N=12) and non-specific (N=9) balanitis were enrolled in the study. All patients had exclusively genital involvement and were asked to fill in a validated Dermatology Life Quality Index (DLQI) questionnaire. The DLQI score and sub-scores were compared between groups using the non-parametric Mann-Whitney test. P values less than 0.05 were considered statistically significant.

Results

Mean DLQI scores were higher in patients with psoriatic balanitis (M=10.00 SD=8.79), than in patients with lichen planus (M=4.25 SD=3.67) and non-specific balanitis (5.00 SD=3.84). The differences between groups were not statistically significant. There was a statistically significant difference (U=11 p=0.026) in the "Symptoms and feelings" sub-group score when comparing psoriatic balanitis (M=3.14 SD=1.77) to non-specific balanitis (M=1.22 SD=1.09).

Conclusions

According to the DLQI score psoriatic balanitis with exclusively genital involvement seems to have a moderate effect on the patients' life, while lichen planus and non-specific balanitis have a small effect on the patients' life.

Quantitative analysis of digital subtraction angiography 2D perfusion in patient with critical limb ischemia

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Objectives

To determine quantitative values of digital subtraction angiography (DSA) 2D perfusion before and after percutaneous transluminal angioplasty (PTA) in midfoot and hindfoot regions.

Materials and Methods

Case report: The patient was admitted to Riga East University Hospital Interventional Radiology ward with critical limb ischemia that resulted in night pain, ulcer in the posterior tibial artery angiosome region, and claudication of 50 meters.

DSA showed long anterior tibial artery occlusion, distal posterior tibial artery occlusion, and patent interosseal artery. DSA 2D perfusion angiography images were acquired before and after anterior tibial artery angioplasty.

Results

After anterior tibial artery recanalization and qualitative assessment of foot perfusion, there was increased contrast media flow rate to the site of the ulcer.

Quantitative parameters that were analyzed included arrival time (AT), the area under the curve (AuC), peak density (PD), and time to peak (TTP). Data were measured at the site of the midfoot (at the localization of the arcuate artery and deep plantar artery) and at the site of the ulcer (lateral hindfoot region).

At the site of midfoot, there was a decrease of AT by 7.6%, an increase of AuC by 35.4%, an increase of PD by 40.3%, and a decrease of TTP by 13.4%.

At the site of the lateral hindfoot region, there was no improvement in AT, PD, and AuC, depicting significance of angiosome concept, but there was an improvement of TTP by 46.3%.

Conclusions

DSA 2D perfusion angiography allows quantitative assessment of affected limb that can aid interventional radiologists and vascular surgeons in clinical decision making.

Quantitative magnetic resonance imaging of knee cartilage for the assessment of post-traumatic cartilage injury

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Objectives

In a case of knee trauma, a meniscus tear is one of the most frequent findings in magnetic resonance imaging (MRI). Due to literature, such meniscus tears can be connected with a traumatic injury of articular cartilage of tibial and femoral condyle. Thanks to the image provided contrast, MRI is the first method of choice to evaluate injuries of knee soft tissue structures - meniscus, ligaments, and articular cartilage.

In this study for qualitative cartilage, evaluation authors used standard FSE PD fat saturation and T2 mapping sequence.

The abstract aim is to evaluate the condition of articular cartilage in subjects with a post-traumatic injury of the knee.

Materials and Methods

Study period from October 1 until December 29, 2020. Riga City 1. Hospital, Department of Radiology, General Electric DISCOVERY 750W 3.0 T MRI system.

The study includes 53 patients. Two groups: patients without meniscus tear (n=22) and individuals with a meniscus tear (n=31).

Results

Inter-rater-agreement (Kappa). In control group for lateral condyle cartilage 0.78 (95% CI 0.55–1.00), for medial condyle cartilage 0.91 (95% CI 0.76–1.00). In meniscus tear group for lateral condyle cartilage 0.75 (95% CI 0.51–1.00), for medial condyle cartilage 0.97 (95% CI 0.92–1.00).

Unpaired T test for T2 relaxation time: FLM,p=0.26, FLL,p=0.3, FMM,p=0.25,, FML,p=0.08, TLM,p=0.54, TLL,p=0.9, TMM,p=0.53, TML,p=0.54.

Group analysis by location: FLM,n=7(33.3%)/n=13(41.9%), FLL,n=3(14.3%)/n=11(35.5%), FMM,n=4(19.0%)/n=14(45.2%), FML,n=2(9.5%)/n=9(29.0%), TLM,n=1(4.8%)/n=8(25.8%), TLL,n=2 (9.5%)/n=5 (16.1%), TMM,n=1(4.8%)/n=7(33.3%), TML,n=2(9.5%)/n=5(16.1%).

Conclusions

Inter-rater-agreement (Kappa) showed good and very good strength of agreement.

Early cartilage damage such as edema - high T2 relaxation time values (above 40 m/sec) was present in both groups - early cartilage damage is not necessarily related to tear off the meniscus.

Statistical analysis didn't show a significant difference in cartilage T2 relaxation time between selected groups. However, the prevalence of high T2 relaxation time showed clear differences between selected groups.

Safety of endoscopic guided percutaneous dilation tracheostomy

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Objectives

Rīga East university hospital to date is the only center in Latvia to perform endoscopic guided percutaneous tracheostomy. The objective of the study was to assess the indication, length of the procedure and early complications of endoscopic guided percutaneous dilation tracheostomy.

Materials and Methods

A retrospective study at Rīga East University hospital was performed and involved patients for whom the data of percutaneous dilation tracheostomy (PDT) during the time period of 2004 – 2019 was available. The procedure was performed in ICU setting at the bedside. All the PDT were performed using Griggs technique and commercial Portex kit, all procedures were done under bronchoscopic guidance.

Results

400 patients' cases were available for analysis, 62% of them were male (247) and 38% (153) were female. The mean age of the patients was $53,9 \pm 18,1$ years. The most common reason for the PDT were neurological deficit (52%) and prolonged mechanical lung ventilation (23%). The diagnosis of patients for need of ICU were variable – most commonly due to sepsis (21%), polytrauma (13%) and oncology (8%). The mean duration of the procedure was $5,5 \pm 2,8$ minutes (ranging from 2 to 20 minutes). The early complications rate was low (8%) and consistent mainly of minor bleeding in 4,5% of the cases, moderate bleeding was seen only in 1% cases mainly due to coagulation problems, in 1,5% - minor desaturation, 1,5% hypotension during anesthesia, in 0,25% cases – tracheal ring fracture and pneumothorax

Conclusions

In our center in ICU setting the PDT with endoscopic guidance is the method of choice that has been proven to be even more important in COVID19 era. Endoscopic guided percutaneous tracheostomy is safe and relatively quick procedure with low complication rate, that shows it can be safely performed in ICU at bedside.

Serum complement C3 and C4 levels: prognostic factors in immunoglobulin A nephropathy

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Objectives

Various serum complement proteins, for example, C3 and C4, have been proposed as prognostic biomarkers of immunoglobulin A nephropathy (IgAN), but their clinical significance remains uncertain. The study aimed to identify the association of clinical data with serum complement C3 and C4 levels as possible predictive factors.

Materials and Methods

A prospective cohort study at Pauls Stradins Clinical University Hospital Nephrology center included patients with histologically confirmed diagnosis of IgAN from 1st January 2020 till 20 November 2020. Daily proteinuria, serum creatinine, serum complement C3 and C4 levels were assessed. Data were analyzed using Pearson Correlation Coefficient and Mann-Whitney test by IBM SPSS Statistics 26.

Results

37 patients (24 men, mean age 42.7 ± 10.9 years) were included in the study. Most of the patients (82%, $n = 30$) had normal C3 levels and C4 levels (95%, $n = 35$). 19% ($n = 7$) of patients had low C3 levels, but 5% ($n = 2$) of patients had high C4 levels. Median daily proteinuria was 0.38 g/24h (range 0.06 – 4.43) and median serum creatinine was 172 $\mu\text{mol/l}$ (range 60 - 1514). There was no significant effect of C3 level on daily proteinuria ($U = 100$, $p = 0.886$) and serum creatinine ($U = 84$, $p = 0.435$). There was a moderate positive correlation between C4 level and serum creatinine, which was statistically significant ($r = 0.329$; $n = 37$; $p = 0.047$). C4 level had a tendency towards correlation with daily proteinuria ($r = 0.319$; $n = 37$; $p = 0.054$).

Conclusions

The proteinuria and serum creatinine levels did not differ in the groups of patients with low or normal C3 level. The positive correlation of C4 level with serum creatinine and daily proteinuria shows that C4 may be a risk factor for IgAN progression.

Synovial osteoarthritis inflammation and its correlation with the level of radiologically assessed

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Objectives

The objective of this study is the assessment of the correlation between synovial inflammation and affection of the joint confirmed radiologically in osteoarthritis (OA) patients.

Materials and Methods

Twenty-one patients presented with advanced OA and underwent knee or hip endoprosthesis operation at the Riga East University Hospital Clinic "Gailezers" were enrolled in the study. Surgically obtained biopsy samples were routinely processed for histopathology and analyzed using the synovitis grading system proposed by Krenn et al.. Preoperative X-ray examination of affected joints was performed by using Kellgren and Lawrence radiological classification for OA. Pain assessment was performed using a visual analog pain scale (VAS) ranged from 0 to 10. Functional abilities of OA patients were estimated using Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).

Results

Ten (47.6%) and 11 (52.4%) patients underwent knee and hip arthroplasty, respectively. Kellgren and Lawrence score varied from 3 (61.9%) to 4 (38.1%) in both groups, respectively. Mean Kellgren and Lawrence scores were equally distributed among groups (3,4). Mean WOMAC score was higher in the hip arthroplasty group – 48.6 (SD 22) vs. knee group – 46,7 (SD 16.3), with a range from 46 up to 81. The mean VAS scale value was measured as 6.7 (SD 1,2), with a range from 5 up to 8 and 5,4 (SD 1,6) and range from 3 to 7 defined for the knee and hip group, respectively. No correlation between Krenn score and Kellgren and Lawrence score was observed as well as no correlation was found between Krenn and WOMAC score.

Conclusions

The study suggests the absence of a direct association between histopathologically and radiologically confirmed tissue damage in OA affected knee and hip joints. Likewise, no correlation between histopathology and WOMAC scores, reflecting the functional status of OA patients was found.

The profile of patients consulted by rheumatologists in the largest outpatient department in Latvia during the first month of the COVID-19 pandemic

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Objectives

This study aims to analyse rheumatic disease profile and treatment aspects of the patients consulted in the outpatient department of Pauls Stradins Clinical University Hospital (PSCUH) during the first month of COVID-19 pandemic.

Materials and Methods

The data were collected from the local database of the Centre of Rheumatology of PSCUH from 2020 March 13 till April 14. The analysed variables were: gender, age, diagnosis, groups of medications used for the treatment of rheumatic disease: synthetic disease modifying antirheumatic drug (sDMARD), biologic DMARD (bDMARD), glucocorticoid (GC), non-steroidal anti-inflammatory drug (NSAID), treatment adjustment during the consultation, comorbidities (hypertension, diabetes, malignancy, chronic respiratory disease).

Results

457 (76.04%) distant and 144 (23.96%) face-to-face consultations were analysed, totaling 601 patients: 434 (72.21 %) females and 167 (27.79 %) males with the mean age of 51.40 ± 14.73 (range 18–89) years. The majority of patients (156 (25.96%)) was aged from 50 to 59 years. Rheumatoid arthritis (223 (37.10%)), psoriatic arthritis (93 (15.47%)) and ankylosing spondylitis (80 (13.31%)) were the most frequently consulted conditions. DMARDs were taken by 515 (85.69 %) patients treated with monotherapy of sDMARD (242 (46.99%)), mainly methotrexate, or bDMARD (156 (30.29%)), mainly tumour necrosis factor inhibitor. More than a half of the cohort (427 (71.05%)) was not taking a GC. Treatment was adjusted in 98 (16.31%) cases, mainly dosage increase or initiation of sDMARD (57 (58.16%)). Cessation of treatment due to undesirable side effects was made in 9 (1.50%) cases. NSAIDs were used in 391 (65.08%) patients, mainly on demand (354 (90.54%)). Most patients (401 (66.72%)) had no comorbidities. The most frequent comorbidity was cardiovascular disease (146 (73.00%)).

Conclusions

The profile of patients consulted in the outpatient department consisted mainly of middle age females with autoimmune inflammatory arthritis treated by DMARD without usage of GCs and regular intake of NSAIDs and absence of comorbidities.

The value of neutrophil-to-lymphocyte ratio in acute appendicitis

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Objectives

In acute appendicitis, neutrophil-to-lymphocyte ratio (NLR) values exceeding 8.8 are shown by some authors to predict the complexity of disease. Although attractive, NLR-based approach is not included in the general standards of appendicitis care. Our objective was to test this hypothesis by our data, and to determine if intraoperative findings correlated with NLR.

Materials and Methods

In a retrospective observational study from September 2016 till August 2020, 242 consecutive cases of acute appendicitis were identified. Two groups of patients were defined by presence of uncomplicated vs complicated disease. Patients with visually intact appendix were excluded. Complicated appendicitis was diagnosed intraoperatively by surgeon as the presence of at least one of five signs: destructive appendicitis, visible perforation, intraabdominal fecalith, abscess, or peritonitis. NLR was calculated and compared with intraoperative findings. Descriptive and analytical statistics was carried out by SPSS23 (IBM); $p < 0.05$ was considered significant.

Results

Based on intraoperative findings, appendix was intact in 14 cases (5.8%). Among remaining patients, non-complicated appendicitis was present in 151 cases (62.4%) and complicated appendicitis in 91 cases (37.6%). NLR higher than 8.8 was statistically significant in discriminating non-complicated vs complicated appendicitis ($p = 0.0002$). In the whole group, mean NLR was 9.24 [95% confidence interval CI: 8.12–10.35]. Non-complicated appendicitis was associated with mean NLR of 7.98 [6.81–9.15]. Patients showing a single sign of complicated appendicitis had mean NLR of 9.37 [7.76–11.03], two signs – 11.45 [9.04–13.95], three or more – 13.65 [8.25–19.05]. However there were no statistically significant differences ($p = 0.092$) within the complicated group. In contrast there were significant differences in NLR distribution between non-complicated and complicated appendicitis ($p < 0.05$).

Conclusions

NLR is statistically significant marker to differentiate between non-complicated and complicated appendicitis. Our study supports the previously reported diagnostic threshold of 8.8. Higher NLR could predict more complex intraoperative findings and thus help to choose appropriate surgical approach.

Thyroid nodule malignancy risk comparison between different Thyroid Imaging and Reporting Data Systems (TIRADS)

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Objectives

The aim of the study was to evaluate which of the following three TIRADS systems is more sensitive and accurate: the system used in Latvia (L-TIRADS), Europe (EU-TIRADS) and the Korean (K-TIRADS) system.

Materials and Methods

A prospective study in which thyroid ultrasound and FNA biopsy results of 176 patients with 187 thyroid nodules according to the national guidelines for thyroid biopsy. 151 female (85.8 %) and 25 male (14.2%) patients were included in the study.

Each nodule was graded by all TIRADS systems and malignancy stratification comparison was performed based on malignant pattern presence by experienced radiologist.

Results

135 nodules (72.19%) were benign, 7 nodules (3.74%) were suspicious of malignancy, 17 nodules (9.09%) were malignant and 14 nodules (7.49%) were FNA non-diagnostic according to the *Bethesda* system. All TIRADS systems have a high sensitivity (100%) for malignancy detection. However, L-TIRADS represents a higher specificity (67.5%), accuracy (71.7%) and AUC (83.7%), in comparison with EU-TIRADS (SPE=33.1%, ACC=41.7%, AUC=66.6%) and K-TIRADS (SPE=42.9%, ACC=50.3%, AUC=71.5%). From ultrasonographic features, microcalcification was more sensitive – 87.5% (OR= 21.53; p<0.001). However, microlobulated or spiculated/infiltrative contour was more accurate and with a better AUC 85.0% and 89.3% (OR=23.13; p<0.001), respectively.

Conclusions

Microlobulated or spiculated/infiltrative contour have shown to be an ultrasonographic malignancy feature with the highest accuracy. One in three nodules with microcalcification and marked hypoechogenicity are malignant. L-TIRADS represents higher specificity and accuracy in comparison to EU-TIRADS and K-TIRADS. Taking into account these results, L-TIRADS can be considered to be the thyroid imaging and reporting data system of a higher quality.

Unconventional and previously undocumented approach to an intraocular lens fixation in the anterior chamber

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The history of cataract surgery has begun long before the modern phacoemulsification method has been introduced to the world. One of the very first technique, referred to as "couching", was supposedly first performed in the fifth century bc, and was regularly used throughout the Roman Empire, Europe, India and sub-Saharan Africa for hundreds of years.

The 17th century is considered to be important in terms of improving and advancing both understanding of the eye anatomy and techniques for extraction of the cataractous lens. Nonetheless, it is the invention of phacoemulsification by Charles Kelman in 1967 that marked the dawn of a new era in cataract surgery.

Over a span of approximately 2500 years, every single aspect of the lens removal and replacement surgery has been evolved and modified – from mature cataract displacement inferiorly with a knife in a conscious adult to an elegantly performed congenital cataract operation in a fully sedated toddler. Along with extractions methods, a number of artificial lens fixation techniques had been developed and employed throughout the world, varying from anterior chamber angle supported to iris-sutured posterior chamber IOL and glue-assisted scleral fixation techniques

However, occasionally, stimulated by either unexpected obstacles, such as poor capsular support, or perhaps simply by enthusiasm, surgeons introduce curious and unorthodox solutions to implantation techniques of an intraocular lens, partially or completely modifying the design of the conventional monofocal intraocular lens and introducing a new fixation method, to fit the needs of the patient.

This is a case report of a rather curious case where a creative surgeon from Russia, who probably inspired by the iris claw fixation technique of the Artisan® lens, found an extremely unconventional approach for the fixation of an artificial lens in the anterior chamber of the eye.

Video-assisted retroperitoneal debridement of infected necrotizing pancreatitis: the first experience of P. Stradins Clinical University Hospital

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Objectives

The main objective of this article was to show the first experience in treating acute necrotizing infected pancreatitis using minimally invasive techniques in Pauls Stradins Clinical University Hospital. The strategy chosen by our hospital includes the so-called step-by-step approach, combining radiological and surgical techniques.

Materials and Methods

Seven patients who underwent this procedure in Pauls Stradins Clinical University Hospital were selected and included in the study. A standardized strategy consisting of CT-guided puncture of necrotic collections, followed by implantation of a navigation drain was used in all cases. Afterwards a minimally invasive technique for draining necrotic collections – video assisted retroperitoneal debridement (VARD) – was performed. In total, 17 VARD operations were performed.

Results

An average of 3 operation per patient were required, which meets the standard of world practice. Four patients were discharged from the hospital without surgical complications but showing the development of pancreatogenic diabetes. One patient died due to a condition unrelated to the underlying disease. One patient died because of progression of the underlying disease, but not associated with surgical treatment. One patient was discharged and continues outpatient treatment.

Conclusions

The VARD technique is a minimally invasive, innovative technique in the treatment of acute necrotizing infected pancreatitis. With appropriate patient preparation and the use of a step-by-step approach, it is possible to achieve significant improvement in patient's condition, in comparison to a conventional or conservative approach.

Artificial Intelligence In Healthcare

Artificial neural network use in optimizing optical non-invasive skin cancer image segmentation and diagnostics

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Objectives

The introduction of artificial intelligence and neural networks within the medical industry has opened many opportunities for the improvement of the effectiveness, precision, and automation of previously tediously manual diagnostics processes. Nowadays, pre-trained artificial neural networks are widely used for various applications in the biomedical industry and are at the forefront of the digitalization of healthcare.

Materials and Methods

In the case of skin lesion image processing, segmentation is required to align the multispectral images, to remove hair artifacts, as well as to perform automated parameter calculations within the skin formation for a multitude of skin lesion data categories. During the conducted research, artificial neural networks were used to segment skin lesions for automatic multispectral data processing. The network uses skin diffuse reflection images from 3 different spectral wavelengths. By using image processing methods, the input images were then segmented by the trained artificial neural network.

Results

The implementation of neural networks within the processing of multispectral skin cancer imagery solves most of the issues of previously conducted research and scripted solutions. The segmentation results have been improved in specific cases that cannot be processed using the previously developed script, such as images containing multiple markers, blurry, malformation areas with indistinguishable contours, as well as low contrast, misaligned or reflective imagery.

Conclusions

To provide more training data for the artificial neural network and increase the segmentation process accuracy, the training image database has been increased by using data augmentation. Additional automation of multiple input image processing makes further improvement implementation and testing more accessible and interchangeable without the constraints of needing licensed software, whilst also making it possible to automate the processing of a large number of data to give an accurate assessment of skin lesions in the process of skin cancer diagnostics.

Handwashing quality control using neural networks

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Objectives

Qualitative hand washing is one of the most efficient ways to prevent the spreading of infectious diseases. The aim of this study was to research handwashing quality control possibilities using neural networks.

Materials and Methods

Neural networks and machine learning were applied to recognize handwashing movements and gestures. In order to teach neural network video files with handwashing episodes were collected and annotated using computer software.

Results

More than 1000 video files with handwashing episodes were collected in local hospitals. 700 videos were annotated - where each handwashing movement was labeled accordingly to World Health Organization recommendations. Annotated video files were used to train the convolutional neural network. As result, the neural network with an accuracy of 64% was obtained. The study shows that neural network accuracy was improving by increasing the number of annotated videos used to train the network. Therefore, we are planning to collect and annotate more video files to increase the accuracy and performance of the neural network in future studies.

Conclusions

Our study shows that well trained neural network could be a beneficial tool in order to control and improve handwashing quality. Moreover, the neural network could be implemented in computer software, so the new type of handwashing quality control devices could be manufactured in the future.

Digital Healthcare, Telemedicine, Virtual Reality

Evaluation of virtual reality in trauma training: randomized controlled trial

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Objectives

Simulation-based medical education is developing rapidly. In the past years new trends in virtual reality (VR) have raised in this field as well. The aim of this study was to compare VR to conventional mannequin-based simulation in trauma training of medical students.

Materials and Methods

Volunteers, Riga Stradins University 3rd-6th year medical students, were randomly assigned to two groups by using minimization algorithm: training by conventional or VR simulation. The conventional simulation was performed on SimMan@3G mannequin (Laerdal Medical) with the same room and equipment set-up as in Trauma Simulator (TS) (Exonicus, Inc.) used in VR group. The primary outcome was Trauma Score (Exonicus, Inc.; range 55-177) in conventional mannequin-based scenario. The sample size was calculated assuming non-inferiority limit of 10. Simulation was scored by video review of two blinded graders. The secondary outcome was Trauma Score in VR and Pre-&Post- Survey evaluation of the experience.

Results

A total of 38 students were randomized: 19 to conventional and 19 VR simulation; all completed primary outcome. The differences between conventional and VR simulation groups in means of Trauma Score were 0,1 (95% CI -7.3 - 7.5; p=0.977) and -24,2 (95% CI -38.3 - -10.1; p=0.001) for mannequin and VR based assessment, respectively. In the Survey, 16% of the students reported some adverse effects after trying the VR headset. All the students rated this training as positive experience regardless the group they were divided in. Majority of students admitted that immersive VR would be a useful addition to their medical training and noted that repeated use of this simulator would help them remember correlating trauma algorithms and increase their confidence in running a similar situation in real life.

Conclusions

TS was non-inferior to conventional mannequin-based simulation. The main advantage of TS is: it does not require vastly experienced medical facilitators. However, this study did not assess costs and critical clinical performance or outcomes.

Stroke patient experience using digital therapy "Vigo" for stroke patient recovery

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Objectives

The aim of this study was to explore patient insights about usability of the digital assistant "Vigo" for stroke recovery. In the last years the number of health applications has grown rapidly. Smartphones and tablets with therapeutic applications could potentially provide resource-efficient rehabilitation to help with recovery. The digital assistant "Vigo" is a computer-generated artificial intelligence-based application with chatbot and gamification elements. It aims to counsel, educate, and train the stroke patient and patient's family on stroke, rehabilitation, care, and other related issues.

Materials and Methods

Twelve patients participated in the study. Each participant tested the application at their home environment for a month. Three semi-structured interviews were conducted with each participant to obtain information on the usability of the application.

Results

Users of digital assistant "Vigo" acknowledged its ability to support, give educational information and increase participation in therapeutic activities. All participants generally evaluated the application as transparent, understandable, and handy. The overall design of the application was rated as good. Participants mostly recommended improving the difficulty level and diversity of exercises.

Conclusions

Our findings show that at a patient level use of tablet technologies is acceptable and feasible as long as they are easy to use and beneficial at an individual level. As a home-based rehabilitation tool, the content of the application must be simple, flexible, and diverse, to face the challenges of meeting each individual's goals, functional needs and abilities. Developers need to put emphasis on programs content, flexibility and diversity. Table use faces the challenge of meeting each individual's goals, functional needs and abilities. In depth analyses of results can be found in the following link: <https://doi.org/10.1080/17483107.2020.1839794>

**Medical Technologies -
Devices, Materials, 3D
Printing, Gadgets,
Biomedical Engineering**

3D printed additive ergonomic intravenous extremity support catheter stabilization protection products

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1. Riga Technical University

Objectives

In connection with the identified problem of a certain state about the lack of the necessary equipment in children's hospitals, it was decided to study the narrowly focused industry in the already existing, as it turned out, protective stabilization means of intravenous administration. As a result of research on the basis of inventions that have already existed since 1991, innovative stabilizing products of various sizes were improved, which are fixed at certain places of intravenous introduction of catheters and protective attachments over the limits of the proximal side of the holder.

The aim of this summary thesis is to model and develop new patent prototypes

Materials and Methods

3D printing PLA materials and modeling methods.

Results

The results of this products are high quality, easy, simple, cost effective to position and strengthen the wrist, elbow and foot joints to stabilize and prevent unwanted movement, catheter insertion into arterial and peripheral (intravenous) lines on delicate veins and extremities.

Products are available in a variety of sizes, from newborns to adults. All protectors can be attached to the wrist with adjustable hook and loop straps. Two pre-attached comfortable straps offer flexible, adjustable, comfortable and effective wrist, elbow, foot attachment for patients of any size. No more, time-consuming frenzy with surgical tape and scissors to attach the boards to the patient. Nurse no longer have to worry about leaving the tape left on the patient after removing the tape. Gently elastic straps do not cause skin injuries - this helps prevent them.

Conclusions

Although specific embodiments have been described, it should be appreciated that other embodiments utilizing the concept of the present embodiments are possible. All embodiments, for example, are not intended to be limited to the specific materials discussed and exemplified and disclosed herein; rather, the embodiments are defined by the claims and the equivalents thereof.

Computer user emotion detection methods in human computer interaction

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Objectives

Exploring and observing the emotions of a computer user plays an important role in human-computer interaction. It allows us to assess user satisfaction with the product, cognitive load, stress level, and other indicators. Finding out what usability methods are utilised to capture and explore emotions, as well as identify the strengths and weaknesses of these methods. To evaluate the methods of verbal emotion expression and facial expression used in the pilot study.

Materials and Methods

The theoretical method of literature analysis was used, as well as the analysis of verbal emotional expressions and facial expressions used in the pilot study, which allows us to obtain results.

Results

Theoretical emotional evaluation of computer users and analysis of observation methods without the application of a pilot study to methodological detection methods of key possibilities, such as facial expressions that can be analyzed by observation and software, skin conductivity or using an electroencephalogram.

Based on the evaluation of the methods used in the pilot study, weaknesses were identified that need to be improved.

Conclusions

The main methods of emotional evaluation of computer users are the analysis of facial expressions with the help of software, skin conductivity and electroencephalogram, where data is obtained and analyzed not only by qualitative, but also by quantitative methods.

Creation of digital bones collection with anatomically correct and optimized 3D models

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Objectives

There are currently several digital applications and databases that offer different types of anatomical three-dimensional (3D) models, but at the same time, it is very important to create a collection of these models for some human skeletal structures that are optimized for testing and verification, according to normal human anatomy.

Materials and Methods

This study consisted of two parts. The 1st part included segmentation of digital models of bones of the torso (52 bones) from computed tomography (CT) scan of the human body, optimization of the models (analysis of the errors, artifacts, mesh density), and validation of the models comparing them to normal anatomy from literature sources and real bones. In the 2nd part, several defective models were corrected and afterward 3D models were developed and made accessible for a digital collection created for the study process. The three software (Slicer, Meshmixer, Meshlab), and the web service for storage and visualization (Sketchfab) have been used in creation process.

Results

The 52 bones were segmented from the free available computed tomography scan of the human body by the Slicer software. Every bone was evaluated on the presence of artifacts by Meshlab. All the detected artifacts were corrected using Meshlab and Meshmixer. Afterwards the anatomical correctness was evaluated and all observed inaccuracies were corrected with the help of Meshmixer. Prepared digital models were uploaded on the special storage and visualization platform.

Conclusions

Created digital collection can be used in the study process and different areas, including simulations, anthropology, 3D printing, bioprinting, etc. It will contribute to the development of a new interdisciplinary solution in the medical sector and promise new benefits in the e-teaching and e-learning of 3D printing in the human anatomy course.

Detection and tracking of epilepsy seizures using machine learning and quantum dots biosensor

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Objectives

We are presenting the idea of developing a cloud connected clinical in vivo implantable quantum dots biosensor to detect and alert about the epileptic episodes with analysis using cloud based machine learning and also sharing the information directly to the caregivers , If necessary.

Materials and Methods

Neurological disorders are diseases of the central and peripheral nervous system which constitute 6.3% of the global burden of disease. Being part of neurological disorders, epilepsy is a chronic non-communicable disease of the brain that affects people of all ages. Before, during and after a seizure, the amount of lactate in our body has a significant increase. This change favors the oxidation of NADH to NAD⁺. NADH and NAD⁺ are the enzymes that are produced during an epileptic episode and emit blue colour when exposed to the UV rays. NADH can absorb light up to 340 nm. This development of detectable oxidation of NADH to NAD⁺ helps in developing a Cloud-connected Clinical In-Vivo longTerm Implantable Quantum Dots Biosensor to detect and record the change of concentration in NADH and NAD⁺ which will alert about the epileptic episodes with analysis using cloud-based machine learning and also sharing the information directly to the caregivers, If necessary. Quantum dots change colour when exposed to UV rays. The Quantum dots will detect UV rays and will change the bandgap that will emit different colours with NADH when NADH and NAD⁺ are exposed to UV rays.

Results

Beneficial for the tracking and analysis for the pharmacovigilance team and clinical trials. Providing high precision and accuracy, this could be the beginning of Precision medicine and precision diagnosis.

Conclusions

Advance data analysis will pave way for researchers to develop precision medicine and also will embark on the beginning of personalized healthcare.

H2S signaling modulation in human pulmonary arteries with low-frequency (20 kHz) ultrasound

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Objectives

We aimed to test if the GYY4137 causes vascular contraction in human pulmonary arteries, check the drug interaction between GYY4137, ambrisentan and tadalafil, see if the KATP and Kv7.2/7.3 channels are involved in these processes and modulate the pharmacological drug action with the LUS.

Materials and Methods

Chemicals: glibenclamide, GYY4137, U46619, tadalafil, Ambrisentan, and XE-991. The physiologic salt solution. The Ca²⁺ free PSS solution was identical to the PSS solution except for the exclusion of CaCl₂. Low frequency ultrasound. Experiments: Functional studies in mesenteric arteries.

Results

We found that GYY4137 causes a dose dependent vascular contraction in the isolated human pulmonary vessels. U46619 was used to contract human lung vessels in the PSS without Ca²⁺. The insonated vessels exhibited lower contraction during insonation. We used tadalafil to inhibit Phosphodiesterase type 5 and contracted with GYY4137. The contraction was not reversed with PDE5 inhibition and the insonation does not seem to potentiate the effect of tadalafil on human pulmonary arteries. Ambrisentan was used on GYY4137 contracted human pulmonary vessels. The contraction was not reversed with ambrisentan. Insonated vessels with ambrisentan produced greater contraction than the control vessels. The GYY4137 induced pulmonary vascular contraction was blocked with XE991, a KCNQ inhibitor and glibenclamide. LUS changed the activity of the Kv7.2/7.3 by counteracting the effects of the XE991 and potentiated the inhibition with glibenclamide.

Conclusions

We show that this GYY4137 induced pulmonary vascular contraction can be partly reduced with the LUS. We also show that neither PDE5 inhibition with tadalafil, nor selective endothelin receptor inhibition with ambrisentan produces vascular relaxation in pulmonary arteries contracted with the GYY4137 and that the insonated vessels contract to a lesser extent as compared to control vessels. We found that XE991 abolishes the GYY4137 induced vascular contraction and that this effect can be counteracted with the LUS. XE991 modulates the Kv7 channels and ERG rectifying ion channels. We show that glibenclamide inhibits the GYY4137 induced pulmonary vascular contraction and that this effect is potentiated with the LUS.

Stealth nanoparticles for tumour-specific delivery

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Objectives

Nanomedicine is an emerging field that applies concepts in nanotechnology to develop novel diagnostics and therapies. Despite intensive study of nanoparticles (NPs) for drug delivery in cancers, the median reported efficiency of NP delivery to tumour sites is less than 1% and NP disposition within the tumour is limited to periphery. The major limitation in developing NP for drug delivery in cancer is the absence of clear guidelines with respect to NP physiochemical properties. The objective of the presented study is to create NPs that avoid opsonization and serve as a platform to investigate the NP size influence on tumour delivery efficiency.

Materials and Methods

We have created polymeric nanoparticles and studied their properties with a range of physical techniques (e.g. NMR, SLS, DLS, TEM). We used fluorescence correlation spectroscopy to evaluate their colloidal stability in serum. We further investigated pharmacokinetics and biodistribution of fluorescently-labelled NPs in healthy Balb/c mice and immunocompromised mice bearing triple-negative breast cancer (TNBC) using fluorescence imaging and plasma concentration analysis.

Results

Data shows that developed nanoparticles are stable in serum and maintain their size for at least a month; they have unprecedented pharmacokinetic and biodistribution profiles. In healthy mice following i.v. and i.p. injections, NPs with a hydrodynamic diameter of 30 nm avoid rapid clearance, have elimination half-life of over 30 h, and distribute across all major organs except the brain. In contrast, in TNBC tumour-bearing mice, after the initial uniform distribution, we observed gradual NP accumulation in tumour, and tissue analysis revealed tumour to be the principle NP accumulation site by day 4.

Conclusions

Our results confirm the hypothesis, that the absence of opsonization and resulting long systemic circulation is essential for efficient NP accumulation in tumours. The developed NPs will serve as a platform for future elucidation of key properties required for selective delivery of NP to tumours.

Personalized Medicine

Assessment of innovative biomarkers in early period after kidney transplantation

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Objectives

The study aimed to assess the utility of novel renal injury biomarkers in early period after kidney transplantation.

Materials and Methods

Retrospective study included recipients who underwent kidney transplantation from deceased or living donors in the time period from 01.01.2018 till 31.12.2019 at Pauls Stradins Clinical University hospital. Patients who agreed to perform additional sampling of blood and urine for biomarker panel evaluation were enrolled in the study. All the laboratory test results and biomarker panel (KIM-1, NGAL, IL-18, MIG, CXCL9, CXCL10, IP-10) were evaluated at one, two, 15 and 60 days post kidney transplantation as recommended by the manufacturer by using commercial ELISA kits. Kidney graft function was assessed by eGFR, calculated by CKD-EPI equation. Data was processed using IBM SPSS 25.0

Results

Study included total of 24 recipients (58% males, mean age 42.6 ± 12.6 years). All recipients had primary graft function. Values of eGFR post- kidney transplantation were following: on the 1st day: $7.5 \text{ ml/min/1.73 m}^2$; $7.0 - 12.5$; $p < 0.001$; 2nd day: $17.0 \text{ ml/min/1.73 m}^2$; $10.2 - 28.7$; $p < 0.001$; 15th day: $58.1 \pm 27.3 \text{ ml/min/1.73 m}^2$; $p = 0.050$; 60th day: $59.5 \pm 23.4 \text{ ml/min/1.73 m}^2$; $p = 0.173$. Correlation between serum KIM-1 and eGFR levels on 15th day post-KT ($r_s = -0.507$; $p = 0.064$, $n=14$); serum NGAL and eGFR levels on 60th day post-KT ($r_s = -0.755$; $p = 0.031$, $n=8$); urine CXCL9 and eGFR levels on 60th day post-KT ($r_s = 0.707$; $p = 0.050$, $n=8$).

Conclusions

- The kidney graft function assessed by eGFR, showed normalization of graft function within 15 days post kidney transplantation.
- No statistically significant correlations were found between eGFR and serum and urine KIM-1/ IL-18/ IP-10 levels.
- Statistically significant correlations were found between serum NGAL/ urine CXCL9 and eGFR levels on 60th day post kidney transplantation.

Human induced pluripotent stem cell derived astrocyte based models in neuropsychiatric disorders

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Objectives

1. Human induced pluripotent stem cell (hiPSC) based model is being developed for research into the pathogenesis of neuropsychiatric disorders and personalized treatment.

Materials and Methods

First we isolate peripheral blood progenitor cells (PBMCs) from patient's, that has a neuropsychiatric disorder, blood. Then, after we run them through culturing process, we start the reprogramming process to create hiPSCs. After that we can start hiPSCs differentiation to astrocyte.

Results

Astrocytes participate in synaptogenesis, glutamatergic, monoaminergic system and form the blood-brain barrier. Astrocyte dysfunction has been linked to the development of various neuropsychiatric disorders (Schizophrenia, Major depressive disorder and Autism spectrum disorders and Alzheimer's) by disruption of glutamate homeostasis or its signaling pathways. hiPSC models with astrocytes and neurons may help in understanding the pathogenesis of neuropsychiatric disorders and thus aid in drug development.

Conclusions

Glial cells in general plays a very important role in the nervous system and depending on their functions may be divided into macroglia and microglia; other classes of glial cells have also been identified: oligodendrocyte progenitor cells and specialized glial cells. Glial cells play a major physiological role in the nervous system and it is known that these cells actively participate in the communicational processes of the brain. It is known, that astrocytes, a type of glial cells, actually are actively involved in the processing, transfer and storage of information in the nervous system, which shows, that brain function depends not only on the neuronal network activity, but more so, on the activity of neuron-glia network. Research shows that various malfunctions in glial cells can lead to psychopathology, so these cells may, therefore, serve as appropriate targets for therapeutic interventions. hiPSCs could be an innovative tool for developing models of neuropsychiatric diseases from human astrocytes, when it is already known that they are effective biomarkers of inflammatory processes in the CNS, which may represent pathologies of the nervous system that may be associated with psychiatric disorders.

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