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HEART RATE AND OTHER RISK FACTORS IN OUTPATIENTS WITH STABLE CORONARY ARTERY DISEASE IN LATVIA

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The aim of the study was to characterise coronary artery disease (CAD) outpatients in Latvia by risk factors (RF) including heart rate (HR), physical examination data, clinical data and treatment. Twelve practitioners had each examined and questioned 6 to 12 patients with established CAD (n = 120). The most frequent cardiovascular (CV) RF and co-morbidity were dyslipidemia (94.2%) and hypertension (78.3%), respectively. Prevalence of increased resting HR (≥70 bpm) was 35.9% and 33.6%, when measured by pulse palpation and electrocardiography, respectively. Regarding other RFs, prevalence of treated but insufficiently controlled blood pressure 140/90 mmHg, total cholesterol1 > 5 mmol/l and triglycerides > 1.7 mmol/l was 25.8%, 30.1% and 33.3%, respectively. Aspirin, statins and angiotensin-converting enzyme inhibitors or angiotensin-receptor blockers were used in 96.7%, 94.2% and 85.0% of cases, respectively. Beta blockers were used in 81.7% of cases. Average daily doses of most frequently used ß blockers (metoprolol and bisoprolol) were 32% and 53% from target doses, respectively. In three cases ß blockers were combined with ivabradin. Our results suggest that practitioners follow guidelines and consider CV prevention by treating CAD patients. Our data identified, however, unused potential for better control of increased HR by higher doses and combinations of HR-reducing agents.

Key words: *resting heart rate, risk factors, coronary artery disease, outpatient.*

INTRODUCTION

Coronary artery disease (CAD) is a highly prevalent cardiovascular (CV) pathology. CAD is the main cause of mortality worldwide and is a major burden on public health (Leal *et al*., 2006). It has been established that CAD will remain the leading cause of death for coming decades (Mathers and Loncar, 2006). CV mortality in Latvia is higher than in the European Union on average (Anonīms, 2010). In the future, number of CAD patients may be increasing due to aging of the population and improved prognosis of coronary patients (Tunstall-Pedoe *et al*., 1999). Recent advances in management of CAD have resulted in more effective treatment for acute coronary syndrome, revascularization and improved prevention. Nevertheless, CAD remains a major public health concern and improvement of outcomes of the disease continues to be a challenge.

Clinical characteristics of patients with CAD as well as understanding of risk factors and treatment have markedly changed over the years. Recently, strong evidence has been found that supports the concept of resting heart rate (HR) being an important prognostic risk factor (Diaz e*t al*., 2005; Fox *et al*., 2008a; Bohm *et al*., 2010). The prospective BEAUTIFUL study confirmed the prognostic value of increased resting HR in stable CAD patients with left ventricular dysfunction and showed that HR ≥70 beats per minute (bpm) is associated with significantly increased CV risk in CAD patients (Fox *et al*., 2008a). Results of another prospective study SHIFT showed that high HR is a risk factor in heart failure and an important target for treatment (Bohm *et al*., 2010).

Based on a large body of evidence, high resting HR has been included as an independent CV risk factor in the latest European and Latvian guidelines on CV disease prevention (Ērglis u.c., 2007; Graham *et al.,* 2007). Recent European guidelines on CV disease prevention recommend measurement of HR as an integral part of the assessment for total CV risk (Graham *et al*., 2007).

Taking into account the evolving concept of high resting HR as a correctable risk factor of CAD, there is growing demand for information on the resting HR level in clinical practice, particularly in outpatients.

The aim of the study was to characterise outpatients with stable CAD in Latvia by survey and analysis of data on demographics, prevalence of risk factors (including increased HR), lifestyle, medical history, physical examination data, clinical data and treatment.

MATERIALS AND METHODS

We surveyed 120 outpatients with treated stable CAD. Ten cardiologists and two general practitioners working in different regions of Latvia participated in the study. Each of the practitioners had examined 6 to 12 CAD patients. CAD was confirmed by history of at least one of the following inclusion criteria: documented myocardial infarction (more than three months ago), coronary stenosis more than 50% (confirmed by coronary angiography), chest pain in combination with myocardial ischemia (confirmed by stress ECG, stress echocardiography or myocardial imaging), coronary revascularisation (coronary artery bypass graft (CABG) and percutaneous coronary intervention (PCI)) more than three months ago. Exclusion criteria were hospitalisation due to CV disease within the last three months, planned revascularisation and limited cooperation of the patient. Data were collected during one visit to each practitioner during the period from November 2009 to March 2010.

The case report form contained the following parts: demographic information (age, gender, employment status, education level); risk factors and lifestyle (family history of premature CAD, treated hypertension, diabetes, dyslipidemia, peripheral arterial disease, smoking status, alcohol intake (1 drink = standard measure of spirits/1 glass of wine/1 bottle of beer), stimulant drinks (coffee and tea), and physical activity); medical history; physical examination; current symptoms (angina and congestive heart failure (CHF) symptoms); most recent measurements (if available) of glucose level, total cholesterol, high density lipoprotein cholesterol (HDL), low density lipoprotein cholesterol (LDL), triglycerides, serum creatinine level, and left ventricular ejection fraction (LVEF), a non invasive test for myocardial ischemia; and current treatment.

Resting HR was estimated by two methods: pulse palpation and electrocardiography (ECG). Pulse palpation was performed after sitting for at least 5 min in a quiet room with comfortable temperature. After this period, HR was measured for 30 seconds. Two measurements were taken, and the second was recorded. For ECG the most recent 12-lead ECG within six months was analysed. High HR was defined as ≥70 (bpm), in accordance with recent evidence (Fox *et al*., 2008a). A low HDL level was defined as < 1.2 mmol/l for women and < 1 mmol/l for men, in accordance with Latvian guidelines on CV prevention (Ērglis u.c., 2007). Waist circumference ≥80 cm for women and ≥94 cm for men was defined as increased, according to criteria of metabolic syndrome (Alberti *et al*., 2005). Target doses for the ß blockers metoprolol and bisoprolol were defined as 200 mg and 10 mg daily, respectively, in accordance with an expert consensus document on ß-adrenergic receptor blockers (Lopez-Sendon *et al*., 2004).

Data were processed using methods of descriptive statistics. The determination of correlations and significant differences was conducted using the Statistical Package for the Social Sciences (SPSS), version 15.0. P values < 0.05 were considered as statistically significant.

RESULTS

Heart rate. Resting HR ranges determined by pulse palpation and ECG were 52 to 101 bpm and 46 to 105 bpm, respectively. Mean values of resting HR by pulse palpation (67.7 ± 9.61 bpm) and ECG (66.9 ± 10.7 bpm) did not significantly differ ($P > 0.05$). We also did not find statistically significant differences in mean HR between women and men: by pulse palpation 69.6 ± 11.9 bpm and 67.0 ± 8.5 bpm, respectively ($P > 0.05$); by ECG 68.7 ± 12.6 bpm and 66.2 ± 9.9 bpm, respectively ($P > 0.05$).

Regarding different levels of HR (<60, 60–64, 65–69, 70–74, 75–79, 80–84, >85), a level from 60 to 64 bpm was observed in 39 (32.5%) and 22 (22.7%) cases by palpation and ECG, respectively (Table 1). Increased resting HR (≥70 bpm) occurred in 43 (35.9%) cases when measured by palpation and in 40 (33.6%) cases when measured by ECG. A total of 45 patients (37.5%) had increased resting HR, estimated by palpation and by ECG.

The resting HR level did not significantly differ in relation to family history of premature CAD, treated hypertension, diabetes, dyslipidemia, smoking and physical activity. We did not find a significant correlation begtween resting HR and number of smoked cigarettes per day, usage of stimulant drinks and age.

Similarly, current symptoms (presence of angina, number of angina attacks per week, symptoms of CHF) were not associated with HR. Patients with increased HR (≥70 bpm) did not have more frequent angina attacks than those with HR < 70 bpm.

Table 1

RESTING HEART RATE LEVELS MEASURED BY PULSE PALPATION AND ECG

Resting heart rate levels (beats per minute)	By pulse palpation		By ECG	
	n	%	n	%
< 60	16	13.3	26	21.8
60–64	39	32.5	27	22.7
65–69	22	18.3	26	21.8
70–74	17	14.2	11	9.2
75–79	11	9.2	17	14.3
80–84	8	6.7	5	4.2
≥ 85	7	5.8	7	5.9
Total	120	100	119	100

ECG, electrocardiography

Regarding physical examination data and most recent measurements, HR showed low but significant correlation with diastolic blood pressure (by pulse palpation: r = 0.270, ($P < 0.05$); by ECG: r = 0.260, ($P < 0.05$) and negatively with LVEF (by pulse palpation: r = -0.254, ($P < 0.05$); by ECG: r = -0.261, ($P < 0.05$). No other significant HR correlations with the investigated parameters were found.

Other risk factors and lifestyle. Age of patients was within the range from 45.7 to 80.1 years. Mean age in studied population was 64.2 ± 7.9 years. Breakdown of patients in different age groups is shown in Table 2. The proportion of females was 33 (27.5%). Half of the patients had retired (Table 3).

Frequencies of positive family history of premature CAD, treated hypertension, diabetes, dyslipidemia, peripheral artery disease, smoking and physical activity are shown in Table 4.

Women more frequently had positive history of premature CAD (42.4% vs 17.2%, ($P < 0.01$) and more favourable smoking status ($P = 0.001$). None of the examined women were current smokers, in contrast to 25.3% of men. Mean number of cigarettes smoked per day was commonly (in 11 (50%) cases) was 10. Former smokers had stopped smoking 1 to 42 years previously to examination. Mean time period after smoking discontinuation was 11.2 ± 13.5 years. Most patients (n = 56, 46.7%) had only light physical activity (Table 4) and there were no significant differences in physical activity according to gender.

Alcohol intake was positive in 81 cases (67.5%), of which three (3.4%) men consumed 20 to 40 drinks per week (Table 5). There were significant differences in alcohol intake according to gender ($P = 0.005$). Noteworthy, in 117 (97.5%) cases, patients consumed stimulant drinks (Table 5). Most commonly (n = 47, 39.2%), patients had two cups of stimulant drinks per day.

Body mass index (BMI) was within the range from 20 to 45 kg/m^2, with mean value of 29.3 ± 4.4 kg/m^2; there was no significant difference between genders. Distribution of patients in different BMI groups is shown in Table 6. The mean BMI was higher in men ($P < 0.05$).

Waist circumference was significantly higher in men ($P = 0.001$). Increased waist circumference (≥80 cm for women and ≥94 cm for men) was observed in 106 (88.3%) cases: in 30 (90.0%) women and 76 (87.4%) men.

Systolic blood pressure was within the range from 100 to 190 mm Hg with a mean value 138.3 ± 14.1 mm Hg. Diastolic blood pressure was within the range from 60 to 110

Table 2

AGE GROUPS OF PATIENTS

Age (years)	n	(%)
40–49	4	3.3
50–59	34	28.3
60–69	46	38.3
≥ 70	36	30.0
Total	120	100

Table 3

EMPLOYMENT STATUS OF PATIENTS

Employment status	Gender				Total	
	Women		Men			
	n	%	n	%	n	%
Employed full-time	4	12.1	29	33.3	33	27.5
Employed part-time	1	3.0	8	9.2	9	7.5
Unable to work	2	6.1	4	4.6	6	5.0
Unemployed	2	6.1	7	8.0	9	7.5
Retired	24	72.7	36	41.4	60	50.0
Other	0	0	3	3.4	3	2.5
Total	33	100	87	100	120	100

Table 4

FREQUENCY OF FAMILY HISTORY OF PREMATURE CAD, TREATED HYPERTENSION, DIABETES, DYSLIPIDEMIA, PERIPFERAL ARTERY DISEASE, SMOKING AND PHYSICAL ACTIVITY ACCORDING TO GENDER

Risk factors		Gender				Total	
		women		men			
		n	%	n	%	n	%
Family history of CAD	Yes	14	42.4	15	17.2	29	24.2
	No	19	57.6	72	82.8	91	75.8
	Total	33	100	87	100	120	100
Treated hypertension	Yes	28	84.8	66	75.9	94	78.3
	No	5	15.2	21	24.1	26	21.7
	Total	33	100	87	100	120	100
Diabetes	Yes	6	18.2	20	23.0	26	21.7
	No	27	81.8	67	77.0	94	78.3
	Total	33	100	87	100	120	100
Dyslipidemia	Yes	31	93.9	82	94.3	113	94.2
	No	2	6.1	5	5.7	7	5.8
	Total	33	100	87	100	120	100
Peripheral artery disease	Yes	2	6.1	6	6.9	8	6.7
	No	31	93.9	81	93.1	112	93.3
	Total	33	100	87	100	120	100
Smoking status	Current	0	0	22	25.3	22	18.3
	Former	4	12.1	45	51.7	49	40.8
	Never	29	87.9	20	23.0	49	40.8
	Total	33	100	87	100	120	100
Physical activity weekly	No physical activity weekly	3	9.1	5	5.7	8	6.7
	Only light activity	19	57.6	37	42.5	56	46.7
	Vigorous activity at least 20' once or twice	6	18.2	17	19.5	23	19.2
	Vigorous activity at least 20' ≥ 3 times	5	15.2	28	32.2	33	27.5

CAD, coronary artery disease

Table 5

ALCOHOL AND STIMULANT DRINK CONSUMPTION ACCORDING TO GENDER

Alcohol / stimulant drinks		Gender				Total	
		women		men			
		n	%	n	%	n	%
Alcohol intake (number of drinks* per week)	0	18	54.5	21	24.1	39	32.5
	> 0 and < 20	15	45.5	63	72.4	78	65.0
	20–40	0	0	3	3.4	3	2.5
	> 40	0	0	0	0	0	0
	Total	33	100	87	100	120	100
Stimulant drink consumption	Coffee	21	63.6	49	56.3	70	58.3
	Tee	12	36.4	35	40.2	47	39.2
	Neither coffee/tee	0	0	3	3.4	3	2.5
	Total	33	100	87	100	120	100

*1 drink = standard measures of spirits/1 glass of wine/1 bottle of beer

Table 6

BODY MASS INDEX GROUPS ACCORDING TO GENDER

Body mass index (kg/m^2)	Gender				Total	
	women		men			
	n	%	n	%	n	%
18.5–24.9	8	24.2	9	10.3	17	14.2
25.0–29.9	13	39.4	43	49.4	56	46.7
30.0–34.9	9	27.3	27	31.0	36	30.0
35.0–39.9	1	3.0	8	9.2	9	7.5
40.0–45.0	2	6.1	0	0	2	1.7
Total	33	100	87	100	120	100

mm Hg with a mean value 82.9 ± 8.6 mm Hg. We did not find a significant difference in systolic and diastolic blood pressure between men and women. In 31 (25.8%) cases, including 8 (24.2%) women and 23 (26.4%) men, blood pressure was 140/90 mm Hg or above.

Medical history. The medical history of patients is shown in Table 7. Mean time after diagnosis of CAD was 5.6 ± 5.3 years. Mean time after PCI (in patients with history of PCI) was 2.7 ± 3.0 years. Men significantly more commonly had history of CABG than women: 28.7% vs 9.1% ($P < 0.05$).

Current symptoms. Angina or equivalent symptoms were positive in 57 (47.5%) patients. Distribution of patients according to the Canadian Cardiovascular Society (CCS) classification of angina was as follows: class I: 16 (28.1%), class II: 36 (63.2%), class III: 5 (8.8%).

Symptoms of CHF were positive in 70 (58.3%) of patients. Severity of symptoms according to the New York Heart Association (NYHA) classification of CHF was as follows: one (1.4%) patient had class II, 64 (91.4%) had class III and 5 (7.1%) patients had class IV.

Most recent measurements. Glucose, total cholesterol, HDL, LDL and triglyceride levels are shown in Table 8.

Table 7

MEDICAL HISTORY OF PATIENTS

Diagnosis		Gender				Total	
		women		men			
		n	%	n	%	n	%
Myocardial infarction	Yes	18.0	54.5	58.0	66.7	76	63.3
	No	15.0	45.5	29	33.3	44	36.7
	Total	33	100	87	100	120	100
Percutaneous coronary intervention	Yes	26	78.8	62	71.3	88	73.3
	No	7	21.2	25	28.7	32	26.7
	Total	33	100	87	100	120	100
Coronary artery bypass graft	Yes	3	9.1	25	28.7	28	23.3
	No	30	90.9	62	71.3	92	76.7
	Total	33	100	87	100	120	100
Aortic abdominal aneurysm	Yes	0	0	1	1.1	1	0.8
	No	33	100.0	86	98.9	119	99.2
	Total	33	100	87	100	120	100
Carotid disease	Yes	3	9.1	6	6.9	9	7.5
	No	30	90.9	81	93.1	111	92.5
	Total	33	100	87	100	120	100
Stroke	Yes	2	6.0	1	1.1	3	2.5
	No	31	94.0	86	98.9	117	97.5
	Total	33	100	87	100	120	100
Transient ischemic attack	Yes	2	6.1	4	4.6	6	5.0
	No	31	93.9	83	95.4	114	95.0
	Total	33	100	87	100	120	100
Hospitalsation for chronic heart failure	Yes	1	3.0	2	2.2	3	2.5
	No	32	97.0	85	97.8	117	97.5
	Total	33	100	87	100	120	100
Atrial fibrillation or flutter	Yes	4	12.1	7	8.0	11	9.2
	No	29	87.9	80	92.0	109	90.8
	Total	33	100	87	100	120	100
Asthma or chronic obstructive pulmonary disease	Yes	2	6.1	4	4.6	6	5.0
	No	31	93.9	83	95.4	114	95.0
	Total	33	100	87	100	120	100

Serum creatinine levels, which were available in 93 cases, ranged from 2.6 to 157.0 μmol/l with a mean value of 87.9 ± 23.2 μmol/l. The mean creatinine level differed significantly between gender: 75.9 ± 14.9 μmol/l and 92.6 ± 24.3 μmol/l in women and men, respectively ($P = 0.001$).

LVEF, estimated in 96 cases, was within the range from 31 to 79% with a mean value of 57.1 ± 8.7%.

A non invasive test for myocardial ischemia had been performed in 107 (89.2%) cases. Evidence of myocardial ischemia in a non invasive test was observed in 8 (6.7%) cases.

Current treatment. Treatment of patients with different classes of drugs is shown in Figure 1.

Preventive treatment. As an antitrombotic agent, aspirin was used in 116 (96.7%) cases and thienopyridine for 16 (13.6%) patients. Regarding lipid lowering agents, 113

Table 8

MOST RECENT MEASUREMENTS

Measurements	% of patients from total population with available measurement	Range	Mean value ± SD	Different levels	n	%
Glucose level (mmol/l	88.3	4.4-10.2	6.1 ± 1.3	< 5.6	49	46.2
				≥ 5.6 to < 7.0	39	36.8
				≥ 7	18	17.0
				Total	106	100
Total cholesterol (mmol/l)	94.2	2.8 - 9.8	4.7 ± 1.3	< 3.5	16	14.2
				≥ 3.5 to < 5.0	63	55.8
				≥ 5.0 to 6.0	22	19.5
				≥ 6.0	12	10.6
				Total	113	100
High density lipoprotein cholesterol (mmol/l)	85.0	0.6-7.1	1.4 ± 0.7	Low*	31	28.8
				Other	73	71.2
				Total	104	100
Low density lipoprotein cholesterol (mmol/l)	89.2	0-7.0	2.7 ± 1.2	< 1.8	25	23.4
				≥ 1.8 to < 2.6	33	30.8
				≥ 2.6 to < 3.5	29	27.0
				≥ 3.5	20	18.7
				Total	107	100
Tryglycerides (mmol/l)	90.0	0.3-6.8	1.7±1.1	> 1.7	36	33.3
				Other	72	66.7
				Total	108	100

SD – standard deviation
* <1.2 mmol/l for women and mmol/l for men

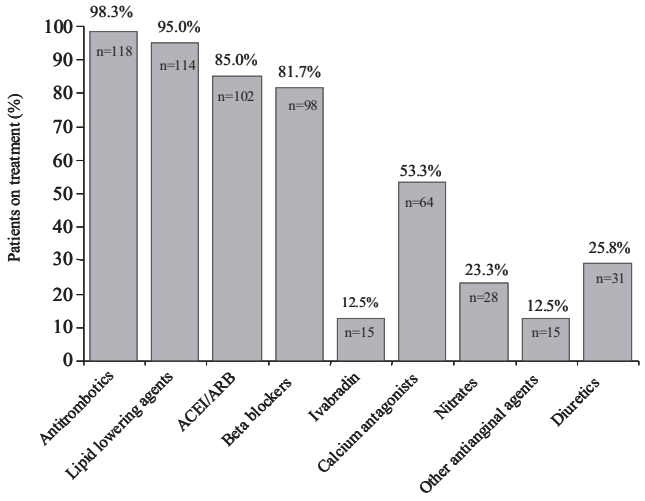

Fig. 1. Treatment of patients with different classes of drugs. ACEI, angiotensin-converting enzyme inhibitors; ARB, angiotensin-receptor blockers.

(94.2%) patients received statins. Among renin-angiotensin system antagonists, 85 (70.8%) patients received angiotensin-converting enzyme inhibitor (ACEI) and 17 (14.2%) were given angiotensin-receptor blocker (ARB). Both agents were never used concomitantly.

HR reducing agents. The beta blocker metoprolol (average daily dose (ADD) 64.4 ± 24.9 mg) was administered in 47 (39.2%) cases, bisoprolol (ADD: 5.3 ± 2.3 mg) in 37 (30.8%) patients, nebivolol (ADD: 4.8 ± 0.8 mg) in 10 (8.3%) patients, and carvedilol in 4 (3.3%) cases. Twenty three (19.2%) patients receiving ß blockers had symptoms of ß blockers contraindications or intolerance. Most commonly fatigue (n = 6, 6.1%) and bradicardia (n = 6, 6.1%) was observed. Fifteen (12.5%) patients received ivabradin (ADD: 7.0 ± 3.8 mg), which is another HR-reducing agent. Among the patients receiving ivabradin, 3 (20%) concomitantly received ß blocker.

HR-reducing agents in the group of patients with increased resting HR ≥70 bpm

The most commonly used ß blockers in the group of patients with HR ≥70 bpm (n = 45) were metoprolol (n = 20, 44.4%) and bisoprolol (n = 11, 24.4%) with ADD 68.8 ± 29.7 mg and 5.8 ± 2.8 mg, respectively. Six (13.3%) patients in this group received ivabradin (ADD: 8.3 ± 4.1 mg) and two of them received ß blocker in combination with ivabradin. Eight (17.6%) patients with increased resting HR (≥70 bpm) did not receive a ß blocker and in 5 (11.1%) cases neither a ß blocker nor ivabradin was used.

Other CV agents. All patients receiving Ca antagonists used dihydropyridine type Ca antagonists. Thirty two (56.1%) and 24 (42.1%) patients from the group with angina or equivalent symptoms were receiving Ca antagonists and long-acting nitrates, respectively. Six (31.6%) and 12

(63.2%) patients from those having angina or equivalent symptoms concomitantly with HR ≥70 bpm were receiving Ca antagonists and long-acting nitrates, respectively. Fifteen (12.5%) patients received other antianginal agents and 12 (10.0%) received treatment with other antihypertensive medicine.

In three (2.5%), five (4.2%) and four (3.3%) cases patients received digoxin, amiodaron and other antiarrythmics, respectively.

DISCUSSION

The characteristics of our sample group were similar to those found in other studies with CAD patients: similar mean age of patients, proportion of males and females, body mass index and percentage of smokers (Anonymous, 2008; Boden *et al*., 2007). Also, the list of co-morbidities, with hypertension as the most frequent, is in line with findings of other studies with CAD patients (Anonymous, 2008; Boden *et al*., 2007). The most frequent CV risk factor is history of dyslipidemia (94.2%). The proportion of patients with increased HR (≥70 bpm), a recently established CV risk factor, is similar to the proportion of patients with treated but still not adequately controlled other risk factors: 35.9% of patients with resting HR by pulse palpation ≥70 bpm; 25.8% patients with blood pressure above 140/90 mm Hg; 30.1% patients with total cholesterol1 > 5 mmol/l; 45.8% patients with LDL >2.6 mmol/l; 28.8% patients with HDL < 1.2 mmol/l for women and < 1 mmol/l for men; 33.3% patients with triglyceride level > 1.7 mmol/l.

The studied population can be compared with Euro Heart Survey (EHS) and REALITY Latvia data, although in those studies only patients with stable angina were surveyed. The EHS study reviewed information from 156 cardiology clinics in 34 countries. In that study 3031 patients were included on the basis of a new clinical diagnosis of stable angina by a cardiologist (Daly *et al*., 2006). Comparison of our data with results of REALITY Latvia results are particularly interesting, as this study reflects the situation in Latvia with stable angina management four years before our study. REALITY Latvia, which examined information from about 300 stable angina outpatients treated by cardiologists, highlighted increased HR and its management (Balode *et al*., 2010).

REALITY Latvia indicated good trends in treatment of stable angina with wider usage of agents that improve CAD prognosis and are recommended by guidelines (Fox, 2006), compared with mean estimates from Europe. In REALITY, a larger proportion of patients were treated with aspirin (91% vs 78%), other antiplatelets (20% vs 9%), statins (83% vs 48%), beta blockers (91% vs 67%), ACEI (82% vs 40%) than in EHS (Balode *et al*., 2010; Daly *et al*., 2005). In our study, the proportion of patients using agents that improve prognosis (Fox, 2006) was also high. Usage of aspirin and statins in our study was even more frequent than in REALITY Latvia: 96.7% vs 91% and 94.2% vs 83%, respectively (Balode *et al*., 2010). This indicates a favourable trend towards following guidelines and considering CV prevention treatment of CAD patients. In our study Beta blockers were used less than in the REALITY Latvia study (81.7% vs 91%), but this does not mean weaker control of increased HR. The resting HR level in our study was even lower than in the REALITY Latvia study: 67.7 ± 9.6 bpm by pulse palpation and 66.9 ± 10.7 bpm by ECG in our study vs 70.3 ± 11.3 bpm in the REALITY Latvia study. Also, the proportion of patients with increased HR (≥70 bpm) in our study was lower than in the REALITY Latvia study: 35.9% by pulse palpation and 33.6% by ECG in our study vs 45% in the REALITY Latvia study. This cannot be explained by higher doses of ß blockers as ADD for the most frequently used ß blockers were similar: for metoprolol 64.4 ± 24.9 and 69.7 ± 30.1; for bisoprolol 5.3 ± 2.3 mg and 5.3 ± 2.0, in our sample and the REALITY Latvia study, respectively. Doses of the used ß blockers corresponded to 32% and 53% from the target dose for metoprolol and bisoprolol, respectively (Lopez-Sendon *et al.,* 2004). This is not surprising, as ß blockers have poor long-term compliance and under-dosing of ß blockers is typical in the community. In practice, patients are using 50% or less of the dosages used in clinical trials (Gislason, 2006). The lower proportion of patients using ß blockers in our sample group, in comparison with the REALITY Latvia study can be explained by the new HR reducing agent ivabradin, which is mainly used instead of ß blockers in cases where patients have intolerance or contraindications. Ivabradin was not available at the time when the REALITY Latvia study was performed; but in our study 12.5% of patients were treated with ivabradin. Ivabradin is a heart rate lowering agent that does not influence other cardiac functions. Ivabradin has antianginal and antiischemic efficacy (Anonymous, 2011). There is also evidence of the ability of ivabradin to reduce risk of events (Fox *et al*., 2008b; 2009; Swedberg *et al*., 2010). It should be noted that ADD of ivabradin in our study was 7.0 ± 3.8 mg, which is less than 50% of the full dose (15 mg daily), thus the potential for full effect was underused (Anonymous, 2011).

In our sample group, the proportion of CAD patients with increased HR (≥70 bpm) was lower than in the EHS study (Daly *et al*., 2008) (35.9% vs 53%). This seems encouraging and shows a trend towards better control of HR and therefore better management of risk factors in CAD patients.

In our study, patients were mainly treated by cardiologists. In real life, stable CAD patients are more frequently treated by general practitioners. Acceptation of increased HR as an independent CV risk factor and important target for treatment can be significantly powerless among general practitioners in comparison with cardiologists, and therefore, HR control in patients treated by general practitioners is with high probability weaker.

High mortality from CV diseases in Latvia (Anonīms, 2010) indicates a need for practitioners to use all possibilities to control CV risk factors, especially when treating

CAD patients. HR is one of the most frequently assessed clinical parameters, which can be easily monitered even by patients. Taking into account the association of increased HR with CV events (Fox *et al*., 2008a) in CAD patients HR should be well controlled.

Our data indicate unused potential for better control of this risk factor. Doses of HR-reducing agents in the group of patients with increased resting HR (≥70 bpm) are similar with those in total population, and the proportion of patients not receiving ß blockers in the group with HR ≥70 bpm is very close to that in the total population (17.6% and 18.3%, respectively). Also, more than 10% of patients with increased resting HR (≥70 bpm) did not receive any HR-reducing agent. Commonly, ivabradin was not combined with a ß blocker. Only three patients (20% from all using ivabradin) concomitantly received a ß blocker. Insufficient reduction of HR was an indication for combination of ß blocker and ivabradin. However, only 2 (4.4%) of all patients with increased resting HR (≥70 bpm) received this combination. An increase of the ß blocker dose is not always possible, even if patient has high HR, and in those cases combination with ivabradin can be applicable for better HR control.

Limitations for interpretation of the results should be acknowledged, as the number of patients involved was relatively small and the data are collected only in one visit. Selection bias may also have taken place. For better understanding of how management of risk factors (including increased HR) in stable CAD patients is changing, longer studies with a follow-up period are needed.

In conclusion, the results of study indicate that characteristics of outpatients with stable CAD in our sample were typical for CAD in other studies. The most frequent CV risk factor was dyslipidemia and the most frequent co-morbidity in CAD patients was hypertension. Prevalence of increased HR (≥70 bpm), a recently established CV risk factor, was similar to other treated but not adequately controlled risk factors.

Compared to previous studies performed in Latvia and internationally, we observed a favourable trend of the following guidelines in terms of CV protection for stable CAD outpatients. However, our data indicated an unused potential for better control of increased HR by higher doses and combinations of HR-reducing agents.

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REFERENCES

Alberti, K.G., Zimmet, P., Shaw, J. (2005) The metabolic syndrome — a new worldwide definition. *Lancet,* **366**, 1059–1062.

Anonīms (2010). *Latvijas veselības statistikas gadagrāmata par 2009. gadu* [Yearbook of Latvian Health Statistics for 2009]. Rīga: VSMTVA (Veselības statistikas un medicīnas tehnoloģiju valsts aģentūra), 2010 (in Latvian).

Anonymous (2011). Procoralan SPC (Summary of Product Characteristics)

http://www.ema.europa.eu/docs/en_GB/document_library/EPAR_Product_Information/human/000597/WC500043590.pdf (last viewed 13.06.2011).

Anonymous (2008). The BEAUTIFUL Study Group. The BEAUTIFUL study: Randomized trial of ivabradine in patients with stable coronary artery disease and left ventricular systolic dysfunction — baseline characteristics of the study population. *Cardiology*, **110**, 271–282.

Balode, I., Jēgere, S., Mintāle, I., Narbute, I., Zakke, I., Latkovskis, G., Ērglis, A. (2010). Current state of angina treatment in the outpatient population and heart rate monitoring survey in Latvia (REALITY Latvia). *Proc. Latv. Acad. Sci., Section B*, **64**(5/6), 194–201.

Boden, W.E., O'Rouke, R., Teo, K.T., Hartigan, P.M., Maron, D.J., Kostuk, W.I., Knudston, M., Dada, M., Casperson, P., Harris, C.L., Chaitman, B.R., Shaw, L., Gosselin, G., Navaz, S., Title, L.M. Gau, G., Blaustein, A.S., Booth, D.C., Bates, E.R., Spertus, J.A., Berman, D.S., Mancini, J., Weintraub, W.S. for the COURAGE Trial Research Group. (2007). Optimal Medical Therapy with or without PCI for Stable Coronary Disease. *N Engl. J. Med.,* **356**. www.nejm.org.

Bohm, M., Swedberg, K., Komajda, M., Borer, J., Ford, I., Dubost-Brama, A., Lerebous, G., Tavazzi, L., on behalf of the SHIFT investigators (2010) .Heart rate as a risk factor in chronic heart failure (SHIFT): The association between heart rate and outcomes in a randomised placebo-controlled trial. *Lancet,* **376**, 886–894.

Daly, C.A., Clemens, F., Lopez Sendon, J. L., Tavazzi, L., Boersma, E., Danchin, N., Delahaye, F., Gitt, A., Julian, D., Mulcahy, D., Ruzyllo, W., Thygesen, K., Verheugt, F., Fox K.M. (2005). The initial management of stable angina in Europe, from the Euro Heart Survey: A description of pharmacological management and revascularization strategies initiated with the first month of presentation to a cardiologist in the Euro Heart Survey of Stable Angina. *Eur. Heart J.*, **26**, 1011–1022.

Daly, C.A., De Stavola, B., Lopez-Sendon, J. L., Tavazzi, L, Boersma, E., Clemens, F., Danchin, N., Delahaye, F., Gitt, A., Julian, D., Mulcahy, D., Ruzyllo, W., Thygesen, K., Verheugt, F., Fox K.M. (2006). Predicting prognosis in stable angina — results from the Euro Heart Survey of stable angina: Prospective observational study. *BMJ*, **332**, 262–267.

Daly, C., Tavazzi, L., Fox, K., Euro Heart Survey of Angina Investigators (2008) Inadequate control of heart rate in patients with stable angina: Results from the European Heart Survey. *Eur. Heart J.*, **29** (Abstract Supplement), 204.

Diaz, A., Bourassa, M. G., Guertin, M. C., Tardif, J. C. (2005). Long term prognostic value of resting heart rate in patients with suspected or proven coronary artery disease. *Eur. Heart J.,* **26**(10), 967–974.

Ērglis, A., Kalvelis, A., Lejnieks, A., Dzērve, V., Latkovskis, G., Mintāle, I., Zakke, I., Rasa, I. (2007). *Kardiovaskulāro slimību (KVS) profilakses vadlīnijas* [Guidelines on cardiovascular disease prevention]. Rīga. 45. lpp. (in Latvian).

Fox, K., Garcia, M.A.A., Ardissino, D., Buszman, P., Camici, P.G., Crea, F., Daly, C., Backer, G., Hjemdahl, P., Lopes-Sendon, J., Marco, J., Morais, J., Pepper, J., Sechtem, U., Simoons, M., Thygesen, K. (2006). Guidelines on the management of stable angina pectoris. The Task Force on the Managment of Stable Angina Pectoris of the European Society of Cardiology. *Eur. Heart J.*, **27**, 341–1381.

Fox, K., Ford, I., Steg, P. G., Tendera, M., Robertson, M., Ferrari, R., BEAUTIFUL investigators (2008a) Heart rate as a prognostic risk factor in patients with coronary artery disease and left-ventricular systolic dysfunction (BEAUTIFUL): A subgroup analysis of a randomised controlled trial. *Lancet*, **372**, 817–821.

Fox, K., Ford, I., Steg, P. G., Tendera, M., Ferrari, R., BEAUTIFUL investigators (2008b) Ivabradine for patients with stable coronary artery disease and left-ventricular systolic dysfunction (BEAUTIFUL): A randomised, double-blind, placebo-controlled trial. *Lance*t, **372**, 807–816.

Fox, K., Ford, I., Steg, P. G., Tendera, M., Robertson, M., Ferrari, R., BEAUTIFUL investigators (2009) Relationship between ivabradine treatment and cardiovascular outcomes in patients with stable coronary artery disease and left ventricular systolic function with limiting angina: A subgroup analysis of the randomized, controlled BEAUTIFUL trial. *Eur. Heart J.*, **30**, 2337–2345.

Gislason, G.H., Rasmussen, J.N., Abildstrom, S.Z., Gadsboll, N., Buch, P., Friberg, J., Rasmussen, S., Kober, L., Stender, S., Madsen, M., and Torp-Pederden, C. (2006). Long term compliance with beta-blockers, angiotensin-converting inhibitors, and statins after acute myocardial infarction. *Eur. Heart J.*, **27**, 1153–1158.

Graham, I., Atar, D., Borch-Johnsen, K., Boysen, G., Burell, G., Cifkova, R., Dallongeville, J., De Backer, G., Ebrahim, S., Gjelsvik, B., Herrmann-Lingen, C., Hoes, A., Humphries, S., Knapton, M., Perk, J., Priori, S.G., Pyorala, K., Reiner, Z., Ruilope, L., Sans-Menendez, S., Reimer, V.S.O., Weissberg, P., Wood, D., Yarnell, Y., Zamorano, J. L. (2007). European guidelines on cardiovascular disease prevention in clinical practice: Executive summary. *Eur. Heart J.*, **28**, 2375–2414.

Leal, J., Luengo-Fernịndez, R., Gray, A., Petersen, S., Rayner, M. (2006). Economic burden of cardiovascular diseases in the enlarged European Union. *Eur. Heart J*., **27**(13), 1610–1619.

Lopez-Sendon, J., Swedberg, K., McMurray J., Tamargo, J., Maggioni, A.P., Dargie, H.,Tendera, M., Waagstein, F., Kjekshus, J., Lechat, P., Torp-Pedersen, C. (2004). Expert consensus document on ā-adrenergic receptor blockers. The Task Force on Beta-Blockers of the European Society of Cardiology. *Eur. Heart J.*, **25**, 1341–1362.

Mathers, C.D., Loncar, D. (2006). Projections of global mortality and buren of disease from 2002 to 2030. *PLoS Med.,* Nov, 3, e442.

Tunstall-Pedoe, H., Kuulasmaa, K., Mahonen, M., Tolonen, H., Ruokokoski, E., Amouyel, P., for the WHO MONICA (monitoring trends and determinants in cardiovascular disease) Project (1999) Contribution of trends in survival and coronary-event rates to changes in coronary heart disease mortality: 10-year results from 37 WHO MONICA Project populations. *Lancet,* **353**, 1547–1557.

Swedberg, K., Komajda, M., Bohm, M., Borer, J., Ford, I., Dubost-Brama, A., Lerebous, G., Tavazzi, L., on behalf of the SHIFT investigators (2010) Ivabradine and outcomes in chronic heart failure (SHIFT): A randomised placebo-controlled study. *Lancet*, **376**, 875–885.

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SIRDSDARBĪBAS FREKVENCE UN CITI RISKA FAKTORI AMBULATORI ĀRSTĒTIEM PACIENTIEM AR STABILU KORONĀRO SIRDS SLIMĪBU LATVIJĀ

Novērojuma mērķis bija raksturot ambulatori ārstētus pacientus ar stabilu koronāro sirds slimību (KSS) Latvijā – riska faktoru (RF), tajā skaitā palielinātas sirdsdarbības frekvences (SF) sastopamību, fizikālās un klīniskās izmeklēšanas rezultātus un ārstēšanu. Vienas vizītes ietvaros tika apsekoti un iztaujāti 120 ambulatori ārstēti pacienti ar stabilu KSS. Divpadsmit praktizējoši ārsti katrs ievāca datus par 6–12 pacientiem un aizpildīja gadījuma ziņojuma veidlapas. Biežāk sastopamais kardiovaskulārais (KV) RF bija dislipidēmija (94,2%), biežākā blakus saslimšana — arteriālā hipertensija (78,3%). Palielināta SF (≥70 x/min) bija 35,9% gadījumu, nosakot ar pulsa palpāciju un 33,6%, nosakot ar elektrokardiogrāfijas metodi. Citu ārstētu, bet nekontrolētu RF sastopamība bija sekojoša: arteriālais asinsspiediens 140/90 mm Hg bija 25,8% pacientu, kopējais holesterīns 5 mmol/l – 30,1%, triglicerīdi 1,7 mmol/l – 33,3% pacientu. Aspirīnu saņēma 96,7% pacientu, statīnus – 94,2%, bet angiotenzīnu konvertējošā enzīma inhibitorus vai angiotenzīna receptoru blokatorus – 85,0% pacientu. Beta blokatori tika lietoti 81,7% gadījumu. Biežāk lietoto beta blokatoru metoprolola un bisoprolola vidējās devas bija attiecīgi 32% un 53% no mērķa devām. Trijos gadījumos beta blokatori tika kombinēti ar ivabradīnu. Novērojuma rezultāti ļauj secināt: praktizējošie ārsti, ārstējot KSS pacientus, seko vadlīnijām un cenšas uzlabot pacientu prognozi. Tomēr ir vēl papildus iespējas labāk kontrolēt palielinātu SF, lietojot lielākas SF samazinošo līdzekļu devas un tos kombinējot.