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The epidemiology of end-stage renal disease in the Baltic countries: an evolving picture

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Abstract

Introduction. The epidemiology of end-stage renal disease (ESRD) and renal replacement therapy (RRT) is under continuous evolution all over the world. Of particular interest is the development of RRT in the countries of the former Soviet bloc which underwent great political and socio-economical changes in the last decade. We report here the epidemiological analysis of ESRD and RRT in the three Baltic countries: Lithuania, Estonia, Latvia.

Subjects and methods. This epidemiological report is based on data from centre questionnaires which were collected from 1996 onwards, with a response rate of 98–99%.

Results. The prevalence/incidence of RRT patients in 1999 were 213/99.5 p.m.p. in Lithuania, 186/45.5 p.m.p. in Estonia and 172/55.8 p.m.p. in Latvia. Haemodialysis (HD) was the most common RRT modality in Lithuania (60% of prevalent patients), but not in Estonia (29%), while in Latvia it was nearly as common as renal transplantation (45 and 46%, respectively). Home HD was not performed. The proportion treated by peritoneal dialysis (PD) was very low in Lithuania (4% of RRT patients), while the percentage was higher in Latvia (9%) and Estonia (20.4%). The percentage of patients on RRT treated by renal transplantation was high throughout, representing the main modality of treatment in Estonia (50.5% of RRT prevalent patients, 94 p.m.p.) and in Latvia (46%, 79 p.m.p.) and being high in Lithuania (36%, 77 p.m.p.). The main renal diseases leading to ESRD were glomerulonephritis, pyelonephritis and diabetes.

Conclusion. The epidemiology of RRT in the Baltic countries is undergoing rapid changes. Transplantation has reached an impressive level. A high percentage of RRT patients live with a functioning graft.

Introduction

The epidemiology of end-stage renal disease (ESRD) and renal replacement therapy (RRT) is under continuous evolution all over the world. In the Western countries, an increase in the prevalence of RRT (dialysis plus transplantation) has been observed over the recent past years [1], due partly, to decreased mortality but, above all, to the increase in the incidence rate, which is mainly accounted for by the increased acceptance of diabetic and older patients.

Profound political and social changes have taken place in Eastern Europe in the last decade and the countries of the former Soviet bloc are undergoing rapid economic development. The issue of how to best provide RRT, both from the clinical and socio-economical points of view, has become a major issue in such nations. The European Renal Association (ERA) and the International Society of Nephrology (ISN) perceived this demand and founded the Joint Action Nephrology in Eastern Europe, with the aim of supporting the growing know-how in nephrologic care and RRT in those countries. In this context, starting in 1992, a series of Baltic Nephrology Conferences was organized in collaboration with the Baltic National Associations of Nephrology. These interactive sessions were designed to offer the opportunity to local nephrologists to discuss important general issues and practical topics with experts from abroad.

We present here the epidemiological analysis of ESRD in the Baltic countries (Lithuania, Estonia, Latvia), which was presented and discussed at the

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Subjects and methods

This epidemiological survey is based on data from centre questionnaires. Data collection was started in 1996 under the responsibility of the chief of each centre or the senior nephrologist of each unit. The national co-ordinator checked the data again to find out contradictions or incongruity. The overall percent response rate was 98–99%. Patients were included in the analysis from their first dialytic treatment.

Results

The principal epidemiological data are summarized in Table 1. The highest prevalence rate of patients undergoing RRT in the Baltic countries up to December 31, 1999 was recorded in Lithuania (213 p.m.p.), compared with Estonia and Latvia (186 and 172 p.m.p., respectively). When considering the incidence data, the greatest acceptance rate to RRT was again recorded in Lithuania (99.5 p.m.p.), while it decreased in Latvia (55.8 p.m.p.) and Estonia (45.5 p.m.p.). The epidemiological trend of RRT over the recent past years was available in Lithuania and Estonia from 1996 for prevalence data and from 1997 for incidence data, while in Latvia both prevalence and incidence were available from 1998. The prevalence rate increased in all three Baltic countries: in Lithuania from 153 p.m.p. in 1996 to 213 p.m.p. in 1999; in Estonia from 138 p.m.p. in 1996 to 186 p.m.p. in 1999; and in Latvia from 157 p.m.p. in 1998 to 172 p.m.p. in 1999. The incidence rate increased in Lithuania and Latvia: in Lithuania from 72 p.m.p. in 1997 to 99.5 p.m.p. in 1999 and in Latvia from 52 p.m.p. in 1998 to 55.8 p.m.p. in 1999. However, it remained constant in Estonia (45.5 p.m.p. in 1997, 34.5 p.m.p. in 1998 and 45.5 p.m.p. in 1999). The increased prevalence of RRT observed in Estonia in the recent past years was due to a decreased mortality (from 19.5% in 1997 to 17% in 1999). Mortality recorded in Latvia in 1999 was even lower (13.5%). Unfortunately, data concerning mortality trend over the recent past years were not available from Lithuania and Latvia.

Table 1. Renal replacement therapy in the Baltic countries, 1999

	Lithuania	Estonia	Latvia
Total population (million)	3.7	1.4	2.4
Number of HD units	22	8	10
Number of HD units (p.m.p.)	5.94	5.71	4.1
RRT prevalence (p.m.p.)	213	186	172
RRT incidence (p.m.p.)	99.5	45.5	55.8
HD (prevalent RRT %)	60	29	45
HD (p.m.p.)	127.7	54	78
PD (prevalent RRT %)	4	20.4	9
PD (p.m.p.)	8.3	38	15
Transplantation (prevalent RRT %)	36	50.5	46
Transplantation (p.m.p.)	77	94	79
Mortality (%)	NA	17	13.5

NA, not available; RRT, renal replacement therapy; HD, haemodialysis; PD, peritoneal dialysis.

As far as the treatment modality is concerned, in 1999 haemodialysis (HD) was the most common RRT modality in Lithuania (60% of prevalent patients), while in Estonia, where the percentage of RRT patients with a functioning graft was very high (50.5%), only 29% of patients was treated by HD. In Latvia HD was nearly as well represented as renal transplantation (45% and 46%, respectively). The highest number of HD units was recorded in Lithuania (5.94 p.m.p.), the lowest in Latvia (4.1 p.m.p.). Home HD was not performed in any of the Baltic countries. In 1999, in Lithuania, where the health care system is public, 18 out of 22 dialysis units were public and four were private: 20 of these were in hospital centres and two in centres where both HD and renal transplantation were present. In Estonia, where the health care system is mixed (public and private), half of the HD units was public (four out of eight) and half private: three units were in hospital centres, one in a dialysis and transplantation centre and four in free-standing centres. Acetate was still used as a buffer in HD in 10% of patients in Lithuania, while in Estonia it was no longer used from 1999. Such data were not available for Latvia. The mean number of HD sessions was thrice weekly both in Lithuania and Estonia: in the former country the mean duration was between 3 and 4 h per session in 97%, in the latter it was more than 4 h in 90% of the sessions. Such data were not available for Latvia.

The proportion of patients treated by peritoneal dialysis (PD) was very low in Lithuania (4% of RRT patients), while it was distinctly higher in Latvia (9%) and Estonia (20.4%). In any case, PD was the least common RRT modality in the three Baltic countries. The great majority of PD treatments was accounted for by continuous ambulatory PD (ranging from 80 to 90%), but automatic PD was performed as well. The percentage of RRT patients treated by transplantation was high. It represented the main treatment modality in Estonia (50.5% of RRT prevalent patients, 94 p.m.p.) and Latvia (46%, 79 p.m.p.). It was also frequent in Lithuania (36%, 77 p.m.p.).

The main underlying diseases leading to ESRD are summarized in Table 2. Glomerulonephritis, pyelonephritis and diabetes were the most important causes of ESRD.

Discussion

Since dialysis and renal transplantation became available in the 1960s, the implementation of the RRT programmes not only reflects the state of the art in medical knowledge and available medical and technical possibilities, but is also related to socio-economic conditions of a community. In fact, the demand on resources and

Table 2. Reported causes of ESRD in Lithuania and Estonia (prevalent patients), and Latvia (incident patients), 1999

	Lithuania (prevalent cohort) (%)	Estonia (prevalent cohort) (%)	Latvia (incident cohort) (%)
GN	36.6	30	32.4
IN-PN	23.8	20	28
Diabetes	16.3	17.8	11.2
PKD	10.1	9	8.9
Hypertension/ vascular disease	4.7	5.4	5.2
Amyloidosis	1.7	6.2	NA
Other causes	6.8	11.6	14.3

NA, not available; GN, glomerulonephritis, IN-PN, interstitial nephritis-pyelonephritis; PKD, polycystic kidney disease.

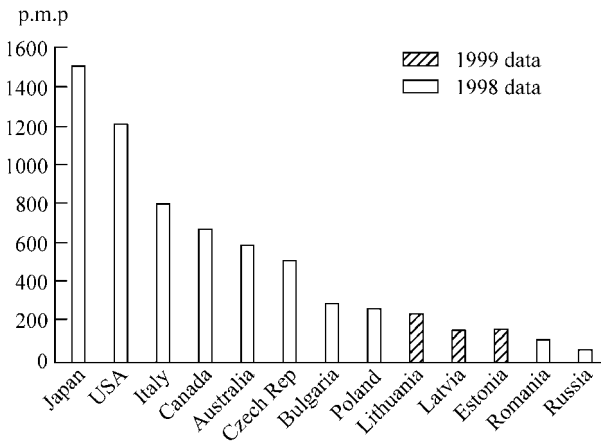

Fig. 1. RRT prevalence in the Baltic countries (1999 data) as compared to other countries (1998 data).

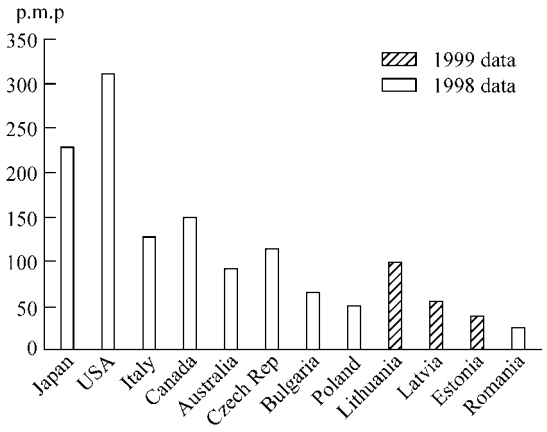

Fig. 2. RRT incidence in the Baltic countries (1999 data) as compared to other countries (1998 data).

social assistance by RRT patients is a challenge for the healthcare systems of all nations. Its implementation requires an economy which is sufficiently developed to support it. The differing distribution of RRT patients in the world is strongly influenced by the level of the gross domestic product, and economic problems impact on the number of patients starting RRT [2]. This explains why the inclusion criteria for patients entering RRT are variable from country to country and, at least in part, are context-dependent.

The collection of data on patients undergoing RRT, i.e. renal registries, was started years ago in the Western countries. International, national and regional renal registries have been established, such as the EDTA-ERA [3], the United States Renal Data System (USRDS) [4], and the Dialysis and Transplant Patients Lombardy Registry [5]. This has provided an important tool to recognize the many factors that influence the delivery of nephrology care and patient outcome. A remarkable example of how much the analysis of registry data can lead to improved management of RRT patients was provided by the comparison of registry data from the USA (USRDS) with Europe (particularly Lombardy) and Japan. The reports on documented higher mortality in USA dialysis patients, mainly associated with a shorter dialysis time [6–8], led to a prolongation of the duration of dialysis sessions in the USA.

The importance of collecting RRT patients' data has been perceived by nephrologists in the Baltic countries as well, and led to the ongoing establishment of official national registries. This followed the recognition that in years of an expanding delivery of RRT, planning of health services must be based on solid quantitative information. The prevalence of patients undergoing RRT in the Baltic countries has been increasing recently, but figures are still in a low range (< 250 p.m.p.) compared with the very high figures recorded in Japan and the USA (> 1000 p.m.p.) and the figures in an intermediate range reported from other European and American countries (400–800 p.m.p.). The figures of the Baltic countries are, however, not far from those recorded in neighbouring Poland and are higher than those recorded in Romania and Russia (Figure 1) [1,9].

The incidence of patients requiring RRT is also increasing in the Baltic countries. Similar to prevalence data, incidence rates are in the low range (< 100 p.m.p.) compared with the very high values reported from the USA and Japan (> 200 p.m.p.). On the whole however, they are similar to, or even greater than, the figures recorded in the other Eastern European countries (Figure 2). Particularly in Lithuania, the incidence was not far from that in Italy and Canada and was higher than that in Australia, indicating that the acceptance rate is similar to that in Western countries.

Among the Baltic countries, the highest prevalence and incidence rates were recorded in Lithuania. They appear to increase progressively, probably reflecting the progressive widening of the inclusion criteria to include elderly, diabetic and complicated patients. It is worth noting that extending the inclusion criteria to such patients requires increasing medical and social assistance.

Systematically collected data concerning prevalent and incident patients with information on age

distribution and co-morbidity (particularly cardiovascular) are currently not available in the Baltic registries. This is a target for the future to improve the quality of the registries and to provide instruments which are better suited for the aim to provide assistance to the health authorities for the planning of optimal RRT programmes within the available resources.

One of the most remarkable observations from the analysis of RRT modalities in the Baltic countries is the high percentage of RRT patients with a functioning renal graft (Figure 3), which is far higher than the mean percentage of 22% in the 14 countries of Eastern Europe, as reported by Rutkowski [9]. When comparing the relative importance of renal transplantation in the Baltic countries with that of other Western European countries [10] (Figure 4) it is obvious that, similarly to what is observed in the United Kingdom and Holland, renal transplantation in Estonia and Latvia is the main RRT modality, in contrast to Italy, Germany, Spain, France and Lithuania, where HD is prominent. Nevertheless, the number of patients living with a functioning transplant per million population is still low (< 100 p.m.p.). The high transplantation rate is presumably a delayed reflection of the situation during the years of Soviet government when dialysis equipment was scarce, so that the development of an active transplantation programme was the only option to save lives.

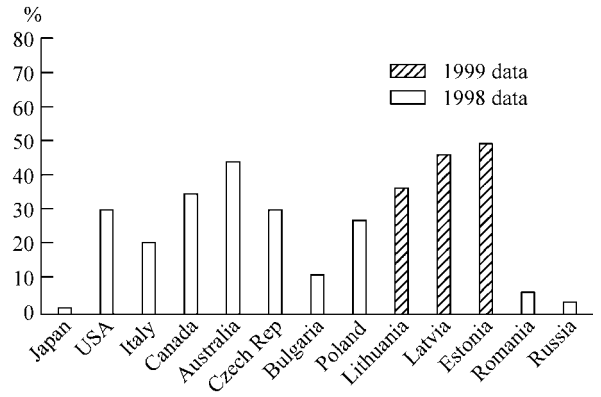

Fig. 3. Prevalent RRT patients with a functioning renal transplant (%) in the Baltic countries (1999 data) as compared to other countries (1998 data).

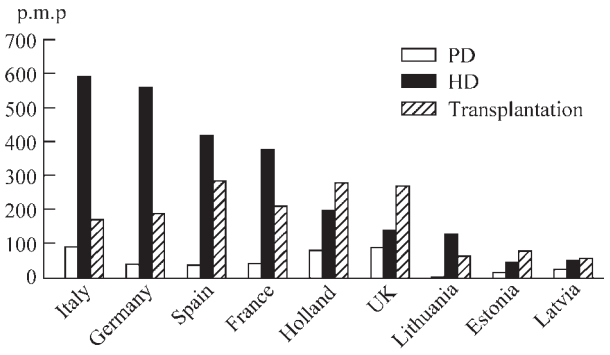

Fig. 4. Treatment modalities (p.m.p.) in some Western Europe countries and in the three Baltic countries.

HD is performed in units where nephrologists are present, mainly in hospital centres. However, in Estonia and Latvia there are some HD centres where non-nephrologist physicians are in charge. Home HD is not performed. Home HD is really not common world-wide, with the exception of Australia, New Zealand and the United Kingdom [1]. An interesting solution for the increasing demand for RRT treatments could be provided by limited care HD, i.e. HD performed in the presence of nursing staff under the medical supervision of a nephrologist (who is not necessarily on site, but can always be reached at a referring hospital whenever needed) [11]. This has proved successful in some countries, such as Italy, where about 15% of patients are dialysed in such units [12]. Another solution to develop the RRT programme may be provided by PD, which to date accounts for only a minority of RRT modalities in the Baltic countries.

As far as the underlying disease leading to ESRD in incident patients is concerned, the Baltic registries have the same problems as other European registries, that is a high degree of imprecision. Nosography must remain vague in an environment where the criteria for performing renal biopsies are variable and clinical diagnoses are uncertain, not least because of the well-known problem of late patient referral to nephrologists. Given these limitations, glomerulonephritis and pyelonephritis were the most frequently reported causes of ESRD in the Latvian incident cohort (only data on prevalent patients were available from Lithuania and Estonia).

Diabetes as a comorbid condition in ESRD patients was reported in 11% of the incident Latvian patients, and 17.8% and 16.2% of the prevalent Estonian and Lithuanian patients. These values are not far from what has been observed in some other European countries, including neighbouring Poland (where in 1998, 11.7% of RRT patients were recorded as diabetics) [9], but less than the percentage of diabetic ESRD patients reported from the USA and Germany (around 40%) [4,13], or from the Czech Republic (33%) [9]. These differences are not only the results of different acceptance rates to RRT, but may also be determined by true differences in the frequency of type 2 diabetes, which accounted, at least in part, for the 'catastrophic' increase in diabetic nephropathy world-wide [13]. The varying frequency of type 2 diabetes is determined, to a variable extent in the different countries, by factors, such as diet and duration of life, as well as genetic background.

Hypertension/vascular disease represents a less frequently reported cause of ESRD (about 5%) as compared to the USA (26%) [4] and Italy (22%) [12], but this difference is probably an artefact, reflecting differences in habits to classify renal diseases on clinical grounds or, more likely, differences in the mean age of patients accepted to RRT.

It is worth drawing attention to a recent report of the results of 600 renal biopsies performed in Lithuania

from 1995 to 1999 [14]. The most commonly diagnosed types of glomerulonephritis (GN) were IgA nephropathy (30%), membranoproliferative GN (23%), and mesangioproliferative GN (13%). Secondary forms of GN were diagnosed in 14% and tubulointerstitial diseases in 8% of the biopsies.

In conclusion, the epidemiological panorama of RRT in the Baltic countries is undergoing a rapid change, compared with previous reports in the last decade [15,16] and with the international situation.

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