Evolution of renal replacement therapy in Central and Eastern Europe 7 years after political and economical liberation*

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Abstract

**Purpose of the study.** The conditions of renal replacement therapy (RRT) were very poor in the countries located in Central and Eastern Europe (CEE) when they were members of the so-called ‘socialist bloc’. The aim of the present analysis was to document the impact of the socioeconomic changes on dialysis therapy in the CEE countries.

**Design.** This was a special survey with the participation of 12 CEE countries, with data obtained through national registries (with the exception of Russia).

**Results.** During the period 1990–1996 the number of haemodialysis units increased by 56% and the number of centres performing peritoneal dialysis by 296%. The number of patients increased respectively by 78% (haemodialysis) and 306% (peritoneal dialysis). The percentage of patients with diabetic nephropathy and elderly patients rose dramatically during this period. One of the main reasons of such expansion was the rapid development of peritoneal dialysis programmes in the majority of the CEE countries. The introduction of modern haemodialysis machines and a wider choice of different dialysers and concentrates permitted individualization of dialysis procedures. These points and the wider use of erythropoietin had a positive influence on quality of life and treatment outcome. There was also a notable increase in the number of transplant centres, but less so of the number of transplanted patients.

**Conclusion.** Renal replacement therapy experienced a major expansion in the CEE countries. Despite the progress achieved, the level of RRT is not yet completely satisfactory in most CEE countries.

Key words: renal failure; haemodialysis; peritoneal dialysis; development

Introduction

Dialysis and renal transplantation are the cornerstones of renal replacement therapy (RRT) [1]. Availability of these techniques varies widely between different regions of the world. Nearly 80% of dialysed patients are treated in the United States, Canada, Japan and the European Community. Similarly, the major proportion of renal transplantations are performed in these countries [2–4].

The rest of the world, comprising more than 80% of the world’s population, has only limited access to such treatment. Not surprisingly, differences in the economical situation are the major reason for such discrepancies, since RRT is one of the most expensive medical procedures [5,6].

For many years the countries in Central and Eastern Europe were members of the so-called socialist bloc, the economy of which was notoriously inefficient. Consequently, conditions were very unfavourable for the effective use of RRT in these countries. The situation was best (or rather less catastrophic) in former Czechoslovakia and Hungary; it was worse in Bulgaria and Poland and worst of all in Albania and the Soviet Union. Political and socioeconomic changes took place at the end of the 1980s and beginning of 1990s and many new countries came into existence or gained full sovereignty. Simultaneously these countries introduced open-market economies. These changes influenced many aspects of life for people living in this area. This included the conditions of health care.

The aim of the present study was to assess the changes of RRT that followed such economic changes in Central and Eastern Europe.
Subjects and methods

All data were obtained in a special survey among the members of the Central and Eastern Europe Advisory Board in Chronic Renal Failure, using specially prepared questionnaires. The Advisory Board was created in September 1996 as a part of the Special Research Programme sponsored by Janssen–Cilag (Zug, Switzerland) with technical assistance of Excerpta Medica (Amsterdam, Holland). The questionnaires included items concerning the number of dialysis units, stations, and patients on treatment, as well as use of different modalities of RRT (haemodialysis, peritoneal dialysis, renal transplantation). Further questions covered some specific topics including number of patients with diabetic nephropathy, frequency of hepatitis among dialysed patients, use of erythropoietin etc.

With one exception the board members were able to complete the questionnaires, using data available from their national registries (Czechoslovakia, Poland) or from annual surveys of the presidents of their nephrological societies. The information from Russia was fragmentary, because a national registry does not yet exist in this country. For this reason, figures from Russia are not included in this analysis.

Results

The number of haemodialysis and peritoneal dialysis units is presented in Figure 1. During the past 6 years, possibilities of dialysis treatment improved significantly in all countries analysed. The number of haemodialysis units increased by 56% and the number of centres performing peritoneal dialysis by 296%. Significant changes were also observed in the number of patients treated by these two modalities of dialysis (Figure 2). The number of patients increased by 78% (haemodialysis) and by 306% (peritoneal dialysis) respectively. It has to be mentioned that not only quantitative, but also qualitative changes were achieved, because more than 50% of machines used are now modern and produced within the past 4 years. In the majority of haemodialysis centres, procedures such as bicarbonate dialysis, controlled ultrafiltration, and sodium profiling are available. Also a wide range of dialysers and concentrates are used in most of the countries. The percentage of patients with diabetic nephropathy treated with either modality of dialysis is presented in Figure 3. The number of patients on treatment increased dramatically, especially for patients on peritoneal dialysis.

Renal transplantation activity in Central and Eastern Europe is summarized in Figure 4. The number of transplant units has almost doubled during the past 2 years, but the increase in the number of renal transplantations was not entirely satisfactory, especially when taken against the increasing number of patients on the waiting list.

Data on the prevalence of patients maintained on different dialysis modalities per 1 million of population are shown in Table 1. These global figures hide some striking differences between countries. In Slovenia the rate is almost 500 p.m.p., in Macedonia 400 p.m.p., in the Czech Republic more than 300 p.m.p., in Poland 145 p.m.p., and in Lithuania 77 p.m.p.

Discussion

The above data document a dramatic increase in the availability of RRT in the Central and Eastern European countries, subsequent to the recent political and socioeconomic changes. Such increase was not uniform, however, and the highest number of patients maintained on dialysis is currently found in Slovenia, the Czech Republic, Hungary and Slovakia. The proportionally most striking progress during the past years was achieved in Poland, however [7–9]. The possibilities of RRT in Albania, Russia and the post-Soviet countries are still far from satisfactory [10,11].

The magnitude of change is not well reflected by the mere numbers. There has also been a dramatic change in the quality of dialysis treatment. Modern newly manufactured dialysis machines were installed in nearly all new dialysis units and in many of the existing ones. This permitted not only more reliable and more effi-
cicient treatment; but also an increase of the patient load and improved the patients’ quality of life. Bicarbonate dialysis, controlled ultrafiltration, sodium profiling, various dialysers (including the more biocompatible ones), and various concentrates have become available and permit individualization of treatment. One striking aspect is the increase in peritoneal dialysis. Several years ago this procedure was very limited in Central and Eastern Europe. During the past years its use has increased dramatically. In parallel, automated peritoneal dialysis (CCPD) has also been started in several centres. These alternative modalities are used mainly for special groups of patients; e.g. in Poland, most children with end-stage renal disease are treated using peritoneal dialysis. Amongst adult patients, CAPD is used mainly in diabetic patients, elderly people, and patients with cardiovascular instability [12,13].

There are interesting demographic differences between Central and Eastern Europe on the one hand and USA, Japan, or Western Europe on the other [1,3,4,8]. The mean age of dialysed patients is much lower in Central and Eastern Europe, but the proportion of elderly people treated has risen significantly during the past few years. The same is true for diabetic patients. Of note, diabetic patients constitute currently

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**Fig. 2.** Number of patients dialysed using haemodialysis (HD) and peritoneal dialysis (PD) in Central and Eastern Europe during the period 1990–1996.

**Fig. 3.** Percentage of dialysed patients with diabetic nephropathy.
Czech Republic and Slovakia that the proportion of diabetic patients amongst dialysed patients approaches the figures reported from Germany or France [4], i.e. 25% in the Czech Republic and 17.9% in Slovakia.

The change in patient mix must be taken into consideration when assessing future trends of the ESRD population [14–16]. In the past, the gross mortality rate on dialysis was quite low and comparable with that reported from more developed countries of the world, and was even lower than that reported from the USA [1,4,17], but we acknowledge that the patients on treatment in Central and Eastern Europe had been strikingly younger.

One should also point to the improvement in the quality of life of the patients treated in Central and Eastern Europe. A few years ago, erythropoietin was introduced and is now given to approximately 60% of dialysed patients.

One unsatisfactory aspect is the underdevelopment of renal transplantation. This is mainly ascribed to lack of sufficient donors. Although this phenomenon has been observed in many countries throughout the world, it is particularly prominent in our region [1,4,8,10]. In the future it will be necessary to adopt living-related donors more widely, to better organize organ retrieval and to change the attitude of the public towards renal transplantation. This is a worthwhile effort, since the results of renal transplantation, at least in the majority of our countries, are comparable with those achieved in developed countries [1,4,8].

Unfortunately, dialysis is linked to money and the reimbursement system is a very important aspect. In most of the analysed countries, reimbursement is still mainly based on central (Ministry of Health) or local budgets. Increasingly, however, insurance systems are introduced. In the majority of countries, the development of RRT is not (or at least not only) based on local or regional budgets, but on national programmes funded by the governments [7,18]. It follows that the development of RRT will strongly depend on the future economic development in the respective countries. It will be an important issue to make local regional and central authorities aware of the problems of RRT through publicity and pressure from the nephrological communities, patients, staff and doctors.

We conclude that (i) in the past 5–6 years significant progress concerning development of dialysis facilities has occurred in Central and Eastern Europe. (ii) Further development of all treatment modalities is necessary to achieve acceptance rates comparable to those of developed countries. (iii) Special national

### Table 1. Rate of dialysis per million population in Central and Eastern Europe

<table>
<thead>
<tr>
<th>Population (10^6)</th>
<th>HD units</th>
<th>HD patients</th>
<th>PD patients</th>
<th>HD + PD patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>(11 countries) p.m.p.</td>
<td>p.m.p.</td>
<td>p.m.p.</td>
<td>p.m.p.</td>
<td>p.m.p.</td>
</tr>
<tr>
<td>119.3</td>
<td>4.5</td>
<td>206.2</td>
<td>13.9</td>
<td>220</td>
</tr>
</tbody>
</table>

HD, haemodialysis; PD, peritoneal dialysis; p.m.p., per million population.
programmes based on central funding appear to be the best solution in countries with underdeveloped health structures.

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