Renal replacement therapy. What are the differences between Japan and Europe?

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The data reported by the Patient Registration Committee of the Japanese Society of Nephrology are most interesting, particularly since some points contrast with the findings obtained by the ERA/EDTA Registry. Not all such differences can easily be explained, and this calls for future joint comparisons [1,2].

In the following we try to contrast the data of the Patient Registration Committee of the Japanese Society of Nephrology with the data collected for the last Annual Report of the ERA/EDTA Registry.

Structure of the Registry and Questionnaires

The Questionnaire of the Japanese Registry includes more data than that of the ERA/EDTA Registry. Despite this a surprisingly high response was obtained by the Japanese Registry, i.e., a 99.8% response rate in 1994. In contrast, the response rate in the ERA/EDTA Registry in 1994 was 66% for the centre questionnaire and 55% for the patient questionnaire.

It is not surprising that the US Renal Data System has a 100% response rate, since it uses the strongest conceivable stimulus, i.e. payment of treatment, but a virtually 100% response rate of the Japanese Registry, even after 30 years of operation, is most impressive.

The deplorably low response rate in Europe was the main reason why rapid changes have been implemented in the EDTA/ERA Registry, particularly simplification of the patient questionnaire and development of appropriate software.

Number of centres

At the end of 1994 there were 2759 centres in Japan for a population of 124 960 000. In the same year, in the ERA/EDTA Registry, there were 2942 centres for a population of 693 200 000 in all of Europe. As we will see, this difference in the number of centres in relation to the size of the population is associated with a higher number of patients on renal replacement therapy.

Number of patients admitted for renal replacement therapy

In Japan the number of new patients starting renal replacement therapy in 1994 was 24 296, i.e. 194.2 p.m.p. In contrast, the number of new patients reported to the ERA/EDTA Registry in 1994 was 58.6 p.m.p. The highest rate of new patients observed in Europe was 132 patients p.m.p. in Belgium and 125 in Germany. Even when one takes into account, and corrects for, the variable response rates in different European countries, the number of new patients p.m.p. in Europe remained significantly lower.

Total number of patients on renal replacement therapy

In Japan, the total number of patients on renal replacement therapy in 1994 was 143 709, i.e. 1149.9 p.m.p. The corresponding figure in Europe was 312 p.m.p. and even in the countries with the highest rate, e.g. 635 in Spain and 628 in France, the figures are lower than in Japan. It is striking, however, that 33.2% of European patients on renal replacement therapy are living with a functioning graft. This percentage is even higher in some European countries, e.g. around 40% in France or Spain and close to 50% in Finland, Ireland, United Kingdom and the Netherlands [3].

The Japanese patients are treated practically without exception by dialysis, 93.3% being treated by haemodialysis. By implication, the proportion treated by peritoneal dialysis in Japan is much lower than in Europe, where 8.5% of patients received this modality of treatment.

Renal transplantation is almost never performed in Japan. The report mentions only 26 renal transplants in 1994, all of them from living donors.

Home haemodialysis (0.1%) was less frequently used in Japan than in Europe (3.6%).

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Age and primary renal disease

The mean age of patients starting treatment in Japan was 61 years in 1994 in contrast to 57 years in 1992 in Europe. The median in Europe was 61 years [4].

Significant differences exist with respect to the type of primary renal disease. In Japan, chronic glomerulonephritis is the most frequent cause of end-stage renal disease (39.8% of all new patients) versus only 19.5% in Europe. Diabetic nephropathy was diagnosed as the primary renal disease in 31.2% of all new patients in Japan versus 17% in Europe. Nephrosclerosis was diagnosed in 6.2% of all new patients in Japan versus 14% in Europe. Polycystic kidney disease was diagnosed in 2.6% of new Japanese patients versus 9.2% in Europe and the respective figures for pyelonephritis are 1.4% in Japan versus 14.3% in Europe.

If one compares these figures, the incidence of diabetic nephropathy as a cause of end-stage renal disease in Japan is similar to that reported from the US, but higher than that reported from Europe. The most striking difference, however, concerns chronic glomerulonephritis. A very high percentage of new patients suffering from chronic glomerulonephritis is reported from Japan. In Europe the incidence of end-stage renal disease accounted for by this disease has been stable over the past years, and this contrasts with the continuous increase in the incidence of end-stage renal failure secondary to diabetic nephropathy and renal vascular disease (nephrosclerosis) observed in Europe [4].

Mortality

The gross mortality rate reported in Japan (9.5%) is very close to that reported by the ERA/EDTA Registry in 1994 (10.7% [3]) but strikingly different from that reported by the US Renal Data System (23.8% [5]).

Causes of death

The proportions reported for the different causes of death are quite similar in Japan and Europe. Cardiac causes of death and myocardial infarction account for 36.4% of deaths in Japan versus 37% in the ERA/EDTA Registry [4]. No differences exist with respect to infectious and vascular causes of deaths. In contrast, death caused by malignant disease accounts for 7.5% of total death in Japan versus <2% in the ERA/EDTA Registry area.

Duration of haemodialysis sessions

In the Japanese Registry, 76.9% of patients are treated with haemodialysis for 4–5 h, 9.9% receive less than 4 h per session and 13.2% receive more than 5 h of treatment. In the ERA/EDTA Registry, more than 5 h of treatment per session are administered to less than 5% of the patients, the most frequent duration of haemodialysis sessions being 4 h. Less than 4 h of haemodialysis per session is reported for 28% [3]. In summary, there is a tendency for shorter dialysis in Europe compared to Japan.

Use of recombinant human erythropoietin

The Japanese Registry gives no information regarding patients treated with erythropoietin, but the mean haematocrit of the patients (28.7%) was relatively high. It is interesting to note that in Japan a correlation was found between dose of erythropoietin administered and mean arterial blood pressure, while such a relationship was not found between haematocrit and mean arterial pressure. This observation would be compatible with a direct effect of erythropoietin on the genesis of hypertension, but alternative causes are obviously not excluded.

Urea kinetic modelling

The mean Kt/V in Japan is 1.31 and the mean PCR 1.04 g/kg/day. While unfortunately comparable data on European patients are not available, we know that target Kt/V was 1.2–1.4 for 43% of European centres [4].

Predictors of death in haemodialysis patients

Using case mixed data and laboratory data and applying logistic regression analysis, the Japanese Registry found that the following factors predict the risk of death (i) age of the patient, (ii) diabetes mellitus, (iii) male gender, (iv) Kt/V below 1.8, and (v) duration of haemodialysis sessions less than 5 h.

The Japanese Registry reports less mortality in patients who have longer dialysis sessions [6]. This fact has also been reported by the ERA/EDTA Registry, which showed that the gross mortality rate is 8.3% in patients treated for more than 12 h per week versus a gross mortality rate of 11.1, 11.8 and 10.9% in patients treated for 12 h, 9–11 h, and less than 9 h respectively [7]. It appears that longer duration of dialysis sessions have a protective effect, which is probably related to higher efficiency of longer dialysis sessions. The exact mechanism involved must be clarified, however, in prospective studies, particularly since the duration of haemodialysis sessions is not always exactly correlated to efficiency.

Conclusions

It is hoped that the remarkable results of our Japanese colleagues, made available to the European nephrologists, will be a starting point for in-depth collaborative studies to clarify the causes of the striking differences that have been pointed out above.
References