

## **Review of outcomes of dialysis and renal transplantation in the Lothian and Borders regions, 2001**

The Edinburgh Renal Unit provides a comprehensive service for renal replacement therapy (RRT) for patients with end-stage renal disease (ESRD) in the Lothian and Borders Health regions, covering a population of 730,000. This study aimed to define the results being achieved, and to investigate possible influences on these outcomes. Patients with ESRD who were treated conservatively were not included in the study.

This study included all adult patients from Lothian and Borders Health Boards who started renal replacement therapy (RRT; dialysis or renal transplantation) between July 1997 and June 2000.

Data collection and analysis was undertaken by members of staff of the Edinburgh Unit supported by ISD Scotland, between November 2000 and May 2001. It involved extraction of data recorded on the Unit database, interrogation of clinical notes to extract information on comorbid conditions, and obtaining comparative data from the Scottish Renal Registry, the UK Renal Registry, and published literature. Data included demographic factors, the presence of other diseases at the time of starting RRT, and other factors thought likely to have an impact on outcomes. Measures of functional ability and quality of life were also made, but in a cross-sectional manner on survivors from the cohort at the beginning of 2001. Hospitalisation data was obtained for patients commencing RRT before January 2000.

### **RESULTS**

#### **Acceptance for treatment**

249 patients, 143 male and 106 (43%) female, commenced RRT during the 3 year period July 1997 – June 2000, a take-on rate of 94 pmp per year. At the same time, the take-on rate for Scotland was 107 pmp per year. The equivalent rate from the UK Renal Registry was 97 pmp. All these figures are low by European standards, but there may be epidemiological as well as resource reasons for some of the differences noted internationally. The rates in Germany and Canada were approximately 150 pmp; in the USA, 320 pmp. A male excess is observed in all surveys of ESRF. In all countries, including Scotland and the UK, the take-on rate is rising steadily.

The proportions of patients with ESRF caused by inherited disease (12%), glomerulonephritis (16%), and the proportion with diabetes (20%; labelled as causing ESRF in 14%) were similar to those in Scotland and in the UK Renal Registry.

Within the region there was no significant difference in the take-on rate or time of referral by Carstairs index (a measure of socioeconomic deprivation) or area of residence, although small differences could not be confidently excluded because of the size of the study.

26% of patients commencing RRT had been known to the Unit for less than 90 days.

The median age of patients commencing RRT was 63y but rose slowly during the study. The equivalent figure for Scotland was 65y, with a similar rate of rise. Comparing the take-on rate to the age profile of the general population, and what is known of the incidence of renal impairment with age (it rises sharply in older age groups), the expected 'bulge' of very elderly patients is not seen in the RRT programme in Lothian, or elsewhere in the UK.

#### **Prevalence**

On 27<sup>th</sup> April 2001, 449 patients in the region were alive and receiving RRT. This gives a prevalence for treated ESRD of 616 pmp. The figure for Scotland is 563 pmp. Within the local region, 52% (232) had a functioning renal transplant, 35% (160) were receiving haemodialysis and 13% (57) were receiving peritoneal dialysis.

#### **Treatment modality**

The modality of first RRT was haemodialysis (HD) for 76%, peritoneal dialysis (PD) for 22.5%, and transplantation for 4 patients. Commencement on HD was more likely for patients referred late (<90 days), and for higher risk-group or older patients. Of total (stock) dialysis patients, 74% were receiving HD, 26% PD.

The proportion of patients receiving HD as a first treatment was similar to the Scottish proportion (76.5%) but higher than the England and Wales figure of 59%. By international standards England and Wales treats an unusually high proportion of patients by CAPD, although this is falling. Lothian PD patients had higher patient survival, technique survival, and transplantation rates than those reported for PD patients by the UKRR.

### Patient survival

Overall patient survival was 91% at 90 days, 87% at 6 months, and 79% at one year. This was strongly influenced by age and by the presence of other diseases. There were no significant influences from other factors, including late referral or modality of first RRT, when these were adjusted for age and comorbidity. Risk group analysis appeared to offer the most useful information.

Patients were stratified into risk groups using age and comorbidity. These groups were determined by testing previously used and published criteria against the local population, leading to the definition of three groups of similar size, which were analysed in detail. Comorbid conditions were defined as:

- Ischaemic Heart Disease (e.g., myocardial infarction or 'heart attack')
- Cerebrovascular Disease (e.g. stroke)
- Peripheral Vascular Disease (e.g. amputation or claudication)
- Diabetes
- Cancer (not including skin tumours).

Category	Description	Patient survival (%)			
		90d	6 mo	1y	2y
LOW RISK	Age <70y with no comorbid diseases [median age 49y]	99	96	96	93
MEDIUM RISK	Age 70-79y, or <70y with 1 comorbid disease [median age 71y]	92	88	76	63
HIGH RISK	Age 80y, or any age with 2 or more comorbid diseases, or any age with cancer [median age 67y]	81	76	63	33

Survival in the low risk group over the period of the study was excellent. However in the high risk group median survival was only 14 months. Nevertheless 1 in 3 of this group remained alive at two years, and mortality in the group had almost plateaued by this time. The unexpectedly low median age of the high risk group is probably caused by low referral rates of elderly patients with comorbid conditions.

Study of individual diagnoses or age showed weaker effects than provided by the risk group categorisation. Age had the most powerful effect as a single factor: the risk of death for patients over 75y was 12 times that of patients aged <59y. However it was equally high for patients aged 65-74y, at 13-fold increased risk. For patients over 75, median survival was 18 months (an equivalent figure for patients in Leicester (Munshi 2000) was 16 months).

Studies using similar risk group categorisation show similar effects but of variable degree. The survival curve for patients treated in Aberdeen and Dundee is closely similar to that in Edinburgh, with 35% 2 year survival for the High Risk group. In a survey using a similar classification across European centres, the overall figure was about 40%, but the range of 2-year survival was from 27% (Netherlands) to 72% (Nantes). The nature of comorbid illnesses differed in the different centres - for example the centres with lower survival experienced a much higher incidence of peripheral vascular disease.

The use of risk groups was imperfect as a guide to prognosis, but gave a better guide than using single risk factors or age alone. The inadequacies of this simple classification of risk were illustrated by the fact that 3 patients (4%) from the group classified as High Risk by this algorithm were deemed to be fit for renal transplantation. However patients thought to be at high risk after an extended clinical assessment are not accepted for transplantation. No simple way of identifying the 'high risk' patients who became

long-term survivors could be found, either during the study, or in a follow-up analysis that looked closely at survivors.

### Hospitalisation

Percentage of time spent in hospital was increased markedly by risk group (12% of time for high risk group, 4% for low), and age (10% over 75y, 3% under 50y).

### COMMENTS AND CONCLUSIONS

The outcomes demonstrated in this study compare favourably with those achieved in comparable centres. Outcomes were excellent for low and medium risk patients. The mortality of the high risk group is of concern, but is similar to that encountered elsewhere, and in large part is probably related to comorbidity, rather than directly to renal failure and its treatment.

Continued careful assessment of appropriate therapy for patients believed to be at high risk will be important, as this is the major growth area for the expansion of dialysis provision at present. It will be important to continue to seek to identify avoidable reasons for excess mortality.

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## Summary points

- Provision of dialysis for ESRD in Lothian is consistent and appropriate
- The acceptance rate is slightly below the average Scottish figure but rising at approximately the same rate
- Outcomes in Edinburgh are similar to national and international comparators
- For most patients, survival on dialysis is good
- For some patients the risks of dying remain high, despite dialysis
- Reliable identification of 'high risk' patients cannot be achieved by simple criteria