An epidemic of renal failure among Australian Aboriginals

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For editorial comment see Thomas

Abstract

**Objective:** To define recent trends (1993-1996) in incidence of endstage renal disease (ESRD) among Australian Aboriginal people in the Top End of the Northern Territory (NT).

**Design:** Analysis of hospital and clinical records of the Darwin-based ESRD treatment program from 1993 to 1996 and comparison with data accumulated since 1978.

**Participants:** All people entering the ESRD treatment program from 1978 to 1996.

**Main outcome measures:** Number of patients treated for ESRD; their ethnicity, age and sex; comorbidities in Aboriginal patients; treatment methods and outcomes.

**Results:** More Aboriginal people presented with ESRD between 1993 and 1996 (87) than in the previous 15 years of the program (68). The incidence of ESRD in Aboriginals reached 838 per million in 1996, and is doubling every 4 years. Aboriginal people presenting with ESRD are younger than non-Aboriginal people with ESRD, and, in contrast to non-Aboriginals, ESRD rates are higher in women than men. The numbers and proportions of Aboriginal ESRD patients who have hypertension, type 2 diabetes and cardiac disease are rising. Haemodialysis remains the most common form of treatment, and the number of dialysis treatments is doubling every 2.5 years. Only 9% of Aboriginal patients entering the program in 1993-1996 were treated with chronic ambulatory peritoneal dialysis and only 3% received transplants. Despite their younger age, survival of Aboriginal people on dialysis is low (median 3.3 years v. 6.5 years in non-Aboriginals), and graft survival after transplant is poor (37% at 5 years v. 88% in non-Aboriginals). Survival has not improved in the past 4 years, with fewer deaths from infection offset by more deaths from cardiovascular disease.
Conclusions: The predicted doubling of ESRD incidence among Aboriginal people by the year 2000 will add an enormous burden to limited resources. Risk factors for renal disease underlie all the excess morbidity and mortality in NT Aboriginal adults, and arise out of accelerated lifestyle changes and socioeconomic disadvantage. Better living conditions and education, robust and integrated primary healthcare programs, and systematic screening for early renal disease and treatment of those with established disease are all matters of urgency.

Introduction

The high rate of endstage renal disease (ESRD) in Australian Aboriginal people is attracting increased attention.\textsuperscript{1-4} The Northern Territory (NT) faces particular challenges in dealing with this problem. It has the lowest population (179 000 people) and tax base of any Australian State, and the highest proportion of Aboriginal people (22% of the population, compared with 5%-6% for Queensland and Western Australia -- the States with the next-highest proportion). It has an area of 1 346 200 km\textsuperscript{2}, and only two dialysis centres, 1500 km apart (one in Darwin and one in Alice Springs), which can scarcely accommodate the increasing numbers of Aboriginal people needing treatment.

In a previous article,\textsuperscript{1} we reported the rising rates of ESRD among Aboriginal people in the Top End of the NT (Figure 1), with an average annual incidence of 440 per million from 1988 to 1993. Aboriginal patients were younger than their non-Aboriginal counterparts and, in contrast to the non-Aboriginal population, more women than men were affected. There was little use of chronic ambulatory peritoneal dialysis (CAPD), and the few transplants gave poor results. Comorbidities were high and there was a shorter survival time on treatment than in non-Aboriginal people. Tiwi people living on Bathurst and Melville islands had especially high rates of ESRD, but for other communities there were too few cases to allow calculation of population-adjusted rates.

We present data for ESRD treatment in the Top End of the NT for the
period 1993-1996, thus extending the period of analysed data to 19 years. The expanded data allow calculation of regional population-specific rates, and illuminate trends in diagnoses, comorbidities, treatment methods and survival.

Methods

Study population

The total study population comprised all people entering the Top End ESRD treatment program from January 1978 to December 1996 inclusive. Our data sources were dialysis unit records and hospital files. We used Australian Bureau of Statistics aggregate and regional data from the 1987, 1991 and 1995 population censuses for the denominators for calculating ESRD rates for the 4-year intervals 1985-1988, 1989-1992, and 1993-1996. The 1991 Aboriginal community census was used to calculate individual community rates for the three 4-year intervals. People moving to the NT from other countries or other States and becoming residents are potentially included in the census and thus the denominators.

Statistical analysis

We calculated age-standardised rates of ESRD with Epi-Info using aggregate Australian non-Aboriginal data from the 1996 Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) as the reference population. $\chi^2$ tests with Yates' correction were used to examine differences between groups. Kaplan-Meier survival analyses were performed by SPSS for Windows, and the log-rank test was used to compare the differences between the groups.

Results

In the period 1993-1996, 104 people entered the ESRD treatment program, making a total of 214 for the period 1978-1996. Of the total, 155 (72%) were Aboriginal, and 59 (28%) were non-Aboriginal.

Incidence of treated ESRD

Figure 2a shows the dramatic increase in incidence of ESRD in Aboriginal people over the three 4-year periods, with an average doubling time of about 4 years. More Aboriginal people (87) presented for treatment in the 4 years 1993-1996 than in the previous 15 years of the program (68). Within this most recent 4-year period, rates have continued to rise at an average of 22% per year, peaking at 838 per million in 1996 (compared with 39 per million in non-Aboriginal people in the NT). With age adjustment, the 1993-1996 average annual rate represents a 15-fold increase and the 1996 rate a 21-fold increase over ESRD rates in non-Aboriginal Australians nationwide. NT rates for non-Aboriginals, which did not change over this time period, are lower than Australian aggregate rates (62 per million from 1993-1996) because the NT has a younger population. All regions of the Top End are experiencing the same phenomenon, although current rates vary. Figure 2b shows the changes in incidence in Aboriginal people in the five regions with the highest current rates.
The number of Aboriginal people receiving ESRD treatment (the prevalence), including those with functioning transplants, peaked at 2871 per million in 1996 versus 377 per million for non-Aboriginals. Finally, the number of dialysis procedures (which accrue most of the costs) is rising by 28% per year, or doubling every 2.5 years.9

Sex and age distribution of ESRD patients

Ninety-three (60%) of the 155 Aboriginals with ESRD were women and 62 (40%) were men, compared with 23 (39%) women and 36 (61%) men among the 59 non-Aboriginal patients. Figure 2c shows the higher ESRD rates in Aboriginal women than men at each time period, resulting, in 1993-1996, in an age-adjusted relative risk of 31 in women versus 16 in men.

On average, Aboriginal people were 5 years younger than non-Aboriginal people on entering the program (44 v. 49 years). However, the age distributions were quite different, with Aboriginal people most commonly presenting between the ages of 30 and 49 years, and non-Aboriginals between 50 and 69 years. Figure 3 shows that ESRD rates in Aboriginal people rose in most age groups over the life of the program, so that the average age and age distribution did not change appreciably. The age-specific incidence of ESRD in Aboriginal people peaked at age 50-59 years, and in non-Aboriginals at over 70 years.
Renal failure causes and comorbidities in Aboriginals

The Table compares the distribution of "causes" of ESRD in the two most recent 4-year intervals in those patients with documented causes. The proportion of ESRD in Aboriginal people attributed to (but not always solely due to) diabetes has almost doubled, that classified as glomerulonephritis has fallen by more than half, and the proportion in the "unknown" category has increased markedly.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>(n = 43)</td>
<td>(n = 32)</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td>51%</td>
<td>19%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>14%</td>
<td>26%</td>
</tr>
<tr>
<td>Unknown</td>
<td>26%</td>
<td>44%</td>
</tr>
<tr>
<td>Systemic lupus erythematosus</td>
<td>0</td>
<td>3%</td>
</tr>
<tr>
<td>Amyloid</td>
<td>7%</td>
<td>0</td>
</tr>
<tr>
<td>Pyelonephritis</td>
<td>2%</td>
<td>0</td>
</tr>
<tr>
<td>Analgesic nephropathy</td>
<td>0</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>7%</td>
</tr>
</tbody>
</table>

ns = not significant.

Aboriginal people with ESRD are more likely than non-Aboriginal people to have type 2 diabetes (48% v. 24%; P = 0.002) and hypertension (52% v. 32%; P = 0.01). Furthermore, these proportions have increased recently: for diabetes from 37% pre-1993 to 60% in 1993-1996 (P < 0.005); and for hypertension from 43% to 57% (P = 0.1); and for people with both diabetes and hypertension from 19% to 38% (P = 0.011).

Treatment for ESRD

Fifty-one per cent (30) of non-Aboriginal people, but only 17% (26) of Aboriginal people, have received transplants since 1978, and only 3% in the period 1993-1996. Potential reasons for this discrepancy include medical ineligibility, discouraging earlier results, distance to the transplant centre (in Adelaide), underservicing and difficulties in supervision of care and follow-up, lack of living related donors, and difficulties in HLA matching with donor organs. In 1996, only 11% of Aboriginal people with ESRD had functioning transplants versus 65% for non-Aboriginal people.

Chronic ambulatory peritoneal dialysis (CAPD) rates in Aboriginal patients remain low, with only 5% of incident cases pre-1993 and 9% in 1993-1996 treated in this manner.

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