Patients with End Stage Renal Disease: A Registry at Sultanah Aminah Hospital, Johor Bahru, Malaysia

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SUMMARY

The epidemiology of new patients presenting to Sultanah Aminah Hospital Johor Bahru (HSAJB) with end-stage renal disease (ESRD) in 2003 and 2004 was analysed. Patients with ESRD were prospectively registered in the renal replacement therapy (RRT) database in the nephrology unit. The incidence of ESRD and the RRT provision rate in the district of Johor Bahru were calculated according to gender and race. There were 306 new patients in 2003 and 299 in 2004. Diabetic nephropathy contributed 56.8% new patients in 2003 and 57.9% in 2004. The mean age was 50.8 + 15.1 years in 2003 and 51.3 + 14.2 years in 2004. Males accounted for 53.3% in 2003 and 47.8% in 2004. Haemodialysis was the commonest form of RRT (60.5% in 2003, 69.9% in 2004), followed by continuous ambulatory peritoneal dialysis (30.1% in 2003, 19.4% in 2004) and renal transplantation (5.5% in 2003, 2.3% in 2004). Ninety-one percent of patients in 2003 and 90% in 2004 were alive at the end of the year they presented. The incidence of ESRD in the district of Johor Bahru was estimated as 136 per million population (p.m.p.) in 2003 and 151 p.m.p. in 2004. In the two year period the incidence of ESRD was higher among females (154 p.m.p.) than males (134 p.m.p.). Malays (194 p.m.p.) had higher ESRD incidence compared to Chinese (126 p.m.p.) and Indians (134 p.m.p.). RRT provision in Johor Bahru (92.7%) did not differ significantly with gender or race. The increasing number of patients presenting to HSAJB with ESRD especially those with diabetic nephropathy is a major concern. Prevention strategies at the primary care level may curb the burden of this chronic disease.

KEY WORDS:
Dialysis, End stage renal disease, Malaysia, Registry

INTRODUCTION

The treatment of end-stage renal disease (ESRD) is costly[1] and the incidence of new patients needing dialysis is growing rapidly in Malaysia[2] from 45 per million population per year in 1996 to 108 per million in 2004. Sultanah Aminah Hospital (HSAJB) has 989 beds[3] and is the general hospital for the district of Johor Bahru (population 1,278,000 in 2003)[4], being the tertiary referral centre with the only nephrology unit in the state of Johor (population 3,027,000 in 2003) (Figure 1).

A prospective registry of new ESRD patients presenting to HSAJB from 1st January 2003 to 31st December 2004 is reported. The incidence of ESRD in the district of Johor Bahru was calculated.

MATERIALS AND METHODS

ESRD is defined as advanced chronic kidney disease (CKD) requiring renal replacement therapy (RRT). This is an analysis of all newly diagnosed ESRD patients in HSAJB prospectively registered from 1st January 2003 to 31st December 2004. The patients had been registered in the notification list for RRT (haemodialysis, continuous ambulatory peritoneal dialysis [CAPD] and renal transplantation) of the National Renal Registry (NRR), in the peritoneal dialysis register of medical wards and the nephrology clinic register for ESRD. Patients with acute renal failure were excluded. Data of patients were retrieved from their medical records.

We analysed the demographics (age, gender and race), causes of primary renal disease, modes of RRT and outcome at the end of the year that the diagnosis of ESRD was made. Chi-square test was used to compare the presence of RRT option against gender or race. Data were recorded and analysed using Microsoft Excel 2003.

RESULTS

There were 306 new patients in 2003 and 299 in 2004 (Table I). The main cause of ESRD was diabetic nephropathy in 56.8% of patients in 2003 and 57.9% in 2004. In 91 patients the cause was unknown. Fifty-one patients presented with small kidneys on ultrasound (< 9 centimetres in bipolar length) with no other cause found. Of the 56 patients with glomerulonephritis (GN) nine had lupus nephritis, two IgA nephropathy and two focal segmental GN; the rest had chronic GN. Of the 60 in the miscellaneous category 17 had hypertension, 14 irreversible obstructive uropathy (12 due to renal stones, two from prostatic hypertrophy), nine had chronic allograft nephropathy, eight had adult polycystic kidney disease, six had a history of taking analgesic drugs in excess, four had gout, one had myeloma and one had HELLP (hepatic dysfunction, elevated liver enzymes, low platelet) syndrome.

One hundred and eighty-five (60.5%) went onto haemodialysis in 2003 and 209 (69.9%) in 2004. Ninety-two (30.1%) were started on peritoneal dialysis in 2003 and 58 (19.4%) in 2004. Seventeen (5.5%) had a kidney transplant in 2003 and seven (2.3%) in 2004. Some died before RRT was started or had an unknown outcome – 12 in 2003 and 25 in 2004. Twenty-two had a cadaveric renal transplant from China, one had a living unrelated renal transplant from India and one living related renal transplant from Kuala Lumpur. Two hundred and seventy-seven patients (91%) in 2003 and 268 (90%) in 2004 were alive at the end of the year of

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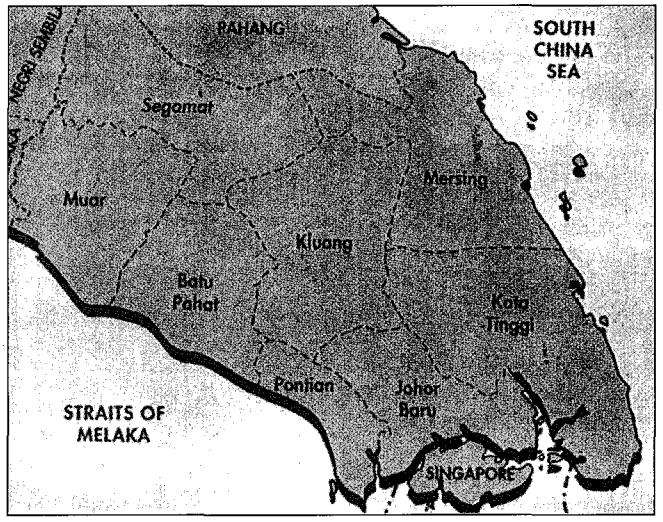

Fig. 1: Map of Johor state, Malaysia with district boundaries

diagnosis; 26 (8%) in 2003 and 31 (10%) in 2004 died; three in 2003 and none in 2004 could not be traced.

There were 174 and 199 new patients with ESRD (excluding patients with failed allograft) from the district of Johor Bahru in 2003 and 2004 respectively. The population of Johor Bahru was 1.278 million in 2003 and 1.315 million in 2004[4]. The minimum incidence of ESRD was estimated to be 136 and 151 per million population for 2003 and 2004 respectively for Johor Bahru district.

Data from 2003 and 2004 were combined and incidence and RRT rate of ESRD according to gender, race and age was calculated for Johor Bahru (Table II and Table III). RRT was provided in 92.7% of patients. Of the 27 who could not be established on RRT 24 died and three were lost to follow up.

DISCUSSION

A similar study had been reported in 1993 using comparable methodology to analyse new ESRD patients presenting to HSAJB in 1990 and 1991[5]. For the last 15 years, HSAJB was the only general hospital with a nephrology unit in the state of Johor. Comparisons may be made between the results of the two studies. The population of Johor state grew by 46% between 1991 and 2003 (2,074,297 in 1991[5] to 3,027,000 in 2003[4]). The number of new ESRD patients presenting to HSAJB rose from 129 in 1991[5] to 306 in 2003, a disproportionate increase of 137%.

There was a preponderance of male patients 14 years ago, 64% in 1990, 60% in 1991[5] but this pattern disappeared in our cohort (53.2% in 2003 and 47.8% in 2004). The patients are older now; mean age was 41.8 + 14.4 years in 1990, 48.8 + 14.8 in 1991, 50.8 in 2003 and 51.3 years in 2004. The race of patients remained approximately similar in proportion to that of the general population.

The prevalence of diabetes mellitus (DM) in Malaysia was 0.65% in 1960 and 2-4% in the early 1980s[6]. Surveys in the mid-1990s showed a prevalence of about 8-12%, while a recent study of the National Diabetes Institute in 1998 reported a prevalence of diabetes among rural and semi-urban populations of 14%. DM as a cause of ESRD has reached epidemic proportions worldwide[7,8]. The incidence of ESRD due to diabetic nephropathy in HSAJB rose from 26 (20% of total) in 1991 to 173 (57% of total) in 2004. This represents a nearly seven-fold increase in diabetic patients with ESRD in one hospital over 14 years. The National Renal Registry (NRR) reported an incidence of ESRD due to diabetic nephropathy as 54% in 2004[4]. Malaysia has the highest incidence of ESRD due to diabetic nephropathy among treated patients in the world[9]. In U.S.A. the proportion of new diabetes related ESRD was 7% in 1982, 36.3% in 1992 and 55.4% in 2004[9]. In Australia there was a doubling of diabetic related ESRD over the last seven years[10]. In New Zealand, the figure rose from 36%[11] in 1996 to 40%[12] in 2003. The importance of preventive strategies in dealing with the increasing burden of diabetic ESRD in Malaysia is obvious.

The number of ESRD cases not due to diabetic nephropathy was 100 in 1991 and 126 in 2004 which was an increase of 26%. As the population of Johor had increased by 46% over the same time there seems to be a relative decrease in the incidence of ESRD not due to diabetic nephropathy. This could be due to better surveillance and management of non-diabetic kidney disease.

As RRT became widely available and affordable the number of patients treated conservatively (45% in 1990 and 51% in 1991[5]) has diminished to nearly zero. A majority of new patients were started on haemodialysis. As the gross domestic product of Malaysia grew from USD 2,750 in 1991 to USD 3,900 in 2003 more patients went on haemodialysis. The establishment of haemodialysis units grew rapidly - Ministry of Health (n=112 in 2004 vs. 55 in 1999), non-governmental organisations (n=93 in 2004 vs. 51 in 1999), private centres (n=124 in 2004 vs. 60 in 1999)[13]. The CAPD programme which started in HSAJB in 1992 has expanded so that the proportion of patients treated with CAPD is quite high (28.8% in 2003 and 18.7% in 2004) compared to a negligible 2% in 1990[5].

In the last decade China has been the main source of cadaveric renal transplant donors. Living unrelated donor renal transplantation in India was an option since the late 1980's (17 patients in 1990, 20 in 1991[5]). Only one patient in 2003 had his transplant done in India. There were four patients from Johor who acquired HIV infection post renal transplant in India[14]. India introduced laws to stop unrelated donor renal transplants in the 1990s. In 1989, 60% of new renal transplants followed up in Malaysia were done in India while in 2004, 74% were done in China[13].

With increased availability of RRT the proportion of new ESRD patients being treated and surviving the calendar year improved markedly from 48%[5] in 1991 to 90% in 2004.

The study methodology captured most of the new ESRD patients from the district of Johor Bahru, except a small group who were financially well off and settled into the private hospital system. As HSAJB had the only nephrology unit in Johor Bahru, most new ESRD patients present there. Some ESRD patients present to the nephrology clinic for administrative purposes as their RRT subsidy is dependent on

Table I: Demographic characteristics of end stage renal disease (ESRD) patients

	Year	
	2003	2004
No. of new patients with ESRD	306	299
Mean age ± SD (years)	50.8 ± 15.1	51.3 ± 14.2
Age range (years)	10 - 82	4 - 82
Male (%)	163 (53.2)	143 (47.8)
Race		
Malay (%)	188 (61.4)	198 (66.2)
Chinese (%)	92 (30.0)	74 (24.7)
Indian (%)	26 (8.6)	24 (8.1)
Others (%)	0 (0)	3 (1.0)
Primary renal disease		
Diabetes mellitus (%)	174 (56.8)	173 (57.9)
Unknown (%)	52 (17.0)	39 (13.1)
Shrunken kidneys on ultrasound (%)	33 (10.8)	18 (6.0)
Glomerulonephritis (%)	23 (7.5)	33 (11.0)
Miscellaneous (%)	24 (7.9)	36 (12.0)

Table II: Incidence of and renal replacement therapy (RRT) for end stage renal disease (ESRD) in Johor Bahru, 2003-2004, stratified according to gender and race.

		Male	Female	Malay	Chinese	Indian
Number of new patients with ESRD	2003	91	83	94	62	18
	2004	90	109	124	57	15
	Total	181	192	218	119	33
Number of new patients on RRT †,‡	2003	86	79	87	61	17
	2004	87	94	111	54	13
	Total	173	173	198	115	30
Population 2003-2004 ('000)		1346.9	1246.3	1124.7	944.5	246.9
Incidence of ESRD for 2003-2004 (p.m.p.)		134	154	194	126	134
RRT §,¶						
Provision rate (combining 2003 & 2004) (p.m.p.)		128	139	176	122	122
Non-provision rate (combining 2003 & 2004) (p.m.p.)		6	15	18	4	12

p.m.p per million population
†Chi-square for number of patients with or without RRT versus gender, p=-0.07
‡Chi-square for number of patients with or without RRT versus race, p=0.14
§Chi-square for RRT provision or non-provision rate versus gender, p=-0.15
¶,Chi-square for RRT provision or non-provision rate versus race, p=0.11

Table III: Incidence of and renal replacement therapy (RRT) for end stage renal disease (ESRD) by age group in Johor Bahru, 2003-2004.

Age (years)		0-14	15-24	25-34	35-44	45-54	55-64	≥65
Number of new patients with ESRD	2003	3	11	14	24	43	41	38
	2004	2	10	13	27	62	39	46
	Total	5	21	27	51	105	80	84
Population 2003-2004 ('000)		806.3	478.5	463.1	366.3	248.4	131.1	99.4
Incidence of ESRD for 2003-2004 (p.m.p.)		6	44	58	139	423	610	845

a nephrologist's certification. Based on these assumptions the minimum incidence of ESRD in Johor Bahru was calculated using the number of new ESRD patients presenting to HSAJB with a Johor Bahru residential address and postcode for the calendar year. The denominator was the population figures for Johor Bahru district[4].

The number of new ESRD patients from Johor Bahru presenting to HSAJB has nearly quadrupled over the last 14 years (56 in 1990, 61 in 1991[5], 174 in 2003 and 199 in 2004). Over the same period, the population of Johor Bahru had increased by nearly two fold. It was 705,432 in 1990 and 1,315,200 in 2004[4]. The nett effect was a nearly two fold rise in the incidence of ESRD from 79 per million population in 1990 to 151 p.m.p. in 2004. The calculated minimal incidence of ESRD for Johor Bahru of 151 p.m.p. in 2004 approximates the dialysis provision rate for Johor state of 150 p.m.p[2] in 2004. This figure is higher than those from several developed countries except the U.S.A: 98 p.m.p. (2004) in Australia[12], 112 p.m.p. (2004) in New Zealand[12], 104 p.m.p. (2004) in the U.K.[15], 338 p.m.p. (2003) in the U.S.A.[9].

The NRR captured a RRT uptake rate of 132 p.m.p. for males and 107 p.m.p. for females[2] for 2003-2004. Such a gap in RRT provision has been observed consistently over the years. A similar trend was reported in U.K. - 158 p.m.p. for males and 93 p.m.p. for females[15] in 2003. The disparity in the RRT provision rate in Malaysia between males and females is thought provoking considering the higher female incidence of ESRD reported in Johor Bahru district (154 p.m.p. versus 134 p.m.p. for males). In this series RRT provision did not differ significantly with gender or race (Table II).

The Malay race had a disproportionately higher incidence of ESRD than the others (194 p.m.p. compared to 126 p.m.p. among Chinese and 134 Indians). A large survey done in Singapore[16] had found Malay race to be independently associated with proteinuria. In Singapore the highest incidence of ESRD was found in Malays[17]. Further study is required to ascertain the impact of ethnicity on ESRD incidence.

The incidence of ESRD (Table III) rose with increasing age, a pattern which is consistent with the increasing RRT provision rates among higher age group as shown in the NRR[2].

The incidence of new ESRD patients for Johor Bahru could apply to other parts of Malaysia and would be a useful target for health policy makers in planning for future dialysis and renal transplant provision. It is hoped that the rate will not increase substantially with time if steps to retard CKD progression is put in place at the primary care level.

CONCLUSION

The incidence of ESRD in Malaysia is increasing especially among patients with diabetes mellitus (57.9%). It was 151 p.m.p. in Johor Bahru district in 2004. RRT provision has increased significantly over the last decade with improvement in immediate patient outcome. Higher incidence of ESRD among females and Malay race are issues of concern. RRT provision was 92.7% and evenly distributed across gender and race. Efforts to retard progression of chronic kidney disease especially diabetic should be targeted at the primary care level.

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