

KIDNEY DIALYSIS FOUNDATION

ANNUAL REPORT

PERITONEAL DIALYSIS PROGRAMME

2006

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY
2. STAFFING
3. PATIENT POPULATION
 - Stock and Flow
 - Demographic characteristics
 - Cause of End-stage renal Failure
 - Hospitalisations
 - Dialysis Parameters
 - Dialysis Adequacy
 - Peritonitis rate
 - Anaemia and use of Erythropoietin
 - Serum albumin
 - Lipid profiles
 - Transplant Waiting List
5. ACTIVITIES OF THE PD CENTRE
6. CONCLUSION

EXECUTIVE SUMMARY

The Peritoneal Dialysis Centre of the Kidney Dialysis Foundation is located at the Kreta Ayer Centre and the programme started on 1 July 2003. The dialysis service is contracted out to a dialysis provider and the current provider is Baxter Healthcare Pte Ltd.

This report covers medical data collated at the end of 2006.

Patient demographics: There were 66 patients on the PD programme as of 31 Dec 2006. Only nine new patients joined the PD programme during the period of 1 Jan 2006 to 31 Dec 2006. Six of the patients were referred from the National University Hospital, 2 from the Singapore General Hospital and 1 from Tan Tock Seng Hospital.

The mean age of the 66 patients was 54 ± 11.3 years; 27 were male, 39 female; Chinese-44, Malay-18, Indian-4. Fifty-four were on CAPD and 12 on APD. The major cause of end-stage renal failure was diabetic nephropathy making up 78.0% of the new patients and 56.3% of the existing patients. The average age of entry into the programme increased from 46 ± 9.3 years in 2003 to 59 ± 13.9 years in 2006.

Hospitalisations: 58.3.0% of the patients were admitted in the year. The admission rate was 1.2 episodes per patient year or 14.16 days per dialysis year. The rate in diabetics was not different from the non-diabetics and was 1.2 episodes per patient year and 13.61 days per dialysis year.

Dialysis Parameters

Dialysis Adequacy: The total KT/V was 2.27 ± 0.5 with 90% of the patients meeting the minimum target of 1.7.

Peritonitis Rate: The peritonitis rate was 1 in 52.2 patient months.

Anaemia: The mean haemoglobin was 10.4 ± 1.6 g/dl with 60 patients (90%) on erythropoietin. Eleven (16.6%) patients had a haemoglobin above the target level of 12 g/dl and 18 (27.3%) had a haemoglobin of 11 g/dl or more.

Serum Albumin: The patients tended to have a low serum albumin level with a mean of 31.0 ± 5.2 g/L. About half (45.5%) of the patients could not meet the lower limit of normal which is 37 g/L.

Lipid profiles: Profiles improved this year with a mean LDL cholesterol of 2.3 ± 1.1 mmol/L and triglyceride of 2.5 ± 2.2 mmol/L. The mean HDL cholesterol level was 1.6 ± 0.7 mmol/L.

Transplant Waiting List: 19.7% of the patients were on the National Transplant waiting list while another 31.8% were not medically eligible for transplantation.

PERITONEAL DIALYSIS PROGRAMME

STAFFING

Medical

The Medical Director (Peritoneal Dialysis) continues to review patients once in 6 months following their routine blood investigations. The patients also go for follow-up with their referring physicians in restructured hospitals every 6 months or less. Urgent medical cover has been arranged with family physicians working in the vicinity using the same clinics as those arranged for the hemodialysis patients.

Nursing

The PD programme is supervised by the Patient Services Manager Ms Theresa Soh, and assisted by Ms Lay Kwee Chin, Senior Executive, Patient Services. There were two nurses employed by the dialysis provider, Baxter Healthcare Pte Ltd. They were S/N Vivienne Ong and S/N Aishah and both were based in the Kreta Ayer PD Centre. SN Vivienne Ong went on maternity leave from June to September and she did not return to the centre after her leave. S/N Aishah managed the centre alone with staff from Baxter Healthcare to relief her as of September 2006.

NEW GUIDELINES

Ordering and Dispensing of Erythropoietin: New guidelines, with the workflow, were written for the service provider.

DIETETICS

Baxter Healthcare Pte Ltd provided a dietitian, Ms Wong Yue Feng from Food and Nutrition Specialists Pte Ltd, to counsel patients. The patients were seen once every six months at the same time as their follow-up with the Medical Director.

PATIENT WELFARE

Patients continued to receive subsidies for their dialysis and erythropoietin on a case by case basis and they were handled by Welfare Executive, Ms Janice Soon and Ms Diana Lee.

PATIENT POPULATION

There were 66 patients on the PD programme as of 31 December 2006. Only 9 new cases were accepted into the PD programme during the period of 1 Jan – 31 Dec 2006; 6 came from the National University Hospital (NUH), 2 from the Singapore General Hospital (SGH) and 1 from Tan Tock Seng Hospital (TTSH).

During the same period of 1 Jan – 31 Dec 2006, 18 patients exited the programme; there were 5 transfers to hemodialysis, 1 transplant and 12 deaths.

Fig 1: Patient Stock and Flow

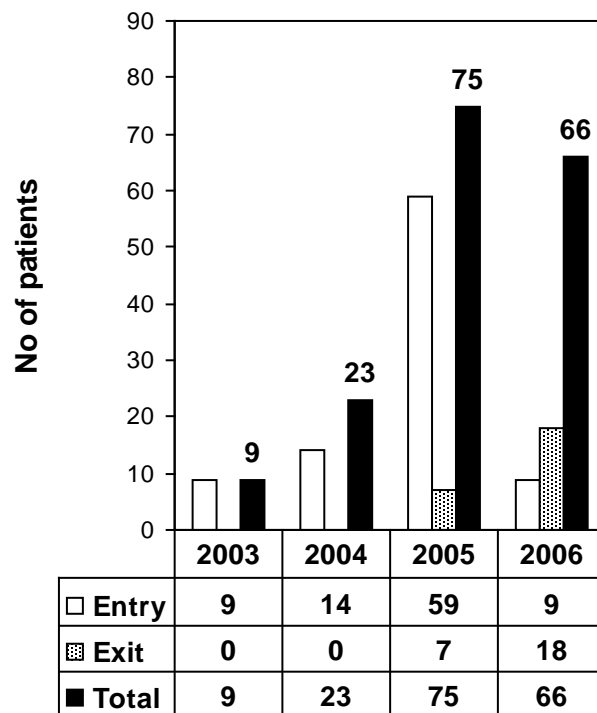


Table 1: Source of Referral

	2003	2004	2005	2006
SGH	7	12	22	2
NUH	2	2	35	6
Private / TTSH	0	0	2	1
Total Entries	9	14	59	9

Patient characteristics

The mean age of the prevalent 66 patients was 54 ± 11.3 years, with a predominance of females [Male: 27 (40.9%), Female: 39 (59.1%)] and the trend of a larger proportion of Malays when compared to the ethnic distribution of the general population continued [Chinese - 44 (66.7%), Malay -18 (27.2%), Indian - 4 (6.1%)]. Fifty-four patients were on CAPD and twelve on APD. The major cause of end-stage renal failure in the PD programme is diabetic nephropathy making up 78.0% of the new patients and 56.3% of the existing patients. The mean age of entry into the programme has increased over the years from 46 ± 9.3 years in 2003 to 59 ± 13.9 years in 2006.

Table 2: Gender of new patients

	2003		2004		2005		2006	
	N	%	n	%	n	%	n	%
Male	1	11.1	3	21.4	31	52.5	6	66.7
Female	8	88.9	11	78.6	28	47.5	3	33.3
Total	9	100.0	14	100.0	59	100.0	9	100.0

Table 3: Gender of prevalent patients

	2003		2004		2005		2006	
	N	%	n	%	n	%	n	%
Male	1	90.1	4	17.4	27	36.0	27	40.9
Female	8	88.9	19	82.6	48	64.0	39	59.1
Total	9	100.0	23	100.0	75	100.0	66	100.0

Table 4: Ethnic distribution of new patients

	2003		2004		2005		2006	
	N	%	n	%	n	%	n	%
Chinese	5	56.0	8	57.0	41	69.5	7	77.8
Malay	2	22.0	6	43.0	17	28.8	1	11.1
Indian	2	22.0	0	0	1	1.7	1	11.1
Others	0	0	0	0	0	0	0	0
Total	9	100.0	14	100.0	59	100.0	9	100.0

Table 5: Ethnic distribution of prevalent patients

	2003		2004		2005		2006	
	N	%	n	%	n	%	n	%
Chinese	5	56.0	13	56.5	47	62.7	44	66.7
Malay	2	22.0	8	34.8	24	32.0	18	27.2
Indian	2	22.0	2	8.7	4	5.3	4	6.1
Others	0	0	0	0	0	0	0	0
Total	9	100.0	23	100.0	75	100.0	66	100.0

Table 6: Mean age of entry into programme

Year	2003	2004	2005	2006
Mean age (years)	46	49	59	59
SD	9.3	7.3	10.8	13.9

Table 7: Mean age of prevalent patients

Year	2003	2004	2005	2006
Mean age (years)	49	48	50	54
SD	9.0	8.1	9.5	11.3

CAUSE OF END-STAGE RENAL DISEASE**Table 8: Etiology of end-stage renal disease in new patients**

Etiology	2003		2004		2005		2006	
	n	%	n	%	N	%	N	%
Chronic glomerulonephritis (no biopsy)	2	22.0	2	14.3	10	17.0	1	11.0
IgA nephropathy	2	22.0	2	14.3	1	1.7	-	-
SLE	-	-	-	-	-	-	-	-
Focal sclerosing GN	-	-	1	7.1	-	-	-	-
Drug induced GN	-	-	-	-	1	1.7	-	-
Membranous GN	-	-	-	-	1	1.7	-	-
Diabetic nephropathy	2	22.0	6	42.9	34	57.6	7	78.0
PCKD	3	34.0	-	-	1	1.7	-	-
Renal calculi	-	-	1	7.1	-	-	-	-
Renovascular disease	-	-	-	-	2	3.4	-	-
TB Kidney	-	-	-	-	-	-	-	-
Unknown	-	-	2	14.3	9	15.2	1	11.0
Total	9	100.0	14	100.0	59	100.0	9	100.0

Table 9: Etiology of end-stage renal disease in prevalent patients

Etiology	2003		2004		2005		2006	
	n	%	n	%	N	%	N	%
Chronic glomerulonephritis (no biopsy)	2	22.0	4	17.4	14	18.7	14	21.2
IgA nephropathy	2	22.0	4	17.4	5	6.7	5	7.5
SLE							1	1.5
Focal sclerosing GN	-	-	1	4.3	1	1.3	-	
Drug induced GN	-	-	-	-	1	1.3	1	1.5
Membranous GN	-	-	-	-	-	-	-	
Diabetic nephropathy	2	22.0	8	34.8	37	49.4	37	56.3
PCKD	3	34.0	3	13.0	4	5.3	3	4.5
Renal calculi	-	-	1	4.3	1	1.3	1	1.5
Renovascular disease	-	-	-	-	2	2.7	2	3.0
TB Kidney							1	1.5
Unknown	-	-	2	8.8	10	13.3	1	1.5
Total	9	100.0	23	100.0	75	100.0	66	100.0

COMORBIDITY

There were 41 (62.1%) patients with diabetes in the prevalent population in 2006. This is higher than the 49.4% in the previous year.

DEATHS AND WITHDRAWALS

There were 12 deaths and six withdrawals (transfer to hemodialysis or transplanted) in 2006. The causes of death are as follows: 3 from septicemia, 2 from cardiac causes, 2 from strokes, 2 died at home, and 1 each from pneumonia, liver cirrhosis and carcinoma of the colon. Of the withdrawals, 5 transferred to hemodialysis (2 because of catheter-related problems, 2 from peritonitis, and 1 opted out to HD) and one patient went to China for a renal transplant.

The death rate was 14.3% based on total number of patients in the year.

HOSPITALISATIONS

There were 100 admissions in 49 patients and 58.3% of the patients were admitted in the year. There were 14 patients with recurrent admissions of 3 or more admissions in the year and they accounted for 595 admission days (57.7% of total admission days). The admission rate was 1.2 episodes per patient year or 14.2 days per dialysis year. The rate in diabetics was not different from the non-diabetics and was 1.2 episodes per patient year and 13.6 days per dialysis year. PD related admissions accounted for 16% of all admissions.

When compared to the previous year (2005), a higher percentage of patients were admitted this year (59% vs 44%) and for a longer duration (14.16 vs 9.68 days per dialysis year). Interestingly, the diabetic patients did not differ from the non-diabetic patients.

Table 10: Hospitalisations

HOSPITALISATION	ALL		DM		NON-DM	
	2005	2006	2005	2006	2005	2006
Number of patients ever in prog	75	84	45	52	30	32
Total patient years	52.4	72.8	29.8	44.8	22.6	28
Number of patients ever admitted	33	49	22	31	11	18
Admission episodes	58	100	40	63	18	37
Admission days	507	1031	386	610	121	421
Days hospitalized						
PD related – technical	19	18	10	-	9	18
- infection	117	137	66	67	51	70
Other Infections	79	187	55	79	24	108
Others	292	689	255	464	37	225
% patients ever admitted						
	44.0	58.3	48.9	59.6	36.6	56.3
Episodes per patient year						
	1.11	1.20	1.34	1.24	0.79	1.16
Days per patient year						
	9.68	14.16	13.1	13.61	5.35	15.04
Days per patient year						
PD related – technical	0.36	0.25	0.34	0.0	0.39	0.64
- infection	2.23	1.88	2.21	1.49	2.26	2.50
Other Infections	1.51	2.57	1.84	1.76	1.06	3.86
Others	5.57	9.46	8.57	10.36	1.64	8.04
% of admissions						
PD related - technical	6.8	2.0	5.0	0.0	11.1	5.4
- infections	18.9	14.0	15.0	12.7	27.8	16.2
Other Infections	13.8	16.0	10.0	15.9	22.2	16.2
Others	60.5	68.0	70.0	71.4	38.9	62.2

Hospitalisations during the period Jan-Dec 2006 were analysed and expressed as days hospitalized per patient year of dialysis programme.

DIALYSIS PARAMETERS

Dialysis Adequacy

Dialysis adequacy is assessed using the total KT/V and is measured 6 monthly. The minimum target total KT/V is 1.7. The total KT/V (which is the sum of the dialysate and residual KT/V) of the cohort was 2.27 ± 0.5 . Although the mean KT/V was above the

minimum requirement, 6 patients (10 %) did not meet the required minimum of 1.7. The 6 patients had virtually no residual renal function compared to the group with $KT/V > 1.7$ (0 vs 0.29 ± 0.33) but they were otherwise no different in terms of duration on PD or body surface area (BSA).

Table 11: KT/V

	2003	2004	2005	2006
N	9	23	69 (6 not done)	60 (6 not done)
Total KT/V	2.55 ± 0.5	2.53 ± 0.5	2.37 ± 0.7	2.27 ± 0.5
Dialysate KT/V	2.10 ± 0.3	2.07 ± 0.3	1.96 ± 0.4	2.00 ± 0.4
Residual KT/V	0.45 ± 0.4	0.46 ± 0.3	0.33 ± 0.5	0.26 ± 0.3
% patients with $KT/V \geq 1.7$	100.0	100.0	88.4 (8 out of 69 <1.7)	90.0 (6 out of 60 <1.7)

Peritonitis Rate

There were a total of 16 episodes of peritonitis during the period of 1 Jan 2006 to 31 Dec 2006 making the peritonitis rate 1 episode in 52.2 patient months. Interestingly, the peritonitis rate was higher in the patients on APD (1 episode in 44.4 patient months) compared to those on CAPD (1 episode in 53.9 patient months). The peritonitis rate in 2005 when there were 75 patients on the programme was better at 1 episode in 65.2 patient months. The peritonitis rate has probably increased as a result of a number of factors including the older age of the new patients who also have more co-morbid conditions, including diabetes.

Table 12: Peritonitis rate

System	Total Patient Months	No of episodes	Infection Rate (Episodes/ Patient month)
APD (Home choice)	133.1	3	44.4
CAPD (Ultrabag)	701.3	13	53.9
All Systems	834.4	16	52.2

Anaemia

The mean haemoglobin was 10.4 ± 1.6 g/dl with 60 patients (90%) on erythropoietin. Eleven (16.6%) patients had a haemoglobin of 12 g/dl or more (target haemoglobin) and 18 (27.3%) had a haemoglobin of 11 g/dl or more (the new proposed target haemoglobin). Despite 90% of the patients being on erythropoietin, only 27.3% achieved a haemoglobin of 11 g/dl or more and this probably reflects inadequate dosing of erythropoietin, in addition to other problems related to iron supplementation.

Table 13: Haemoglobin and use of Erythropoietin

Hb (g/dl)	2003		2004		2005		2006	
N	9		23		75		66	
Mean ± SD	11.9 ± 2.6		11.1 ± 1.8		10.7 ± 1.8		10.4 ± 1.6	
< 10 not on EPO	1	11.0%	1	4.3%	3	4%	1	1.5%
< 10 on EPO	2	22.0%	4	17.4%	22	29%	29	43.9%
> 10 not on EPO	1	11.0%	6	26.0%	10	13%	5	7.6%
> 10 on EPO	5	56.0%	12	52.2%	40	53%	31	47.0%

Serum Albumin

The patients tended to have a low serum albumin level with a mean of 31.0 ± 5.2 g/L. Almost half the patients (45.5%) did not achieve a normal albumin level of 37 g/L and 40.9% were below 30 g/L. This occurs as a result of protein loss in the dialysate in patients on peritoneal dialysis. This is a perennial problem in patients on PD and is best addressed through nutritional supplementation.

Table 14: Serum albumin

Albumin (g/L)	2003	2004	2005	2006
N	9	21	71	66
Mean ± SD	28.7 ± 4.6	30.7 ± 5.9	31.5 ± 4.7	31.0 ± 5.2
% < 37 g/L	88.8	95.2	52.1	45.5
% < 30 g/L	66.7	33.3	39.4	40.9

Hyperlipidaemia

There was an improvement in lipid control when compared to the previous year. The mean LDL cholesterol level was 2.3 ± 1.1 mmol/L with 70.3% of the patients achieving the recommended MOH guidelines for LDL cholesterol of < 2.6 mmol/L. Serum triglycerides were also better controlled with a mean of 2.5 ± 2.2 mmol/L with 61.3% of the patients achieving the target of < 2.3 mmol/L. Once again, the mean HDL cholesterol level were good at 1.6 ± 0.7 mmol/L.

Table 15: Serum Cholesterol and Triglycerides

	2003	2004	2005	2006
Total Cholesterol (mmol/L)	5.7 ± 2.2 (n = 2)	5.7 ± 1.2 (n = 18)	5.3 ± 1.5 (n = 59)	4.9 ± 1.4 (n = 62)
% < 4.1 mmol/L	50.0	11.0	10.2	32.3
LDL Cholesterol (mmol/L)	3.3 ± 1.2 (n = 2)	3.1 ± 1.0 (n = 15)	2.9 ± 1.1 (n = 52)	2.3 ± 1.1 (n = 54)
% < 2.6 mmol/L	100.0	26.7	25.0	70.3
HDL Cholesterol (mmol/L)	1.9 ± 0.6 (n = 2)	1.5 ± 0.4 (n = 18)	1.5 ± 0.4 (n = 60)	1.6 ± 0.7 (n = 62)
% ≥ 1.0 mmol/L	100.0	94.0	88.3	93.5
Triglycerides (mmol/L)	1.3 ± 0.8 (n = 2)	2.3 ± 1.8 (n = 16)	2.5 ± 1.8 (n = 59)	2.5 ± 2.2 (n = 62)
% < 2.3 mmol/L	100.0	56.3	59.3	61.3

TRANSPLANT WAITING LIST

Only 13 (19.7%) patients were registered on the transplant register with 21 (31.8%) pending registration. A large number of patients (21 patients, 31.8%) were not eligible for transplant as a result of exceeding the age limit of 60 years (19 patients, 28.8%) or because they were seropositive for Hepatitis B or C (2 patients, 3%).

Table 16: Transplant status

	2003		2004		2005		2006	
N	9		23		75		66	
Registered	1	11.0%	6	26.0%	8	10.6%	13	19.7%
Not eligible	1	11.0%	4	17.4%	31	41.3%	21	31.8%
Opted out	0	0	4	17.4%	13	17.3%	11	16.7%
Pending	7	78.0%	9	39.0%	23	30.6%	21	31.8%

INTERIM HEMODIALYSIS

Seven patients required interim hemodialysis (due to catheter leak, bloody effluent, catheter problem and peritonitis) and 5 were converted to permanent haemodialysis (2 went to KDF HD and 3 went to private centres).

ACTIVITIES OF THE PD CENTRE

Patient Activities

The PD patients participated in the following activities:

1. a Patient Education Seminar on “Understanding Your Blood Results” on 23 April 2006,
2. a one-day patient outing to Malacca on 23 July 2006, and
3. a Patient Education Seminar on “Heart Disease in Dialysis Patients’ on 12 November 2006.

Most Compliant Patient Awards

These awards are presented annually to encourage patients to actively participate in their dialysis treatment. The Medical Director and the PD nurses select the awardees based on standard criteria. This year’s awardees were Mdm Yeo Kwee Geok and Ms Saadiyah Bte Ismail.

Provider Contract Expiry

The provider contract ended in June 2006. A new contract is currently under discussion and Baxter continued to provide one staff nurse to run the PD Centre, pending the outcome of the contract discussion.

Patient Fee Review

Patient fees are reviewed once every two years. The Welfare Executive, together with the Patient Services Manager and General Manager, met up with patients and their family members in November 2006. Summaries of the fee review were then submitted to the Executive Committee for their approval.

Transfer Set Adaptor

Patients from TTSH use a plastic adaptor for the transfer set for both the Baxter and Fresenius system. Baxter, the current PD provider for KDF, recommends a titanium adaptor. Hence, it has been agreed that patients from TTSH will have their transfer set change performed in TTSH and not in the KDF PD Centre.

Consultation Room

The consultation room was temporarily converted to office space for use by the CEO due to space constraints. Practical procedures were performed in the training area.

CONCLUSION

The PD programme caters for patients who are generally older and with more co-morbid conditions than those in the HD programme. It continues to remain a challenge to provide affordable, high quality dialysis in this cohort of patients.

Dr Grace Lee Siew Luan
Medical Director (Peritoneal Dialysis)