

Comparison of Outcomes and Quality of Life between Hemodialysis and Peritoneal Dialysis Patients in Indian ESRD Population

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ABSTRACT

Background: Hemodialysis (HD) and peritoneal dialysis (PD) are important renal replacement treatments in end stage renal disease (ESRD). There is paucity of data comparing outcomes and quality of life (QOL) between the two modalities in Indian scenario.

Materials and Methods: We followed 60 End stage renal disease patients (30 CAPD and 30 Maintenance hemodialysis) for a period of one year. Patients were analysed and compared for complications, physical quality of life and psychological well being with a two part self reported questionnaire at baseline and subsequently at six and twelve months. For the physical component appropriate sections of the McMaster Health Index Questionnaire (MHIQ) and for psychological component Psychological General Well-Being Index (PGWB) developed by Dupey was applied.

Results: The number of males and females in both groups were comparable (p -value > 0.05). The prevalence of diabetes mellitus,

coronary artery disease, obesity and ischaemic heart disease was comparable in both groups (p -value > 0.05). Significantly higher mortality was observed in patients undergoing HD (20% vs 0%, p -value < 0.05) at the end of study. At the end of study, 16.6% of patients undergoing HD were found to be anti HCV positive as compared to 3.33% in CAPD. Six episodes of CAPD peritonitis were observed (0.2 episodes per catheter year). Significantly higher number of CAPD patients had negative responses between 2-4 at baseline and subsequently on follow ups in Part A of QOL questionnaire (86.7 vs 23.3% at baseline, 80 vs 26.7% at 6 months, 80 vs 16.7% at 12 months; $p < 0.05$). Mean score in Part B of questionnaire was significantly higher in CAPD patients at baseline and at all follow ups (66.7 \pm 11 vs 50.1 \pm 17 at baseline, 66.7 \pm 12.1 vs 53.32 \pm 16.3 at 6 months, 65.3 \pm 9.5 vs 48.8 \pm 16.7 at 12 months, $p < 0.05$).

Conclusion: CAPD patients have significantly better quality of life in physical as well as psychological aspects and have significantly lower mortality when compared with hemodialysis patients.

Keywords: CAPD, Complications, Hemodialysis, India, Quality of life

INTRODUCTION

Both hemodialysis (HD) and peritoneal dialysis (PD) are established renal replacement therapies to treat patients with end-stage renal disease (ESRD). Paucity of organs and an almost nonexistent cadaver renal transplant programme in India have forced patients to opt either hemodialysis or peritoneal dialysis as renal replacement therapy. It is now widely accepted that health-related quality of life (HRQOL) is an important outcome of health care and one on which patient's base treatment decisions. HRQOL is a multidimensional concept that includes physical functioning, social and role functioning, mental health and general health perceptions. Cross-sectional studies have yielded most of the data on the HRQOL in people with ESRD. Comparisons of HRQOL on HD and PD have produced conflicting results [1]. It is not clear from the previous studies that which dialysis modality provides better quality of life [2, 3]. PD has been suggested to be better in few areas [1, 4] and HD in others [5]. Few other studies have reported little difference between the two modalities [6, 7].

To our knowledge, very few longitudinal studies comparing outcomes and quality of life between hemodialysis and peritoneal dialysis have been done in Indian context. We intend to study the same.

MATERIALS AND METHODS

This study was conducted in Dayanand Medical College and hospital, Ludhiana (India) from 1st October 2005 to 30th September 2006. A tertiary care hospital. The study protocol was approved by Institute Ethics Committee and study was conducted according to principles mentioned in Declaration of Helsinki. After taking relevant history all patients were subjected to general physical examination and systemic examination. A total of 60 patients were studied (30

each for CAPD and HD). Various complications like peritonitis, Hepatitis B and C infection, mortality, urinary tract infection, recent development of diabetes and quality of life was compared in them at 0, 6, and 12 months of the study. Patients aged < 18 years, with neuromuscular disease, active rheumatologic disease, unstable angina/angina on exertion, terminal illness with life expectancy less than 12 months or MI or CABG within the last year were excluded from the study. The presence of co-morbid conditions, like diabetes mellitus, hypertension, obesity, ischaemic heart disease in both groups was noted.

A two part self administered questionnaire which measured physical functioning and psychological well being was given to the patients at baseline, six months and twelve months. Appropriate sections of McMaster health index questionnaire were used to measure physical well being [8]. The MHIQ has been used in variety of patient populations e.g. patients at rehabilitation centers, patients with coronary artery disease and elderly patients admitted in hospital [9-12]. Questions pertaining physical activities, self care activities, mobility and communication (sight and hearing) have been included in MHIQ questionnaire. We also added a question related to sexual dysfunction as was done by Strauss et al., [12]. Total number of negative responses were noted and compared at baseline and subsequent follow ups.

The psychological component was assessed with the Psychologic General Well-Being Index (PGWBI) developed by Dupey for the National Center for Health Statistics to measure an individual's subjective sense of well-being or distress [13]. Various components of psychological well being assessed were: anxiety, depressed mood, positive well being, self control, general health and vitality. The test contains 22 questions and the responses are graded from

0 to 5. Total overall psychological well being index was assessed by adding answers to all the questions.

At the end of the study the data was analysed, compiled and comparative assessment of survival and quality of life in CAPD and HD patients was done. Data was analysed using spss version 12. Paired t-test was used for comparison between the two groups and p value <0.05 was considered as significant.

RESULT AND OBSERVATIONS

The mean age of patients undergoing CAPD was 52.7± 13.1 as compared to 49.4±15.9 in HD patients. Out of 30 patients undergoing CAPD 20 were males (66.6%), 10 were females (33.3%) as compared to 24 males (80%) and 6 females (20%) in patients undergoing HD. The number of males and females in both groups were comparable (p-value > 0.05) [Table/Fig-1].

Age (years)	CAPD		HD		p-value
Mean	52.77 ± 13.14		49.49 ± 15.94		NS
Sex	No.	%age	No.	%age	NS
Male	20	66.67	24	80.00	NS
Female	10	33.33	6	20.00	NS
Comorbidities	CAPD		HD		
	No.	%age	No.	%age	
HTN	28	93.33	15	50.00	0.0069
DM	11	36.67	8	26.67	NS
CAD	4	13.33	2	6.66	NS
Obesity	1	3.33	0	0.00	NS

[Table/Fig-1]: Demographic profile of patients

Complications [Table/Fig-2]

Total number of peritonitis episodes observed was six over a period of one year (0.2 episode per patient per CAPD year). Six patients died in hemodialysis group and two patients each were lost to follow up in CAPD and HD group.

Part A of Questionnaire

Negative responses in range of 2-4 in Part A of self-assessment questionnaire were observed in 26, 24, 24 patients on CAPD and 7, 8 and 5 patients on hemodialysis respectively at baseline, six months and twelve months respectively [Table/Fig-3].

Complications	Baseline			First follow up			Second follow up		
	CAPD	HD	p-value	CAPD	HD	p-value	CAPD	HD	p-value
Peritonitis	0	0	-	2	0	0.1146	4	0	0.0095
HBsAg+	1	0	0.1634	1	0	0.1634	0	0	-
HCV+	1	2	0.2797	1	5	0.0959	1	5	0.0959
Lost to follow up	0	0	-	2	2	0.00	0	0	-
Expired	0	0	-	0	6	0.0488	0	0	-
Recurrent UTI	-	-	-	0	1	0.1634	0	0	-
New onset DM	-	-	-	0	1	0.1634	0	0	-

[Table/Fig-2]: Complications in CAPD and HD patients

Negative responses in Part A	Baseline		First Follow up		Second follow up	
	CAPD	HD	CAPD	HD	CAPD	HD
2-4	26	7	24	8	24	5
5-7	1	10	2	6	2	4
8-10	0	8	0	5	0	7
11-13	1	1	1	1	1	0
14-16	0	2	0	2	0	2
Mean	2.79±1.79	7.00 ±3.34	2.46±0.86	6.73 ±0.86	2.96±2.28	7.22 ±3.38
p-value	0.0044		0.0042		0.0051	

[Table/Fig-3]: Negative responses in Part A of questionnaire

Part B of Questionnaire

Mean scores in Part B of self assessment questionnaire were 66.71±11.01, 66.62±12.17, 65.37±9.58 in CAPD patients and 50.11 ±17.00, 52.32 ±16.34, 48.83 ±16.76 in HD patients at baseline, first and second follow up respectively [Table/Fig-4].

DISCUSSION

Deciding about the modality of renal replacement therapy is a crucial decision for ESRD patients. Various factors e.g patients age, co morbid conditions, ability to perform the procedure influence patients choice for either peritoneal or hemodialysis. Our study concluded that mortality in patients undergoing HD is more than CAPD patients. Total of six patients undergoing HD expired as compared to none undergoing CAPD. Studies have reported variable results regarding survival in patients of peritoneal dialysis and hemodialysis.

In some studies PD has been found to be having higher mortality [14] whereas in few others PD patients have survival advantage over hemodialysis patients [15]. Some large scale studies have suggested PD and HD patients have almost similar survival [16,17]. Characteristics of the patients and observational period has been found to influence overall survival rate in few studies [18].

To our knowledge, Indian studies on outcome of dialysis modalities and survival with dialysis modalities are very few. Though our study was not a long term study, we did observe a higher mortality in patients on hemodialysis. However, due to shorter follow up and small sample size, we were not able to draw any conclusion about long term effect of dialysis modality on survival and we need larger and long term studies for the same in Indian context. Peritonitis is the most common cause of CAPD failure. Reported peritonitis rates vary widely, with incidence noted in one review varying from 0.06 episodes per patient-year in a Taiwanese program to as high as 1.66 episodes per patient-year at risk in a pediatric program in Israel [19].

In our study rate of peritonitis was 0.2 episodes per patient –CAPD year. The peritonitis rate in our center was comparable to the rate reported in other Indian studies. Narayan Prasad et al., have reported peritonitis rate of 0.63 episodes per patient–CAPD year in their study [20].

In our study two part quality of life questionnaire was used to compare the quality of life in patients undergoing CAPD and HD.

The results were statistically significant for both part A and part B of quality of life questionnaire at the start and at six and twelve months of study (p-value <0.05).

In few studies HD patients have been found to be better scores of physical well being [21] which also includes better sleep and sexual life [1]. These findings were seen in first two years of dialysis and subsequently also [1,6,22]. On the contrary, some studies have reported sleep problems and distress during the night in hemodialysis patients especially a night before dialysis [23, 24]. Compromised physical well being in PD patients has been attributed to lower albumin levels and complications e.g peritonitis [22,25]. Though we did not analyse various domains of Mc master questionnaire separately, overall physical well being was better in patients on CAPD.

We did not randomize patients to either form of therapy which could have resulted in healthier patients opting for CAPD, and hence better physical quality of life in them. Patients with better social support and efficiency might choose peritoneal dialysis. Whereas patients who are less independent may choose hemodialysis as their preferred mode of renal replacement therapy.

However, in a longitudinal study done by Wu et al., despite lower scores at baseline, at one year, patients on HD actually reported better scores in some domains, such as better physical role functioning. HD patients improved more in some aspects, such as sleep (which for PD patients actually became worse over time) and body image. Scores for ability to travel, diet, dialysis access remained higher in PD patients throughout the study period and improvement in scores was noted in features such as financial well being. At the end of one year, patients on HD reported significantly better sexual functioning than those on PD. PD patients improved more on other dialysis-specific aspects of life, such as financial well-being, and continued to have higher scores for ability to travel, diet, and dialysis access [1]. In many other studies as well, patients who

started PD were healthier, more privileged, and more likely to be working than those who started HD [26].

Part B of questionnaire which contained PGWBI, is a brief self-administered questionnaire that contains 22 items rated on a 5 point scale; higher scores indicate better quality of life.

The PGWBI has been extensively used as an indicator of HRQoL in patients with chronic conditions. Hemodialysis patients experience more depressive symptoms as compared to PD patients, which may be due to restriction in independent living due to continuous need to go to hemodialysis unit [22,23,26]. PD patients have been found to report better QoL ratings in specific areas like 'perceived ability to travel', 'financial concerns', 'and restriction in eating and drinking 'and' dialysis access problems [27]. PD patients usually are more satisfied with medical care and report lesser disease burden. Higher rates of suicide including deaths resulting from dietary violations has been reported in HD patients [27]. Moreover, increased psychosocial burden faced by HD patients sometimes contribute to conflicts with dialysis health personnel. Vascular access problems and prolonged waiting time can lead to dissatisfaction with health services and hence increased psychosocial problems in HD patients [27]. Furthermore, PD patients have indicated more positive ratings in several disease QoL domains, e.g. less kidney disease burden, and being more encouraged and satisfied with care. In addition, the rate of reported suicide in HD is higher, while a substantial number of deaths resulting from dietary violations could also be accounted for as suicide [28]. HD patients are reported to face psychosocial problems, which can contribute to conflicts between themselves and their medical carers. Dissatisfaction with health services may reflect the burden experienced by these patients, including stressful conditions during the dialysis procedure, high frequency of received in-center treatment and prolonged waiting-time in the unit [27]. Such findings could be attributed in part to the stressful conditions in the HD treatment modality. These findings are more

Part B Score	Baseline		First follow up		Second follow up	
	CAPD	HD	CAPD	HD	CAPD	HD
11-30	0	2	0	1	0	1
31-50	2	14	2	9	2	1
51-70	17	7	16	6	18	3
71-90	9	5	11	6	7	3
Mean	66.71±11.01	50.11 ±17.00	66.62±12.17	52.32 ±16.34	65.37±9.58	48.83 ±16.76
p-value	0.006		0.0071		0.0061	

[Table/Fig-4]: Scores of Part B questionnaire

Study	No. of patients	Questionnaire used	CAPD better	HD better	Remarks
Wu et al., [1]	698 HD 230 PD	CHOICE health questionnaire	ESRD domains bodily pain, travel, diet restrictions, and dialysis access, finances	Physical functioning and general health perception, sleep and overall quality of life	Distinct advantages and disadvantages of PD and HD. General health better in HD.
Diaz Buxo et al., [21]	16755 HD 1260 PD	SF 36	Mental processes after adjustment	Similar physical function in CAPD and HD	CCPD patients worse for physical function and better for mental function than either CAPD or HD
Ginieri-Coccosis et al., [27]	77 HD 58 CAPD	WHOQOL-BREF, GHQ-28 and MHLIC	Better QOL, physical health, social relationships, environment, overall mental health		In early and later years of treatment, QoL deficits in HD patients become more extended
Ramprasad et al., [29]	30 PD 30 HD	SF 36	Physical functioning Role- Physical Body pain Role-emotional Mental health General Health Vitality Social functioning		CAPD better in role health, general health and general functioning. CAPD better in all aspects
Present study	30 PD 30 HD	MHIQ, PWBI	General Health Physical functioning Sexual functioning Mental health		CAPD better in all aspects at baseline, 6 months and one year.

[Table/Fig-5]: Studies comparing QOL between CAPD and HD

important in Indian set up due to paucity of dialysis machines and health care personnel. CAPD patients are more likely to continue with their jobs making them financially better off and are freer to travel than HD patients. In Indian set up, medical insurance not being very common, continued earning can significantly contribute to psychological well being of CAPD patients. CAPD treatment offering increased autonomy and control, flexibility in everyday life and fewer social restrictions could also be the reason for better psychological health in these patients.

There are not many studies from India comparing quality of life between the two modalities of treatment. As observed in our study, Ramprasad et al., in their study found that CAPD patients had better quality of life in general health, physical functioning and quality of mental and physical health scores [29]. Various studies comparing quality of life between PD and HD patients are summarized in [Table/Fig-5].

Most of CAPD patients were easily able to perform routine activities like working, climbing stairs, washing, driving, travelling and also did not have any sexual problem. CAPD patients were more energetic, cheerful, and active and had good feeling of well being. As quality of life is subject to change over time due to aging, development of complications, change in comorbidities and patients adjustment to treatment, our observations could have been more meaningful had baseline scores been comparable.

Quality of life differences without due consideration of time factor may have a significant impact on our perception about various modalities of dialysis [27]. It is argued that quality of life differences linked to modality without taking into consideration the time factor may restrict our understanding of differences and changes in QoL over time [27]. The strength of our study was that it was a longitudinal study and there are very few longitudinal studies addressing this issue particularly in Indian setup. However, randomization of therapy, comparable baseline scores analysing duration of renal replacement therapy before recruitment in study and subgroup analysis (e.g. diabetics vs non diabetics) could have made our observations more reliable.

LIMITATION

Our study had several limitations. Firstly, it was non randomized study with small sample size done for relatively short duration. We could not therefore exclude the influence of therapy selection. Secondly, we did not analyse adequacy of dialysis and various biochemical parameters which could have affected quality of life. Lastly, we did not separately analyse different domains used in questionnaire and effect of dialysis modality on each of them separately. Nevertheless, ours is one of very few longitudinal studies comparing outcomes and quality of life in patients on peritoneal dialysis and hemodialysis in developing country like India.

CONCLUSION

Although the present study is not a randomized controlled study and the selection of dialysis modality may have been biased in many aspects, our study indicated that PD patients enjoyed better physical and psychological quality of life than their HD counterparts.

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