



STUDY OF SURVIVAL AND ITS PREDICTORS IN ELDERLY PATIENTS ON CONTINUOUS AMBULATORY PERITONEAL DIALYSIS: SINGLE CENTER EXPERIENCE

Nephrology

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ABSTRACT

Introduction: In last two to three decades, the prevalence of chronic kidney disease (CKD) has shown rising trend globally. With increasing life expectancy and affordability more elderly people are opting for renal replacement therapy. Peritoneal dialysis (PD) remains a good option for renal replacement therapy (RRT) in elderly population as well both in terms of survival and quality of life.

Material & method: Retrospective observational study in a tertiary care institute between period of 1st January 2009 and 31 December 2013. 44 patients aged more than 65 years of age were evaluated for their PD outcomes.

Result: 43 patients were on continuous ambulatory peritoneal dialysis (CAPD) and only one patient was on automated peritoneal dialysis (APD). There were 31 male and 13 female patients. Mean age of the patients was 69.55 years. Mean follow up period was 21.9 month. During follow up period, 25 patients died. Major cause of death was cardiovascular (13 patients) followed by peritonitis (5 patients). At 1 year and 2 year, Technique survival was 83.5% and 43.7%, and peritonitis free survival was 85% and 43% respectively. Peritonitis occurred in nine patients of which culture was positive in five patients. Mean age of the patients having peritonitis was 68 years. Outcome was death in five patients, catheter removal in three patients and complete recovery in two patients. Major cause of death was cardiovascular (13 pts) followed by peritonitis (5 pts). On univariate analysis, significant predictors of death were presence of CAD, residual renal function, serum calcium, serum sodium, and serum vitamin D level. After the multivariate analysis and independent t test, CAD, serum sodium, and serum vitamin D level were found to be significantly correlated with the outcome.

Conclusion: Our study has shown that peritoneal dialysis is an effective option for elderly population. Patient survival in these elderly patients on PD is as good as in age matched hemodialysis population. Cardiovascular disease was the most common cause of mortality. Rate of peritonitis was higher in our study and was associated with high incidence of death. Technique survival (death censored or non-censored) was comparable to other studies on elderly PD.

KEYWORDS

Chronic kidney disease, ESRD, Peritoneal dialysis, Peritonitis, Survival.

INTRODUCTION

Prevalence of chronic kidney disease (CKD) is progressively increasing over the past decade largely due to increase in the prevalence of diabetic and hypertensive population. In developed countries prevalence of elderly CKD patients has significantly increased because of increasing health care availability and improving health infrastructure. Availability of renal replacement therapy (RRT) modalities has also improved even in remote inaccessible areas. According to CKD registry of India, 24% of CKD patients are of age > 60 yrs (1). In India and other developing countries scenario is much different. Health infrastructure and resources are meager and there is great disparity in distribution of the resources concentrated more in urban areas in particular. So a large CKD population remains far from reach of health services. In India usually patients are not covered under health insurance, so whole of the financial burden is on the patient. Thus patient faces both social and financial crisis simultaneously.

Although there is no clear consensus on the preferred modality in these elderly patients, remains hemodialysis preferred mode of RRT. There is a regional variation in the use of peritoneal dialysis (PD) in elderly population. In United Kingdom in 2007, PD was started in 30% and 17% patients aged <65 yrs and >65 yrs respectively (2). In France, where assisted PD using community nurses is available and expenses are covered by insurance, 54% of elderly males and 59% of elderly females were on PD in 2006 (3). Peritoneal dialysis offers many advantages over hemodialysis including better preservation of residual renal function, cardiovascular stability, and no need for vascular access, a better sense of well-being, more autonomy and higher self esteem. But at the other hand there are many hurdles in this particular

group including more co-morbidity, visual and psychological handicap, cognitive dysfunction, social isolation and financial problems (4). They are most likely to need family support or institutional care for PD. These factors may lead to a physician being biased towards hemodialysis. So it's necessary to get a better understanding of outcome of the elderly patients on peritoneal dialysis. With this aim we carried out a retrospective study of elderly patients >65 years of age who were initiated on PD.

Aim of this study -

1. To study the patient survival and technique survival.
2. Predictors of survival.
3. Incidence of peritonitis.

MATERIAL AND METHODS

This is a retrospective study conducted in Sanjay Gandhi Institute of Medical Sciences (SGPGIMS), Lucknow, India. All the adult patients of age > 65 yrs who were inserted Tenckhoff's catheter between period of 1st January 2009 and 31st December 2013 were assessed and patients who were on PD for at least more than one month were included in the study. Ten patients were excluded as their PD did not prolong for more than one month either due to surgical complications [N=2], peritonitis [N=1] or death [N=7] due to septicemia [N=3], cerebrovascular accident (CVA) [N=1] or other cardiovascular events [N=3]. Two patients were lost to follow up.

The patients were followed until death, withdrawal from PD, or study end (31 January 2014). Serum biochemistry for all patients was done on regular intervals. We retrieved information from patient's records and data from hospital information system. Baseline data retrieved

includes age, sex, underlying disease, co morbidities and biochemical parameters. Outcome measures include patient survival, technique survival and peritonitis episodes.

STATISTICAL ANALYSIS

We used SPSS 16 for statistical analysis. Continuous variables were described by means and standard deviations unadjusted survival analyses were performed using the Kaplan– Meier method for each of the clinical outcome events of interest (patient survival, technique survival, death-censored technique survival and peritonitis-free survival) and to calculate median survival by each explanatory variable. $P \leq 0.05$ was taken as statistically significant. Univariate analysis was done for each variable to calculate odds ratio and CI 95% and then multivariate analysis was done for further assessment of significance. Independent sample t test was done to assess significance, standard deviation of variables with survival.

RESULT

Total of 56 patients who were started on PD during the study period were evaluated, out of which 12 were excluded as they did not fulfil inclusion criteria. Out of 44 patients, 43 patients were on continuous ambulatory peritoneal dialysis (CAPD) and only one patient was on automated peritoneal dialysis (APD). There were 31 male and 13 female patients. Mean age of the patients was 69.55 years. Mean follow up period was 21.9 months (range 8 months -55 months). Basic disease was diabetes mellitus in 20 patients, CGN in 14 and CIN in 10 patients. (Table- 1)

Anaemia (100%), hypertension (88%) and coronary artery disease [CAD] (45%) were most common co-morbidities associated with these elderly patients. During follow up period, out of 44 patients (pts), 25 patients died. Major cause of death was cardiovascular (13pts) followed by peritonitis (5pts). On univariate analysis, significant predictors of death were presence of CAD, residual renal function, serum calcium, serum sodium, and serum vitamin D level while age, gender, blood urea nitrogen (BUN), serum creatinine, total protein, lipids and alkaline phosphatase were not significant predictor. (Table-2) After the multivariate analysis and independent t test, CAD, serum sodium, and serum vitamin D level were found to be significantly correlated with the outcome while age, gender, diabetes, BUN, serum creatinine, serum potassium, total protein, lipids and alkaline phosphatase were not significant. (Table-3) In our study patient survival at 1 yr, 2 yr and 4 yrs were 85.7, 44.8% and 22% respectively (Figure 1). At 1yr and 2 yr, Technique survival was 83.5% and 43.7% (Figure 2), and peritonitis free survival was 85% and 43% respectively. Median peritonitis free survival was 28 months. Median survival free of peritonitis for age group <70 yrs, 71-80 and >80 yrs was 23.5, 14 and 24 months respectively. (Table – 4) Peritonitis occurred in nine patients of which culture was positive in five patients. Mean age of the patients having peritonitis was 68 yrs. Four patients were male and five females. Outcome was death in five patients, catheter removal in three patients and complete recovery in two patients. (Table-5)

DISCUSSION

Optimum renal replacement therapy in elderly CKD population is still unclear and sufficient data are lacking in this regard. Several studies have shown PD to be more suited to elderly patient in terms of better hemodynamic stability, need for vascular access, higher self esteem, autonomy and institutional dependency. In our study patient survival at 1 yr, 2yr and 4 yrs was 85.7, 44.8% and 22% respectively which is comparable to dialysis population of same age group. Otowa T et al in their study showed that patient survival at 1 yr and 2 yrs was 83% and 41% respectively (6). While in Hong Kong study 2 yr and 5 yrs patient survival was 88.3% and 56.4% respectively (7). Lamping et al in their study in elderly PD patients, showed the 1-year survival rate to be 69%. (8). Median survival in our patients was 27.5 months. Jeloka T and Jhamani A in their study of elderly patients on dialysis have showed a median survival to be about 25 months (9). In our study 9 episodes of peritonitis occurred and 5 deaths were attributed to the peritonitis. This reflects that patients who develop peritonitis are prone to serious consequences. This result is in contrast to other studies where risk of death from peritonitis remains 2.2%-5.9% (10). Gokal in a multi-centric study found that the peritonitis rate was 1.28 and 1.37 episodes per patient year for patients above and patients below 60 years of age respectively (11). Higher incidence of peritonitis in our study may be due to age related disability in performing PD, lack of dedicated family support, socioeconomic status as majority were poor

villagers with poor literacy rates and lack of clean sterile surrounding patient residing in 'kachhaa' house. In their study of 247 patients, Hiramatsu et al. reported that the incidence of peritonitis did not increase with increasing age (12). Cultures were negative in 45% cases which are more than recommended by ISPD. This may be because antibiotics are started immediately as symptoms occurred before specimens were sent for microbiological assessment or because of poor access for microbiological assessment. Nessim et al (2009) in their study showed that increasing age was not associated with increased risk of peritonitis (13). In our study, presence of CAD, Sodium, Calcium and Vit D were significantly related to the overall survival. 100% patients were anemic and hypoalbuminemic and most of them had Hb level below 9 g/dL. Surprisingly low sodium level was significantly related to adverse outcome. Diabetes, age, gender, Hb, creatinine, and serum lipids were non-significant factors.

CONCLUSION

Our study has shown that peritoneal dialysis is an effective option for elderly population.

Patient survival in these elderly patients on PD is as good as in age matched dialysis population.

Age is no bar to initiate RRT in elderly patients. Cardiovascular disease was the most common cause of mortality in this population. Rate of peritonitis was higher in our study which needs attention as peritonitis was associated with high incidence of death in this subgroup of patients. Technique survival (death censored or non-censored) was comparable to other studies on elderly PD. Nutritional status as reflected by S. Sodium, Calcium and vit D was significant predictor of survival among elderly PD population. All patients were having very low Hb level and most of them were hypoalbuminemic showing very poor nutritional status that results in overall increased morbidity and mortality in all affected patients. We need to take care of nutritional deficiencies, co-morbidities, socioeconomic status and patient's will in deciding modality of RRT.

Limitation

This is a single centred study and sample size is small. We need to study on larger scale involving many centers in India so that sample bias, centre-effect and regional or institutional practices may not confound the outcome.

Conflict of interest : None declared.

TABLE- 1. Demographic character of the patients

		Number
GENDER	MALE	31
	FEMALE	13
SURVIVAL	ALIVE	19
	DEAD	25
PERITONITIS		9
CO-MORBIDITIES		
ANEMIA		44
HTN		39
CAD		20
DM		24

CAD: Coronary artery disease, DM: Diabetes mellitus, HTN: Hypertension

Table.2 comparative Demographic Characters Of The Patients.

VARIABLES (mean)	ALIVE	DEATH	P value
TOTAL PATIENTS	19	25	
AGE (YRS)	68.32	70.48	0.98
CAD	5	15	0.03
Residual renal function (ml/day)	415.79	234	0.001
Haemoglobin	8.68	8.6	0.9
BUN	59.85	59.88	0.997
Serum Creatinine	6.7	7.1	0.62
Serum Na+	131.4	134.7	0.04
Serum K+	4.15	4.3	0.5
CALCIUM	10.1	7.8	0.01
iPO4	5.5	5.3	0.32
Serum Albumin	3.07	2.9	0.30

Serum Iron	78.4	66.01	0.17
iPTH	231	388	0.25
Vitamin D	28.4	21	0.049

CAD: coronary artery disease, BUN: blood urea nitrogen, iPO4: inorganic phosphate.

Na+: Sodium, K+: Potassium

Table-3 Significant Predictors Of Death In Elderly Pd Patients

	ODDS RATIO	CI 95%		P VALUE
		LOWER	UPPER	
CAD	0.146	0.042	.632	0.03
S. Na	0.9	0.83	0.98	0.04
S. ALBUMIN	0.87	0.17	0.43	0.30
IRON	0.96	0.99	0.93	0.17
iPTH	1.0	1	1	0.25
Vitamin D	0.9	0.83	0.98	0.04

CAD: coronary artery disease, S: Serum, iPO4: inorganic phosphate.

Table –4 Survival Data OfThe Elderly Patients (IN %)

SURVIVAL(%)	1 YR	2YR	3 YR	4 YR
PATIENT SURVIVAL	85.7	44.8	29.4	22
TECHNIQUE SURVIVAL	83.5	43.7	28.6	21.5
DEATH CENSORED TECHNIQUE SURVIVAL	75	25	-	-
SURVIVAL FREE OF PERITONITIS	85	43.4	28.5	21

Table 5. Characteristics Of Patients With Peritonitis

PERITONITIS	9	
AGE (MEAN)	68.37 YRS	
GENDER	MALE	4
	FEMALE	5
CULTURE POSITIVE	5	
OUTCOME	TREATED SUCCESSFULLY	2
	CATHETER REMOVAL	3
	DEATH	5

Table 6. Organism Isolated In Pd Fluid Culture

M. tuberculosis
Pseudomonas aeruginosa
Acinetobacteriwofii
Streptococcus pneumoniae
Pediococcuspentosacells

FIG 1PATIENT'S TECHNIQUE SERIVAL.

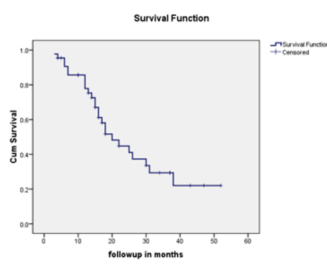
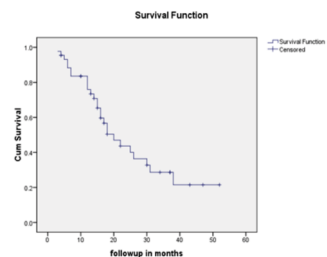


Fig- 2. patient Survival



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