Survival of elderly dialysis patients is not dependent on modality or "older" age

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ABSTRACT

While discussing renal replacement therapy, the choice of modality and survival on dialysis are important considerations. These issues are even more important in elderly group of patients. We studied the survival and factors affecting survival of our elderly dialysis patients. All incident patients who started dialysis from November 2006 to March 2014 were considered for inclusion. Patients who initiated dialysis at or >65 years of age and had completed 90 days of dialysis were included. Overall survival of elderly dialysis patients was determined. Patients were divided into two groups based on the modality of dialysis and age: elderly (65–70 years) and older (>70 years). The baseline data and survival were then compared between groups. Mean age of the study population was 71.8 ± 6 years with 73.8% males, and 71.4% had diabetes. Median overall survival of the patients was 26.6 months. Median survival of elderly dialysis patients was 26.5 months and of older dialysis patients was 30.1 months ($P = 0.9$). Median survival of hemodialysis and PD patients was also similar (30.1 and 25.2 months respectively. Multivariate analysis showed diabetes as the only determining factor affecting survival ($P = 0.01$). To conclude, there is no difference between survival of elderly and "older" or between elderly hemodialysis and PD patients.

Key words: Elderly dialysis patients, hemodialysis, peritoneal dialysis, survival

Introduction

While discussing renal replacement therapy, the choice of modality and survival on dialysis are the two most important questions discussed in predialysis chronic kidney disease clinic. This question is even more pertinent in elderly patients, where co-existing co-morbidities and lower expected long survival, makes the decision difficult for the family. Issues with hemodialysis are cardiovascular instability, sudden fluid, and electrolyte shifts, need for vascular access, and travel to nearby dialysis center whereas with peritoneal dialysis (PD), the issues are peritonitis, and at times attending person to do the exchange. There are limited survival data of dialysis patients, especially elderly patients from India. As there is increasing prevalence of elderly patients on dialysis, we retrospectively analyzed the cohort of our elderly dialysis patients for survival, factors affecting survival, compared survival between the two modalities of dialysis as well as between the two age groups of "elderly" and "older", so as to answer these questions in Indian perspective.

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Subjects and Methods

All incident patients with chronic kidney disease who started dialysis at Aditya Birla Memorial Hospital from November 2006 to March 2014 were considered for inclusion. Inclusion criteria were those dialysis patients (hemodialysis or PD) who initiated dialysis at or >65 years of age and had completed >89 days of dialysis. Patients with hepatitis B, C or HIV were excluded. Acute or acute on chronic kidney disease patients on dialysis were also excluded. All patients were on thrice a week hemodialysis or three times a day PD. All patients were targeted to achieve adequate dialysis urea reduction ratio (URR > 65% in hemodialysis or KT/V urea >1.7 in PD). URR was measured every month for hemodialysis patients and KT/V urea at 1-month, 3-month, 6-month, and then 6-monthly in PD patients.

All attempts were made to achieve adequacy as per guidelines. Assessment of metabolic bone disease was done by monthly laboratory tests including calcium and phosphorus. Parathormone levels were done every 6-month. Assessment of cardiovascular disease was done as per need except echocardiography, which was done for most of the elderly patients starting dialysis. Patients were followed until death, transplantation, and shift to other modality or end of March 2014.

Baseline demographic, clinical and biochemical data were recorded after the 1st month postinitiation of dialysis. Overall survival of elderly dialysis patients was determined. Patients were then divided into two groups based on the modality of dialysis. The baseline data and the survival were then compared between patients on hemodialysis and those on PD. Further, all patients were then divided into another two groups – elderly (65–70 years) and older (>70 years). Their baseline characteristics and survival were again compared.

Continuous variables were compared with mean and standard deviation and categorical variables by Chi-square test. Survival was determined by Kaplan–Meier; and comparison of survival between those on hemodialysis and PD and further between elderly and older dialysis patients was done by Log rank test. Factors affecting survival were evaluated by univariate and multivariate analysis. Factors considered for survival analysis were age, sex, diabetes, modality of dialysis, vintage of dialysis, all biochemical parameters, including albumin. All statistical analyses were done using SPSS version 17 (SPSS, Chicago, IL, USA).

Results

A total of 294 patients with chronic kidney disease were initiated on dialysis during this period. Of these, 22 were excluded because of death or migration to alternate center within first 3 months. Out of remaining 272 patients on dialysis, 42 (15.4%) were >65 years of age - 19 patients (45%) being between 65 and 70 years and 23 (55%) were >70 years. Mean age of the study population was 71.8 ± 6 years with 73.8% males, and 71.4% had diabetes. Basic disease of study subjects were diabetes (71.4%), hypertension (11.9%), ischemic nephropathy (2.4%), microscopic polyarteritis (2.4%), and unknown (11.9%). Among hemodialysis patients, 87% had arteriovenous fistula and 13% had permcath as an access. In PD patients, all had swan neck double cuff Tenckhoff catheter as access. Baseline characteristics of all the groups are shown in Table 1. Mean age of elderly patients was 67.1 ± 1.4 and that of older patients was 75.7 ± 5.6 years; there was no difference in baseline characteristics between hemo and PD patients and except for hemoglobin, which was lower in "older" patients, there was no difference between "elderly" and "older" patients. At follow-up of last visit in the study, there was no difference in any baseline characteristics between any group except that serum K was lower in PD patients as compared to hemodialysis.

Median overall survival of the patients was 26.6 (SE 1.9) months. Overall 1-year, 2-year and 3-year survival was 78.9% (34 patients remaining at the end of 1-year), 63.9% (30 patients at the end of 2-year), and 25.2% (22 patients at the end of 3-year) respectively. Median survival of "elderly" dialysis patients was 26.5 (SE 0.8) months and of "older" dialysis patients was 30.1 (SE 4.8) months, similar in both groups (Log rank [Mantel Cox - 0.9 [NS]) [Figure 1]. The 1-year, 2-year and 3-year survival of "elderly" and "older" patients were 78 versus 79.8%, 63.8 versus 62.8%, and 23.6 versus 26.9% [Table 2].

Median survival of hemodialysis patients was 30.1 (SE 5.3) months and those on PD was 25.2 (SE 5.1) months, again similar between the two groups (Log rank [Mantel Cox - 0.2 [NS]) [Figure 1].

Table 1: Baseline characteristics of dialysis patients divided into modality and 'elderly' and 'older' patients

Parameters	Overall (range)	At 1-month of initiation of dialysis		*P*	At 1-month of initiation of dialysis		*P*
	All elderly dialysis patients (*n*=42)	Hemodialysis patients (*n*=23)	Peritoneal dialysis patients (*n*=19)		Elderly dialysis patients (*n*=19)	Older dialysis patients (*n*=23)	
Age (years)	71.8±6 (65-90)	73.2±7	70.1±3	0.09	67.1±1.4	75.7±5.6	0.000
Sex (%, male)	31 (73.8)	65	84	0.2	73.5	74	1.0
HB (g/dl)	10±1.8 (6.9-16)	9.6±2	10.5±1.4	0.1	10.7±2	9.4±1.3	0.02
BUN (mg/dl)	52.6±26.2 (15.9-146)	50±29	55.6±22.9	0.5	55.8±2.5	49.8±29.2	0.4
Creatinine (mg/dl)	6.6±1.6 (4.1-9.9)	7±1.9	6±1	0.07	6.8±1.4	6.4±1.8	0.4
Na (meq/L)	133.9±4.3 (122-142)	134±4.7	133±3.9	0.5	134.7±4	133.2±4.5	0.2
K (meq/L)	4.4±0.8 (3-7)	4.5±1	4.3±0.7	0.6	4.5±0.9	4.3±0.8	0.5
Ca (mg/dl)	8±0.7 (6.1-10.5)	8±0.7	8.2±0.9	0.7	8.1±0.9	8±0.8	0.7
PO4 (mg/dl)	5±2.3 (1.2-10.5)	5±2.3	4.2±1.1	0.2	4.4±1.6	4.8±2.1	0.3
PTH (pg/ml)	182.4±209.1 (18.9-735.1)	202.3±243.7	112.7±107	0.2	75.6±81	248.1±246.5	0.09
Albumin (g/dl)	3.2±0.6 (1.8-4.5)	3.3±0.7	3.2±0.6	0.8	3.1±0.7	3.1±0.7	1
URR or KT/V urea	(56.1-79.1) (1.19-3.1)	69±5.8	1.8±0.48				

URR: Urea reduction ratio, BUN: Blood urea nitrogen, PTH: Parathyroid hormone, HB: Hemoglobin, PO4: Phosphorus, K: Potassium, Ca: Calcium

The 1-year, 2-year and 3-year survival of hemo and PD patients were 81.3 versus 77.4%, 73.9 versus 54.2%, and 35.9 versus 13.9% [Table 2].

Univariate analysis showed diabetes as the only determining factor affecting survival ($P = 0.03$) and failed to show any of the other factors including modality or advancing age to be affecting survival in this elderly population. Multivariate analysis further confirmed the relationship between survival and diabetes ($P = 0.01$).

Discussion

The objective of this study was to know the survival of prevalent elderly patients on dialysis which is important for counseling, comparing, auditing, and improvising the outcome of each center. Survival data from other countries would be different because of the difference in socioeconomical, demographic, educational, and clinical characteristics of patients. Though scattered reports are available from other parts of the country, they are hugely different possibly because of the difference in resource availability and practice patterns. Hence, we studied the survival and factors affecting survival of our elderly dialysis patient in unselected population. Being a retrospective analysis, it was true representation of the survival with existing practice.

We found median survival of elderly patients on dialysis was 26.6 months and was not different between hemo and PD and also similar between 65 and 70 years and >70 years. Our earlier analysis comparing young and elderly patients also showed survival of elderly dialysis patients as 25 months.[1] The survival has marginally increased over last 5 years. Survival from other parts of the country includes study by Chandrashekhar *et al*., where mean survival of patients on hemodialysis was found to be 19.2 months in a patient population of mean age of 49 years with 80% on twice a week hemodialysis.[2] This is very different from our experience of previously published survival analysis, where median survival of younger dialysis patients with mean age of 48 years was 79.6 months.[1] Another study from rural Karnataka showed 2-year survival of elderly dialysis patients of 26%[3] as against 63% in current study. If compared with international data, Latos *et al*. from USA showed a survival of 54% in their elderly dialysis patients[4] which is comparable to ours. They also reported 1 and 2 years survival of elderly dialysis patients as 71 and 54.3%. Another study from Canada, reported by Jassal *et al*. showed 1 and 3 years survival in elderly dialysis as 77.9 and 50.2%.[5] Our own study showed 1–3 years survival of 78, 63.8 and 23.6%. The differences in these survival data may be because of many factors like adequacy of dialysis, compliance, better serum albumin and possibly different sociodemographic profile of our patients. We ensure thrice a week hemodialysis and at least three exchanges of PD every day. All patients are monitored for adequate dialysis, and all attempts are made to achieve it. Compliance also may be a factor in adequate dialysis and survival. Our PD patients and elderly hemodialysis patients are fully compliant, but younger hemodialysis patients are compliant to 85% only. Rest 15% of younger HD patients tends to get 10 dialysis sessions every month (unpublished).

We did not find any difference in survival between the two modalities of dialysis or effect of "advancing" age in our elderly patients. The only significant factor determining

Table 2: Survival of elderly dialysis patients

Survival (%)	Overall	Elderly	Older	Hemodialysis	Peritoneal dialysis
1-year	78.9	78	79.8	81.3	77.4
2-year	63.9	63.8	62.8	73.9	54.2
3-year	25.2	23.6	26.9	35.9	13.9

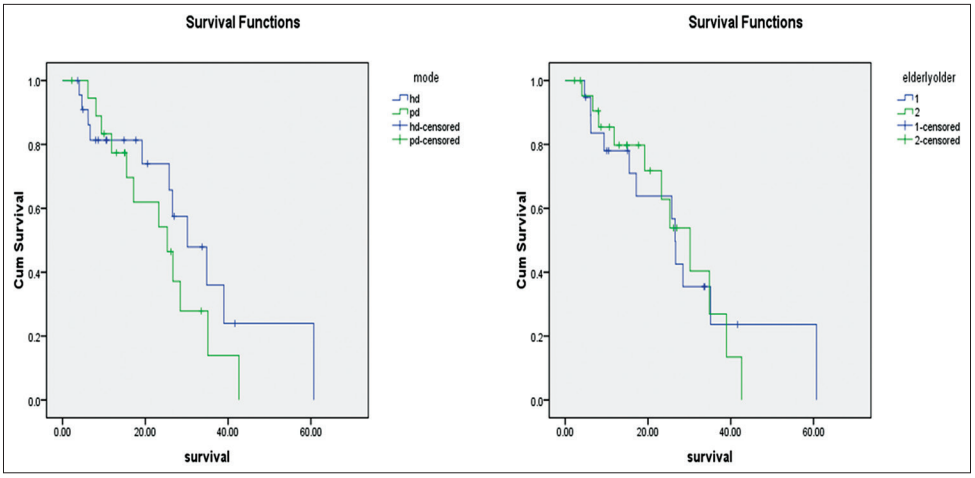

Figure 1: Kaplan–Meier curves depicting survival of different patient groups

survival in our study was diabetes. Similar results were seen by Verdalles *et al*., who found no difference with advanced age and modality.[6] Diabetes was associated with increased mortality in univariate analysis but finally, Charlson comorbidity index was the only factor related to mortality in multivariate analysis in their study population. Another study for Southeast Asian patients also had similar results with no difference between modality and diabetes as one of the risk factors for survival in dialysis patients.[7] A study from France in elderly PD patients showed no impact of diabetes or advancing age on survival.[8]

Besides regular demographic and biochemical factors, there are many other factors studied in relation to survival of elderly dialysis patients depending on patient characteristics and practice patterns. Timing of referral, access at the time of initiation of dialysis, number of comorbidities and comorbidity indices, volume control on dialysis, residual renal function in hemodialysis patients, polymedication, social isolation, etc,[8-10] which has impact on survival but were not looked into our study.

Limitations of our study are single center, small number of patients, and retrospective study of prevalent patients. However, in absence of the national registry, marked differences in practice patterns, this study gives an idea of survival of elderly Indian patients on dialysis and factors determining their survival. Further, large multi-center prospective or observational studies addressing survival as well as other parameters like quality of life, complications, comorbidities, practice pattern, etc., is required in future.

Conclusion

There is no difference between survival of elderly and older dialysis patients. Also, there is no difference in survival between elderly hemodialysis and PD patients.

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