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ORIGINAL ARTICLE

A Retrospective Study on Outcome of Hemodialysis in Elderly Diabetic Patients

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ABSTRACT

Background and Aim: Hemodialysis is a valuable treatment for elderly individuals progressing to chronic kidney disease (CKD). Globally, hemodialysis demand is increasing for elderly individuals as a life-sustaining therapy which might lead to prolonged suffering in geriatric patients. Therefore, the current study aimed to evaluate the outcomes of hemodialysis in elderly diabetic patients.

Methodology: This retrospective study was carried out on 64 type 2 diabetic patients admitted to the Dialysis Unit at Social Security Hospital, Multan Road Lahore from January 2021 to April 2022. Ethical approval was taken from the institution research and ethical committee. All the type 2 diabetic patients above 65 years age having CKD on dialysis were included. Patients having disease that require immunosuppressive treatment, history of malignancy, and those who died within three months of initial treatment were excluded. Patient's survival data and comorbidities such as cognitive, vascular, and autonomy were studied. Other comorbid conditions such as cerebrovascular disease, peripheral vascular disease (PVD), and coronary artery disease (CAD) were reviewed. SPSS version 25 was used for data analysis.

Results: Of the total 64 diabetes patients, there were 34 (53.1%) males and 30 (46.9%) females. The overall mean age was 68.9±3.1 years whereas dialysis mean duration was 28±22 months. Cognitive impairment, lost autonomy, and prior cerebrovascular accident had significant association with mortality rate reported as 7.8% per year. The incidence of fistula or graft, depression, dementia, died, and bedridden cases were 39% (n=25), 18.8% (n=12), 15.6% (n=10), 12.5% (n=8), and 14.1% (n=9) respectively. Of the 25 cases of fistula or graft, about 9.5% used catheter.

Conclusion: The present study found that mortality rate was 7.8% in elderly (>65 years) diabetes patients. The high mortality risk was substantially related with cognitive disorder, cerebral vascular accident, and lost autonomy. Generally, hemodialysis practice varies with the region's clinical pattern due to age variation in elderly patients.

Keywords: Hemodialysis, Chronic kidney disease, Elderly, Diabetes

INTRODUCTION

The rate of chronic kidney disease stage 5 (CKD5) is growing globally due to higher prevalence of cardiovascular disease, diabetes, and hypertension with an aging population [1]. Hemodialysis is a valuable treatment for elderly individuals progressing to chronic kidney disease (CKD). Globally, hemodialysis demand is increasing for elderly individuals as a life-sustaining therapy which might lead to prolong suffering in geriatric patients [2]. In Western countries, hemodialysis demand is increasing more swiftly in elderly patients compared to the younger population [3]. Based on statistics of the United States Renal Data System, the prevalence of ESRD is increasing among the population aged >65 years [4]. Mortality among elderly ESRD patients is high, as expected [5, 6]. Though, the dialytic patient's aging phenomenon is exacerbated by older dialysis patients more copious acceptance, improved dialysis patient survival, and limited access to treatment. Over the last five years, Nephrologists have practically detected an increase in the chronic kidney disease stage 5 (CKD5) among elderly patients [7]. Fewer studies showed that new dialysis patients are 48% >65 years age, with 51% survival rate within five years [8, 9].

The ideal renal therapy among elder patients varies and yet to be determined as the literature in this area is evolving. Nephrologists are debating regarding the dialysis withdrawal and conservative management concept because elderly patients are more susceptible to frailty varying degree and other comorbidities along with chronic kidney disease. In cases like that renal therapy might not be the suitable treatment option as it won't improve life's quality or survival [10, 11]. The end stage renal disease treatment is a complex process and their management varies among nephrologists. Dialysis prescription is similar in both elder and young population once hemodialysis is initiated. No conventional guidelines were found for hemodialysis practice among elderly patients. In our current study, we attempted to focus on elderly diabetic patients >65 years the most susceptible subgroup, with multiple comorbid conditions. The main goal was to investigate the patient's survival and its relationship to various comorbidities.

METHODOLOGY

This retrospective study was carried out on 64 type 2 diabetic patients admitted to the Dialysis Unit at Social Security Hospital, Multan Road Lahore from January 2021 to April 2022. Ethical approval was taken from the institution research and ethical committee. All the type 2 diabetic patients above 65 years age having CKD on dialysis were included. Patients having disease that require immunosuppressive treatment, history of malignancy, and those who died within three months of initial treatment were excluded. Patient's survival data and comorbidities such as cognitive, vascular, and autonomy were studied. Other comorbid conditions such as cerebrovascular disease, peripheral vascular disease (PVD), and coronary artery disease (CAD) were reviewed. Patient's demographic details, hemodialysis treatment, medical history, and laboratory findings were taken from the individual medical record. Self-administrated questionnaires were completed by each participant. Variation in systolic BP during (≥30 mm Hg) and after (<100 mm Hg) dialysis were referred to intradialytic hypertension.

SPSS version 25 was used for data analysis. Quantitative variables were expressed as mean and standard deviation whereas qualitative variables were described as frequency and percentage. Post-stratification chi-square test and fisher test were used for comparing different parameters with comorbidities of hemodialysis. P-value >0.05, <0.05, and <0.01 were considered as insignificant, significant, and highly significant respectively.

RESULTS

Of the total 64 diabetes patients, there were 34 (53.1%) males and 30 (46.9%) females. The overall mean age was 68.9±3.1 years whereas dialysis mean duration was 28±22 months. Cognitive

impairment, lost autonomy, and prior cerebrovascular accident had significant association with mortality rate reported as 7.8% per year. The incidence of fistula or graft, depression, dementia, died, and bedridden cases were 39% (n=25), 18.8% (n=12), 15.6% (n=10), 12.5% (n=8), and 14.1% (n=9) respectively. Of the 25 cases of fistula or graft, about 9.5% used catheter. Table-1 shows the baseline characteristics of all the participants. Gender distribution is illustrated in Figure-1. The incidence of different outcomes such as fistula, depression, dementia, and mortality are shown in Figure-2. Association of outcomes with different variables are shown in Table-II.

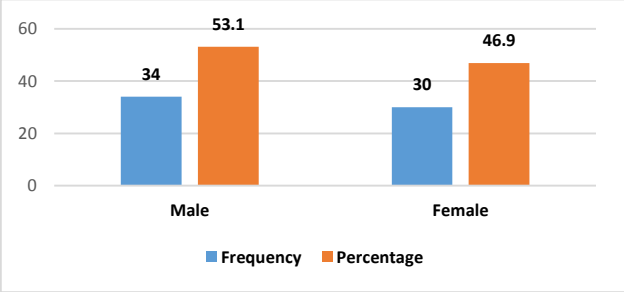

Figure-1: Gender's distribution (n=64)

Table-1: Baseline characteristics (n=64)

Variables	Frequency N (%)
Gender Male Female	64 (100) 34 (53.1) 30 (46.9)
Duration (months)	28±22
Hospital Stay (days) Median IQR	46.5 ± 37 [23 (8–29)]
Age (years)	68.9±3.1
No. of Admission Median IQR	5 ± 3 [5.3 (2–9)]

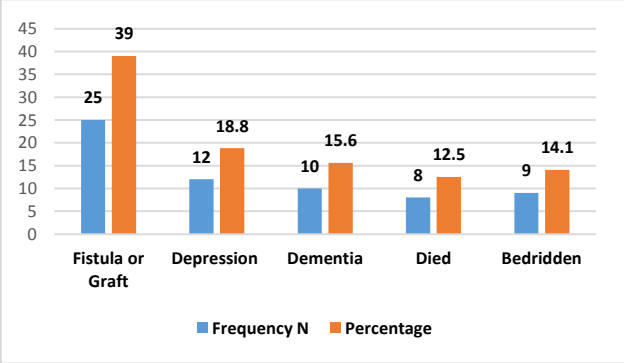

Figure-2: Incidence of different co-morbidities

Table-2: Association of outcome with different variables

Parameters	Outcomes (N (%)		x^2	P-value
	Normal	Dementia		
Gender				
M	27 (50)	6 (60)	0.2	>0.05 (NS)
F	27 (50)	4 (60)		
CVA (Cerebral vascular Accident)	23 (42.6)	10 (100)	Fisher	>0.05 (S)
PVD (peripheral vascular disease)	8 (14.8)	2 (20)	Fisher	>0.05 (NS)
Survival				
Alive	46 (82.1)	4 (50)	Fisher	>0.05 (S)
Expired	8 (14.8)	2 (50)		
Access				
Fistula	25 (46.3)	7 (12.7)	1.6	>0.05 (NS)
Graft	24 (	0		
Catheter		1 (12.5)		

DISCUSSION

The present study focused on outcomes of hemodialysis in elderly diabetes patients. The mortality rate reported was 7.8% in elderly patients mainly associated with comorbidities such as cognitive impairment, cerebral vascular accident, and lost autonomy. Renal replacement therapy is globally increasing accounting for 30% in end stage renal disease (ERSD). A significant challenge and higher cost of effective health care could demand special attention in geriatric population [12]. Generally, kidney disease worsen the mortality rates in elder patients. A previous study conducted on life expectancy after 70 years of age reported that individuals with age 75 to 79 years had 10.4 years life expectancy but participants with CKD5 had 2.6 years. Also, diabetes make it 25% less [13].

Stroke was found as a major factor in chronic kidney disease stage 5 among the general population. It has been observed that dialysis patients suffer 5-10 fold risk of stroke in hospital compared to non-CKD patients [14]. The mortality of both types short and long-term is significantly linked with stroke in CKD patients. A Japan based study reported that a higher mortality rate was found in chronic kidney failure patients with stroke compared to the general population [15]. Another study carried out in Taiwan on 5672 hemodialysis cases reported that 11.5% had a history of stroke and had increased risk 36% of mortality as compared to patients without stroke [16].

In older patients, different comorbid conditions such as cognitive impairment, cerebral vascular accident, and lost autonomy exist. The incidence of coronary artery disease (CAD) increased with advancement of age from 60 years to 75 years. The risk of CAD increased 3 times in patients above 75 years compared to patients under 50 years of age. Likewise, malignancies increase 3 to 18 times in elder patients compared to younger patients. All these findings were reported by epidemiological studies conducted on the incidence of malignancies and cardiovascular events increased with aging [17, 18]. Remarkably, the prevalence of dementia and neurological diseases were significantly higher due to culture difference in the diagnosis of these conditions [19].

Cognitive impairment has been identified as chronic kidney disease stage 5 post-complication. The incidence of cognitive disorders varies from 16% to 38% relying on the sample and impairment definition based on neuropsychological tests among elderly patients [20]. The poor outcomes of hemodialysis comes from dementia which increases the possibilities of hospitalization, dialysis withdrawal, death, and disability [21, 22].

As a whole hemodialysis clinical practice and prescription among elder patients varies from country to country. The average hemodialysis duration was about 15 minutes shorter in older patients whereas catheters of venous type were frequently used in old age patients compared to younger one. Upon the normalization between body weight and prescribed treatment time, hemodialysis becomes similar in all age group populations. The delivered dialysis dose were found similar measured by single pool Kt/V. Lower lean body mass, lower dry weight, and lower serum albumin could be the possible explanation for maintaining satisfactory dialysis dose among elderly patients [23].

In dialysis patients, the significance of autonomy and mobility could be emphasized. A previous study by De Marco et al [24] investigated 146 hemodialytic patients with follow-up duration of 30 months. It has been reported that all age adults undergoing hemodialysis had a higher incidence of frailty almost five times higher in community-dwelling older adults. Number of hospitalizations and mortality could be predicted by a strong parameter frailty regardless of the patient's age [25]. Another study established a bedside scoring system for predicting mortality among elderly hemodialytic patients [26]. Diabetic patients was given 1 point where highest score of 3 points was given to transfer due to its dependency.

The mortality of hemodialysis patients could be significantly predicted by vascular access. The risk of mortality increases 2-3 fold in patients using catheter as compared to those utilizing

arteriovenous access (graft or fistula). In the present study, no significant survival outcome was reported due to the small number of participants using catheter. For elderly patients worsening toward chronic kidney disease stage 5, hemodialysis is a best treatment option. Though hemodialysis plays a significant part as a life-sustaining therapy, it might lead to initiation and prolong suffering in elderly patients. Serious and chronic diseases such as uremia might be caused by hemodialysis which provides disease pathways in elderly patients [27]. In the present study, coronary artery disease (CAD) and peripheral vascular disease (PAD) were significantly associated with cognitive impairment. The reason could be a common pathological pathway establishing risk factors in traditional and nontraditional ways among CKD patients. The etiology of CKD patients was diabetes. Additionally, dialysis plays a substantial role in increasing risk and worsening vascular disease among elderly patients. A previous study reported that the coexisting of CAD or PAD as a vascular disease are significantly associated with higher risk of mortality among elderly patients undergoing dialysis [28].

CONCLUSION

The present study found that mortality rate was 7.8% in elderly (>65 years) diabetes patients. The high mortality risk was substantially related with cognitive disorder, cerebral vascular accident, and lost autonomy. Generally, hemodialysis practice varies with the region's clinical pattern due to age variation in elderly patients.

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