Original Article

Clinical and laboratory profile of patients with end-stage renal disease on maintenance hemodialysis: experience from a tertiary care center of Bangladesh

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ABSTRACT

Background: *Hemodialysis has become an increasingly safe and well tolerated therapy for patients with end-stage renal disease (ESRD). The aims of this study were to evaluate clinical and laboratory profile of the ESRD patients undergoing maintenance hemodialysis.*

Methods: *This cross-sectional study was carried out in the Department of Nephrology and Dialysis of BIRDEM General Hospital, Dhaka, Bangladesh from November to December, 2015. After taking informed consent from the patients, clinical data were taken from history and physical examination findings and laboratory data were collected from record books of the patients.*

Results: *Total patients were 107, male were 78 and female were 29. The mean age was 57.3 ± 11.4 years. Mean duration of chronic kidney disease (CKD) was 5.7 ± 4.2 years. Diabetic nephropathy was the most common (43%) cause of CKD. Maximum duration of dialysis was 6.5 years with mean of 1.73 ± 1.25 years. Over two-thirds (68.2%) of the patients were on thrice-weekly dialysis and rest (31.2 %) were on twice-weekly dialysis. In majority (91.6%) of the patients dialysis was initiated through temporary catheter. Eighty five percent of the patients were on anti-hypertensive medications. The mean pre-dialysis systolic and diastolic blood pressures were 151 and 85 mm Hg respectively and the mean post-dialysis systolic and diastolic blood pressures were 146 and 80 mm Hg respectively. Mean hemoglobin was 9.01 gm/dl, mean ferritin was 947.6 ìg/dL. Sixty five percent patients were on treatment for anemia, with either erythropoiesis-stimulating agent (ESA) or iron or both. Eighty five percent patients had been vaccinated against Hepatitis B virus. The mean serum calcium, phosphate and parathyroid hormone was 8.87 mg/dL, 5.69 mg/dL and 245.2 pg/mL respectively. About one-third (31.2%) patients had history of hospitalization in last six months and 23% patients had plan for renal transplantation.*

Conclusion: *Diabetic nephropathy was most common cause of ESRD. A temporary dialysis catheter was the most common initial vascular access. Near two-thirds patients were on thrice weekly dialysis. Our patients' blood pressures were controlled with medication but were mildly anemic and had mild mineral abnormality.*

Key words: *Anemia, clinical profile, dialysis, end stage kidney diseases, hypertension.*

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INTRODUCTION

Hemodialysis has become an increasingly safe and well tolerated therapy for patients with end-stage renal disease (ESRD). Nevertheless, life expectancy of dialysis patients remains significantly shorter than that of the general population with similar demographics.[1] There is also a high incidence of cardiovascular morbidity and mortality in this population.[2,3] Large, prospective, observational studies, including the Dialysis Outcomes and Practice Patterns Study (DOPPS)[4], and the United States Renal Data System Dialysis Morbidity and Mortality Wave 2 study[5,6] have provided important insights into the characteristics and likely prognosis of

haemodialysis patients. Mortality rates are high among dialysis patients and dialysis outcomes vary across facilities and countries.[6-10] The reported five-year mortality rates among patients with end-stage renal disease (ESRD) in Europe and Japan are 20–35%; lower than those reported for patients in the United States (US).[9] This observation remained the same even after controlling for factors like age and other co-morbidities. This variation in dialysis outcomes across different centers and countries raises the possibility of differences in treatment practices, contributing to the variation.[11] Dialysis outcomes can be modified by changes in dialysis practice. For instance, studies have shown that improved patient survival can be achieved with the use of higher dialysis dose and different types of dialysis membranes.[9-10,12] The aims of this study were to evaluate clinical and laboratory profile of the ESRD patient undergoing to hemodialysis, with special emphasis on cause of ESRD, anemia, hypertension, initial vascular access, current vascular access, calcium, phosphate, parathyroid hormone status, vaccination, hospitalization and plan for transplantation.

METHODS

This cross-sectional study was carried out in the Department of Nephrology and Dialysis of BIRDEM General Hospital, Dhaka, Bangladesh from November to December, 2015. A total of 107 patients of ESRD and on maintenance dialysis for at least >1 month were included in the study. Informed consent was obtained from the patients after full explanation. Patients were interviewed face to face during dialysis session and data recorded in a preformed questionnaire. Demographic data like age, sex were noted. Clinical records were reviewed to note down the frequency and duration of dialysis, duration of diabetes, hypertension and chronic kidney diseases, pre- and post-dialysis blood pressure, hemoglobin, calcium, phosphate status, vascular access, vaccination status, hospitalizations, and plan for transplantation. All necessary investigation reports were collected from patient's hospital record that was done from standard laboratory of the institute. Data were processed manually and analyzed with the help of statistical package for social sciences (SPSS) Version 20.0. Quantitative data were analyzed by mean and standard deviation. Qualitative data were analyzed as percentage. A probability value (p) of <0.05 considered as statistically significant.

RESULTS

Total numbers of patients were 107, male were 78 (72.9 %) and female were 29 (27.1%). The mean age was 57.3 ± 11.36 (range 32-80) years. (Table I) Mean duration of CKD was 5.74 ± 4.19 (range 1-20) years. About half (43%) of ESRD patients had CKD due to diabetic nephropathy. Other causes were shown on Table II.

Table I. Demography of the study population (N=107)

Characteristics	Value
Male/Female, n (%)	78 (72.9 %)/29 (27.1%)
Duration of hypertension	10.35± 7.94 years
Duration of chronic kidney disease	5.74 ± 4.19 years
Duration of dialysis	1.73 ± 1.25 years
Residence (Dhaka/outside Dhaka)	96.3%/3.7%

Table II. Causes of CKD of study population (N=107)

Cause	Frequency	Percentage
DM	46	43
DM + HTN	24	22.4
HTN	21	19.6
CGN	14	13.1
ADPKD	1	0.9
CAN	1	0.9

CKD: chronic kidney disease, DM: Diabetes Mellitus, HTN: Hypertension CGN: chronic glomerulonephritis, ADPKD: autosomal-dominant polycystic kidney disease. CAN: chronic allograft nephropathy

Maximum duration of dialysis was 6.5 years with mean of 1.73 ± 1.25 years. Seventy three (68.2%) of the patients were on thrice-weekly dialysis and 31.2% (n = 34) were on twice-weekly dialysis. The vascular access at initiation of dialysis was temporary catheter in 91.6% (n = 98) of study population and arterio-venous (AV) fistula in 8.4% (n = 9) of the study population. The current vascular access was native AV fistula in 90.7% (n =97) of the study population, and temporary catheters 4.7%, permanent catheter 3.7% and 0.9% Arterio-venous graft (Table III). Eighteen (16.8%) of the patients had a history of failure of AV fistula.

Table III. Vascular access at initiation and current vascular access among the study patients (N=107)

Vascular access	On first dialysis, n (%)	Current vascular access, n (%)
Temporary jugular catheter	33 (30.8)	1 (0.9)
Temporary femoral catheter	65 (60.7)	4 (3.7)
AV fistula	9 (8.4)	97 (90.7)
AV graft	-	1 (0.9)
Permacath	-	4 (3.7)

Mean duration of hypertension was found 10.35± 7.94 years (range 1-32 years).

The mean pre-dialysis systolic (SBP) and diastolic blood pressures (DBP) were151.50± 23.09 and 85.00± 710.16 mm Hg, respectively, and the mean post-dialysis systolic and diastolic blood pressures were 146.30± 19.47 and 80.79 ± 8.7 mm Hg, respectively. Eighty five percent (n = 91) of the patients were on anti-hypertensive medications. About half (n=41, 45.1%) of those taking antihypertensive medication were on three anti-hypertensive drug, 9.9% (n = 9) were on single drugs, 22% (n = 20) were on two drugs and 13.2% (n = 12) were on four drugs, 9.9 % (n= 9) on five drugs for the treatment of hypertension.

Ninety one (85%) of the patients were vaccinated against hepatitis B but only 59 (64.8%) patients anti HBs titer were checked. Mean anti HBs titer was 232 IU/l. Mean hemoglobin of the study patients was 9.01 gm/dl (range 6.3-11.4 gm/dl). About 48% (n= 51) patients were evaluated for iron stores. Mean iron was 10.20 ìg/dL and mean ferritin was 947.6 µg/dL. Sixty five percent patients were on treatment for anemia, with either erythropoiesis-stimulating agent (ESA) or iron or both. The mean values of serum calcium, phosphorous in the study population were 8.87 ± 1.08 mg/dL, 5. 69 ± 1.67 mg/dL, respectively. Fifty-four percent patients were evaluated for iPTH and mean value was found 245.20±144.17 pg/ml.

Thirty four (31.2%) of the patients gave a history of hospitalization within the last six month. Of these, 41.2 % (n = 14) were admitted for acute left ventricular failure, 20.6 % (n = 7) for pneumonia, and 11.8% (n=4) for catheter-related sepsis. Near one fourth (23.4%) of the study population had plan for future renal transplantation.

DISCUSSION

In this study mean age was 57.3 ± 11.36 years. This result was correlated with Telles CT et al. they reported that mean age of study patients was 53.5 (± 16.3) years.[13] About half (43%) of ESRD patients had CKD due to diabetic nephropathy, 22.4% both diabetes mellitus and hypertension, 19.6% hypertension, 13.1% CGN in this study but Rafael Perez-Garcia R et al. found diabetes mellitus 26%, hypertension 17%, CGN 11% as a cause of chronic kidney diseases.[14] Kulkarni MJ et al. in sharp contrast to other studies, found 50% of their study population had ESRD of unknown etiology. Diabetic nephropathy, which is the most common cause of ESRD worldwide, accounted for 20% of cases in their study.[11] In this study about 68.2% of the patients were on thrice-weekly dialysis and 31.2% were on twice-weekly dialysis which correlated with the findings of Kulkarni et al. who found about 77% of the patients were on thrice-weekly dialysis and 23% were on twice-weekly dialysis.[11] But Perez-Garcia R et al. found in ANSWER study 97% patient on thrice weekly hemodialysis.[14]

In this study, we found the vascular access at initiation of dialysis was temporary catheter in 91.6% of patients and arterio-venous (AV) fistula in 8.4% of the patients which was correlated with findings of Kulkarni MJ et al. who found 90% of CKD patient initiate dialysis with temporary catheter and only 10% patient with AV fistula in India.[11] But Perez-Garcia R et al. found 16% patient initiate dialysis permanent catheter, 30% with temporary catheter, 51% with AV fistula, and 2% with AV graft.[14] In the present study the current vascular access was native AV fistula in 90.7% of the cases and temporary catheters 4.7%, permanent catheter 3.7% and 0.9% arterio-venous graft, Kulkarni MJ et al. also found same findings.[11] About 16.8% of the patients had a history of failure of AV fistula but Kulkarni MJ et al. found higher rate (33%) fistula failure.[11]

In the current study, the mean pre-dialysis systolic and diastolic blood pressures were 151.50± 23.09 and 85.00± 10.16 mm Hg, respectively Perez-Garcia R et al. in ANSWER study found mean SBP (mmHg) (SD) 140.5 (21.7) mean DBP (mmHg) (SD) 75.4 (12.2).[14]

Eighty five percent of the patients were on anti-hypertensive medications in our study which correlated with findings of Kulkarni MJ et al. About half (45.1%) of those taking antihypertensive medication of the patients were on three anti-hypertensive drugs, 9.9% were on single drugs, 22% were on two drugs and 13.2% were on four drugs, 9.9 % on five drugs for the treatment of hypertension but Kulkarni MJ et al. found 50% patient on single antihypertensive medication and no patient on five antihypertensive medications.[11]

This study found about 85% of the study populations had been vaccinated against hepatitis B which was lower than Kulkarni MJ et al. found (93%) in their study.[11]

In our study we found mean hemoglobin of the study patients was 9.01 gm/dl which correlated with the findings of Kulkarni MJ et al. in Indian population .[11] According to the dialysis outcomes and practice patterns study (DOPPS), the mean hemoglobin in the US dialysis population is 11.41 g/dL.[18] About 47.7% patients were evaluated for iron stores which was much higher than Kulkarni MJ et al. found (14%) in their study.[11] Mean ferritin was 947.6 ìg/dL which was higher than that found by Kulkarni MJ et al. from India who found 828.65 ìg/dL[11] and US, 568.13 ìg/dL.[15] and 236 ìg/dL in ANSWER study in Spain.[14] Sixty five percent patients were on treatment for anemia, with either erythropoiesis-stimulating agent. (ESA) or iron or both. Kulkarni MJ et al. found eighty-two percent of the patients were on both ESA and intravenous (i.v.) iron.[11]

The mean serum calcium, phosphorous and parathyroid hormone levels of the study population were 8.87 mg/dL, 5.69 mg/dL and 245.20 pg/mL, respectively, while in the US they were 8.97 mg/dL, 5.24 mg/dL and 366.85 pg/mL, respectively[15] and in Indian population 8.09 mg/dL, 4.97 mg/dL and 312.27 pg/mL, respectively.[11]

In this study we found 31.2% of the patients had history of hospitalization within the last six month. Of these, 41.2 % were admitted for acute left ventricular failure, 20.6 % for pneumonia and 11.8% for catheter-related sepsis but Kulkarni MJ et al. found 24% had history of hospitalization and of these, 20% were admitted for catheter-related sepsis and 15% for hypertension.[11]

Conclusion

Our study found that diabetic nephropathy was most common cause of ESRD. Temporary dialysis catheters are the most common initial vascular access. Near two-thirds patients were on thrice weekly dialysis and less than one-tenth patients started dialysis with arterio-venous fistula. Although our patients' blood pressure was controlled but were mildly anemic and had mild mineral abnormality.

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