Original Article

Clinical Profile of End Stage Renal Disease Patients Undergoing Hemodialysis in a Tertiary Care Hospital of Nepal

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Abstract

Background: Maintenance hemodialysis is a popular treatment modality of renal replacement therapy for end stage renal disease patients. The clinical profile of end-stage renal disease (ESRD) and dialysis in Mid Western Nepal are scarce. This study aimed to study the clinical profile of ESRD patients undergoing hemodialysis at the tertiary care Hospital.

Methods: This study was a single center based cross sectional observational study carried out over a period from 15th December 2022 to 15th February 2023 in Department of Medicine. A total of 40 patients undergoing maintenance hemodialysis were enrolled in the study. Data about Socio demographic profiles , clinical data, duration of chronic kidney disease (CKD), major comorbidity, the presumed etiology of ESRD, duration of haemodialysis, laboratory parameters including Renal function tests etc were entered in MS Excel and analyzed through SPSS 21.

Results: A total of 40 patients were enrolled in the study. Males were 25(62.5%) and females were 15(37.5%). The mean age of the patient was 45.75±15.2 years. The most common cause of end stage renal disease and reasons for admission were hypertension nephropathy 36(90%) and Type 2 diabetes mellitus 9(22.5%) respectively. Anemia was the most common hematological findings in ESRD patients (>90%) followed by hypocalcemia in 65%.

Conclusions: Hypertensive nephropathy was the commonest cause for CKD followed by diabetic nephropathy and glomerulonephritis. Early detection and effective management of these illnesses can delay the onset, progression of CKD to end stage and subsequent morbidity and the requirement of renal replacement therapy.

Introduction

Chronic kidney disease (CKD), a continuum of kidney disease ranging from mild kidney damage to end-stage renal disease (ESRD) is a major public health problem worldwide associated with increased morbidity and mortality.[1] ESRD is the most advanced stage of CKD when the kidneys can no longer maintain homeostasis of the body and the patient depends on dialysis or kidney transplant.[2]

Diabetes mellitus is the leading cause of CKD followed by hypertension. Other causes include glomerular disease, cystic kidney disease, tubulointerstitial disease, obstructive uropathy, vascular diseases, recurrent renal calculi disease, congenital defects of kidney or bladder, autoimmune diseases like systemic lupus erythematosus, rheumatoid arthritis, Wegener granulomatosis.[3] Various institutional studies of Nepal have shown hypertension and diabetes as the major causes of CKD with a prevalence of 24.5% and 5.8% respectively.[4]

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In Nepal, hemodialysis service was started in 1987 and since then ESRD patients continue to rise and die prematurely due to poor health care system, lack of dialysis service centers and its cost.[5] The prevalence of CKD in Nepal is 6.0% among the general population and as high as 27.6% among high-risk populations.[4] Data of end stage renal disease patients in this region is very few thus we aimed to study the clinical profile of such patients undergoing haemodialysis at Bheri Hospital Nepalgunj.

Methods

This was a cross-sectional observational study conducted in the haemodialysis unit of department of Medicine of Bheri Hospital Nepalgunj during 15th December 2022 to 15th Feb 2023. Convenient sampling method was used and included all ESRD patients undergoing haemodialysis for at least three months. The ethical clearance for the study was taken from the Nepal Health Research Council (Reg. No: 1060) before starting the study. Written and informed consent was taken from all the participants. The socio-demographic characteristics, details of haemodialysis and laboratory parameters of patients were collected. The data was entered in Microsoft Excel of windows 10 and analysis was done by statistical software SPSS version 21. Descriptive analysis was done and results were expressed as percentages, ratios and mean values.

Results

A total of 40 patients were enrolled in the study. There were 5(62.5%) males while females were 15(37.5%) with male is to female ratio of 1.6:1.The mean age of the patient was 45.75±15.2 years. Around half of the patients were in the age group 25 to 44, this indicates that chronic kidney disease has been affecting the economically active population. This would have a significant socioeconomic impact in the community and nation as a whole. The baseline characteristics of the ESRD patients on maintenance hemodialysis. Table 1.

Table 1. Baseline characteristics of ESRD Patients

Baseline Characteristics		Frequency n(%)
Gender	Male	25(62.5)
	Female	15(37.5)
Age group	15-24	2(5)
	25-44	18(45)
	45-74	19(47.5)
	≥ 75	1(2.5)
Duration of dialysis	1 to <3years	35(87.5)
	3 to <5 years	5(12.5)
	≥ 5 years	0
Hours of dialysis per week	4 hours	1(2.5)
	8 hours	37(92.5)
	12 hours	2(5)
Regular use of erythropoietin	yes	36(90)
	No	4(10)

Mean: 45.75 SD: 15.20

Table 2. Etiology of Chronic kidney disease N=40

Etiology of chronic kidney disease	Frequency n(%)
Hypertensive nephropathy	36(90)
Diabetic nephropathy	9(22.5)
Chronic glomerulonephritis	2(5)
Obstructive uropathy	2(5)
Unknown	1(2.5)

Table 3. Clinical signs and symptoms of End stage renal disease

Clinical signs and symptoms of End stage renal disease	Frequency n(%)
Pedal oedema	12(30)
Breathlessness	14(35)
Anorexia	22(55)
Nausea/ Vomiting	18(45)
Muscle weakness	17(42.5)
Oliguria	32(80)
Hypertension	36(90)
Pleural effusion	2(5)
Weight loss	21(52.5)
Joint pain	24(60)
Abdominal pain	8(20)
Altered sensorium	2(5)
Tingling,numbness or burning sensation	19(47.5)
Dryness of skin and pruritis	21(52.5)

Table 4. Hematological profile of ESRD patients

Hematological Parameters		Frequency (n)
Hemoglobin	≤6gm/dL	7(17.5)
	>6 to 10gm/dL	29(72.5)
	>10gm/dL	4(10)
Serum sodium	125 to 134meq/dL	0
	135 to 149meq/dL	40(100)
	≥ 150meq/dL	0
Serum potassium	<3.5meq/dL	4(10)
	3.5 to 5.4meq/dL	24(60)
	≥5.5meq/dL	12(30)

Serum calcium	< 8.5mg/dL	26(65)
	8.5 to 10.4mg/dL	14(35)
	≥10.5mg/dL	0
Serum phosphorus	< 2.5mg/dL	2(5)
	2.5 to 4.4mg/dL	27(67.5)
	≥4.5mg/dL	11(27.5)
Serum uric acid	<3.5mg/dL	1(2.5)
	3.5 to 7mg/dL	30(75)
	>7mg/dL	9(22.5)
Serum urea (mg/dl)	<50	1(2.5)
	50-150	16(40)
	150.1-250	23(57.5)
Serum creatinine (mg/dl)	<5	8(20)
	5.1-12	30(75)
	>12	2(5)

Discussion

The present study enrolled 40 patients under maintenance hemodialysis. The male to female ratio was 1.6:1. The male predominance in ESRD patients were similar to the study done at a medical college in Chitwan, Nepal.[6] Similar findings were noted in the studies from India.[7,8] However it was 2:1 in another similar study from India.[9] This was much higher than our study. Male predominance in various studies may be due to the paterchiarchial society and health seeking behavior of males are greater than females. The mean age of the patients was 45.75 ±15.20 which was similar with the studies from India.[9,10] A Study from chitwan Nepal had mean age of 52 ±15 which was also comparable to our study.[6] Comparable number of patients are in age group 25-44 and 45-74. More younger population are getting chronic kidney disease.

Diabetes and hypertension are the leading cause of chronic kidney disease.[3] In the present study 90% of the patients cause of ESRD was hypertensive nephropathy followed by diabetes in 22.5%. This finding was similar to the study from Nepal and India.[9,11,12] However numerous studies from Nepal and abroad noted diabetes as the leading cause for CKD.[6,8,10] In another study, it was found that diabetic nephropathy (32.0%), hypertensive nephropathy (20.0%) and chronic glomerulonephritis (10.0%) to be the most common etiology of CKD.[13] Similarly study also revealed diabetic nephropathy (31.2%) and hypertensive nephropathy (12.8%) to be the most common aetiologies of CKD.[14]

The most common systemic manifestations in our study were hypertension (90%), oliguria (80%) followed by joint pain (60%), anorexia (55%), weight loss (52.5%), dryness of skin and pruritus (52.5%), nausea/vomiting (45%), muscle weakness (42.5%), breathlessness (35%) and pedal edema (30%). Hypertension was found in 92% in a study from kathmandu[4] and 84% from a study in china.[15] Gastrointestinal system involvement in 81.5% patients, excretory system manifestations in 85% of patients.[15] Most common system wise manifestations were related to excretory system and due to fluid overload 82% each, followed by cardiovascular system (76%), Musculoskeletal System (74%), Gastrointestinal System (70%), Respiratory System (32%) and Nervous System (22%).[13] The most common symptom in patients from this study group was pedal oedema (59.2%), followed by anorexia (53.1%), breathlessness (30.7%), nocturia (27.7%), and weakness (25.4%).[8]

Our study showed hypertension as the most common sign. Hypertension is due to sodium dysregulation, increased sympathetic nervous system and alterations in renin angiotensin aldosterone system activity. Oliguria was the most common symptom which could be due to the reduction of renal mass and fluid restrictions to overcome fluid overload presenting in the form of pedal edema. Anorexia is due to accumulation of toxic substances of metabolism which suppress appetite in CKD patients. Joint pain is due to renal osteodystrophy in CKD patients and hypocalcemia. Pedal edema is due to loss of ability of the kidney in fluid management. It may be due to cardiac failure, hypoalbuminemia or protein energy malnutrition. Muscle weakness and lack of endurance could be caused by uremic myopathy resulting in a sedentary lifestyle, which leads to progressive deconditioning. Breathlessness that could be due to congestive heart failure, anemia, underlying chronic lung disease or dialyzer bio-incompatibility, sodium and fluid overload.

Hemoglobin levels were below 10 gm/dl in 90% of the patients. This was similar with the study from India.[7] A study among 863 patients of ESRD had hemoglobin less than 10 gm/dl. In 90%.[16] A study from Nepal had 78.3% of anemia among ESRD patients.[4] Lower hemoglobin may result from the loss of erythropoietin synthesis in the kidneys and or the presence of inhibitors of erythropoiesis.[16] The severity of anemia in chronic kidney disease is related to the duration and extent of kidney failure. Onset and severity of anemia are related to the levels of GFR; below a GFR of 60 ml/min/1.73m2, there is a high prevalence of anemia. It was observed that more patients were anemic as the GFR stage progresses.[8] The prevalence of anemia was high in our study/. This may be due to various factors like not being able to get erythropoietin analogs in adequate doses, micronutrient deficiencies, iron deficiency or resistance to erythropoietin stimulating agents. Most of the CKD patients were from low socioeconomic backgrounds, which was the major factor for not being able to use erythropoietin analogs adequately. Therefore the patients rely on frequent blood transfusions for correction of anemia.

The incidence of Hyperkalemia was 30% in our study which shows the need for the early detection and management of this dangerous complication. Similar study from india had hyperkalemia in 34%.[13] Our finding was also consistent with the findings from a study from china, hyperkalemia of 28.9%.[15] Despite of regular hemodialysis and treatment of constipation, hyperkalemia remained persistent which must be due to be excess dietary intake of potassium. Several drugs like Renin-Angiotensin-Aldosterone System (RAAS) inhibitors, β2-adrenergic receptors blockers, and cardiac glycosides also elevate serum potassium levels. A state of metabolic acidosis in such patients also promotes the extracellular shifting of potassium. Hypocalcemia was 65% in the present study. This was consistent with the study with hypocalcemia of 52%.[13] However another study had hypocalcemia of 17.7%.[8] High percentage of patients with hypocalcemia in this study can be explained as lack of proper use of calcium supplements and activated vitamin D from the early stages of CKD.

Hyperphosphatemia was 27.5%in the present study. A study noted only 3.1% patients to have hyperphosphatemia.[8] Our finding was much more than expected. This could have been due to excess dietary phosphate intake and inadequate use of phosphate binders in patients amongst the study group. This leads to cardiovascular calcification, metabolic bone disease and development of secondary hyperparathyroidism in patients of chronic kidney disease.[17] Patients

must be counseled regarding dietary restriction of phosphates and use of phosphate binders to correct hyperphosphatemia. Hyperuricemia was found to be in 22.5% of ESRD patients. These patients were not on regular treatment or not taking any uric acid lowering medications at all.

Conclusion

Hypertensive nephropathy was the most common cause for CKD followed by diabetic nephropathy and glomerulonephritis. Diabetes and hypertension including other risk factors should be managed optimally to prevent and delay the progression to CKD. Prevention strategy only can help to decrease the morbidity related to CKD and eventually prevent in landing into end stage renal disease, requiring maintenance hemodialysis or renal transplant.

Conflict of Interest: None.

Acknowledgement: None

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