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Epidemiological Profile of Patients of End Stage Renal Disease (ESRD) for Hemodialysis (HD) at Tertiary Care Rural Hospital of Subhimayalian Region of India

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Abstract: ***Background: Mostly, end organ damage becomes the reason for morbidity and mortality among patients with non-communicable diseases (NCDs) due their chronicity. Derangement of renal function along with brain and heart damage considered to be a significant problem of NCDs. Objectives: this background, ESRD as a common complication for common NCDs, present study planned to study the distribution of responsible NCDs. Methods: Over three year period, all the cases reported GFR <15ml/min/1.73m2 were studied. Results: Total 100 patients (Male: 65) were studied with mean age of 51.0+_13.0 years. Diabetes Mellitus (38.0%), Hypertension (28.0%), and glomerulonephritis (16.0%) were three leading cause for ESRD. Idiopathic cause was observed among 12.0% patients. Fifteen percent patients could not survive. Conclusion: NCDs mainly Diabetes mellitus and hypertension observed to be most common cause for ESRD.***

Keywords: ESRD, GFR, Diabetes, Hypertension

1. Introduction

Ongoing epidemiological transition as a consequence of economic and social changes has brought non communicable diseases (NCDs) upfront, so do their complications as a common cause of mortaltiy.[1] Chronic Kidney Disease (CKD) is a global problem, as estimates showed that diseases of kidney and urinary tract contribute to about 850,000 deaths/ year and 115,010,107 disability adjusted life years (DALYs). It considered being a 12th and 17th cause of death and disability respectively. Patients with CKD are at high risk for cardiovascular disease (CVD) and cerebro-vascular disease (CBVD), and they are more likely to die of CVD than to develop end-stage renal disease (ESRD). Moreover, patients with CVD often develop CKD during the course of their disease.[2] Routine screening of CKD offers early detection and treatment of CVD and CBVD as a cause of death. Based on estimates, both rural and urban areas of India as a largest contributor for NCDs[1,3,4] expects 25-40% cases of CKD and so ESRD. It was estimated that every year about 100,000 incident cases of ESRD requires renal replacement therapy.[5-8] As estimated by the NHANES (National Health and Nutrition Examination Survey) of United states, the burden of CKD is at least12 times more than of ESRD. In India, earlier, Glomerulonephritis and interstitial nephritis were reported as predominant causes[9] with diabetes and hypertension responsible for 28.5% and 16.2% respectively. (CKD registry)[10] Evidence from a community based study showed diabetes, hypertension and chronic glomerulonephritis accounted for 41%, 22%, and 16% of cases of CKD, respectively.[11] Haemodialysis (HD) as a mainstay treatment for ESRD observed highest in Japan and Unites States.[12,13] The underlying profile of patients with ESRD could differ in different circumstances, regular analysis of such data can serve as a proxy for changing trend of NCDs in community. With this background present study was planned to study the patients with ESRD.

2. Materials and Methods

Prospective study was carried out in Haemodialysis (HD) of a tertiary care rural hospital of Himachal Pradesh from 1st January 2011 to 31st March 2014. All patients with ESRD which met the inclusion criteria with glomerular filtration rate (GFR) of <15.0ml/min/1.73m^2. Cockcroft-Gault equation was used in most of the patients for estimation of creatinine clearance. Baseline blood investigations such as haemoglobin (Hb), blood urea, serum creatinine (creat.), serum sodium (Na) potassium (K), phosphorus (P), intact prothrombin (I-pth), Hepatitis B Surface antigen (HBsAg), Anti HCV and HIV I and II were carried out in all patients.

3. Results

During the study period one hundred patients (Male: 65) were included in the study with the mean age of 51.0 years (Standard Deviation (SD): 13.0; range: 20-80 years). DM was the leading cause of ESRD (38%) followed by HTN (28%), idiopathic (12%) and glomerulonephritis (GN) (16%). Other causes were obstructive uropathy (5.0%), and polycystic kidney disease (PKD) (1%). Baseline biochemical assessment showed deranged renal function, average Hb was observed less among patients with DM, HTN and GN, raised serum urea GN and HTN, high creatnine levels in Obstructive uropathy, HTN and GN. High mean level of serum Na and low level of K was observed in obstructive uropathy followed by HTN. I-pth was observed high in GN, HTN and DM (Table: 1)

Table 1: Biochemical assessment of patients with End Stage Renal Disease (ESRD) at tertiary care rural hospital of Himachal Pradesh, India, 2011-2014

Disease	Hb(g/dl)		Urea(mg/dl)		Creat		Na(meq/lt)		K (meq/lt)		Phos (mg/dl)		I-pth (pg/ml)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
DM (n=38)	7.4	1.9	124.4	15.7	9.7	2.6	134.3	5.7	4.6	0.9	5.4	1.3	122.9	27.9
HTN (n=28)	7.4	1.8	127.5	11.5	10.2	2.6	137.6	6.7	4.9	0.8	5.5	1.3	130.2	58.7
GN (n=16)	7.3	1.6	128.4	10.2	10.3	2.4	134.4	6.7	4.7	1.0	5.4	1.5	138.5	58.0
Idio (n=12)	7.9	2.2	126.0	11.8	10.4	2.9	133.3	5.7	4.3	1.0	5.8	1.6	121.1	37.0
Obs.uro (n=5)	8.2	1.6	124.8	13.6	12.6	4.1	136.2	1.4	5.3	0.5	5.3	0.5	115.0	52.7
PKD (n=1)	9.0	0	124.0	0	9.0	0	129.0	0	3	0	3.0	0	123.0	0
All (n=100)	7.5	1.8	125.0	13.2	10.2	2.7	135.2	6.1	4.7	0.9	5.5	1.3	131.5	49.2

DM (Diabetes Mellitus), HTN (Hypertension), GN (Glomerulonephritis), Idio (Idiopathic), Obs. (Obstructive Uropathy), PKD (P olycystic Kidney D isease)

Table 2: Biochemical assessment of patients with End Stage Renal Disease (ESRD) at tertiary care rural hospital of Himachal Pradesh, India, 2011-2014

Laboratory Values	DM N (%)	HTN N (%)	GN N (%)	Idio N (%)	Obs. N (%)	PKD N (%)	All N (%)
Hb </=7g/dl	17 (39.5)	13 (30.2)	7 (16.3)	4 (9.3)	2 (4.7)	0 (0.0)	43 (100)
Na >145meq/lt	3 (23.1)	7 (53.8)	2 (15.4)	0 (0.0)	1 (7.7)	0 (0.0)	13 (100)
Na=135-145 meq/lt	10 (29.4)	10 (29.4)	6 (17.6)	5 (14.7)	3 (8.8)	0 (0.0)	34 (100)
Na <135 meq/lt	25 (47.2)	11 (20.8)	8 (15.1)	7 (13.2)	1 (1.9)	1 (1.9)	53 (100)
K>5 meq/lt	11 (39.3)	8 (28.6)	5 (17.9)	2 (7.1)	2 (7.1)	0 (0.0)	28 (100)
K=3.5 -5 meq/lt	24 (38.1)	17 (27.0)	10 (15.9)	9 (14.3)	3 (4.8)	0 (0.0)	63 (100)
K<3.5 meq/lt	3 (33.3)	3 (33.3)	1 (11.1)	1 (11.1)	0 (0.0)	1 (11.1)	9 (100)
Pho>4.5mg/dl	32 (38.1)	24 (28.6)	13 (15.5)	10 (11.9)	5 (6.0)	0 (0.0)	84 (100)
Pho=2.5-4.5 mg/dl	6 (37.5)	4 (25.0)	3 (18.8)	2 (12.5)	0 (0.0)	1 (6.3)	16 (100)
I-pth >54pg/ml	36 (37.9)	28 (29.5)	15 (15.8)	11 (11.6)	4 (4.2)	1 (1.1)	95 (100)
I-pth=11-54 pg/ml	2 (40.0)	0 (0.0)	1 (20.0)	1 (20.0)	1 (20.0)	0 (0.0)	5 (100)

When assessed, hyponatremia observed among 53.0% and hperkalemia in 28.0% patients. Raised phosphorus was observed among 84.0% patients. Almost all (95.0%) patients observed with raised I-parathormone levels and almost half (43.0%) patients observed with severe anaemia. Hyponatremia was observed among mostly among diabetics (47.2%), whereas, hperkalemia in diabetes (39.3%) and hypertension (28.6%). Severe anaemia was observed in 39.5% diabetics and 30.2% hypertensives. (Table: 2)

Table 3: Peripheral blood smear picture of anaemia among patients with End Stage Renal Disease (ESRD) at tertiary care rural hospital of Himachal Pradesh, India, 2011-2014.

Disease	Normocytic normochromic anemia(g/dl)	Microcytic hypochromic anemia(g/dl)	Dimorphic Anemia (g/dl)
DM(n=38)	56.9	31.9	11.5
HTN(n=28)	61.3	29.6	9.1
GN(n=16)	50	43.75	6.25
Idio(n=12).	57.3	33.3	9.3
Obs. (n=5)	60.0	40.0	00.0
PKD(n=1)	100.0	00.0	0 0.0
All(n=100)	63.0	31.0	6 .0

Anaemia was present in 85.0% of the population. In 58.0% of the anaemic patients blood was transfused to correct anaemia and only 42.0% of the anaemic patients were treated with erythropoietin. Among anaemic, 63.0% of patients had normocytic normochromia, 31.0% had microcytic hypochromic anaemia, and rest had dimorphic anaemia (Table: 3). Total 8 patients underwent renal transplantation and 15 patients died.

4. Discussion

Burden of ESRD, which is a common reason for morbidity and mortality along with CVD and CBVD is a common complications for mostly chronic diseases.[1,3] Patients with end stage complications reflects almost died individuals but survived on availability of treatment. Such cases reflect a surrogate marker for mortality due to chronic diseases. Due of long standing nature of chronic diseases and treatment availability patients reports at end stage of their lifetime. Current study observed most patients of 50- 60 year of age with average age of 51 years, which is more as compare to observed average age of 43 years.[14,15] In developed world, the mean age for CKD was observed as between 60-63 years.[16] This variation observed for differential in availability and accessibility of diagnostic and treatment facilities for early detection of NCDs and their complications. This study also shows that patients seek medical management late in the course of the disease which is evident from the baseline blood

parameters which were already deranged significantly at the time of admission.

Current study observed DM (38.0%) and HTN (28.0%) as two most common NCDs as a leading cause of CKD, where as a study from Nepal observed chronic glomerular disease was most common cause of chronic renal failure (36.0%) while HTN was 29.0%, diabetes mellitus was 9.0%, obstructive uropathy was 11.0%.[17] Studies from other parts of country show Diabetes[18]and Chronic GN[14,15,17] as leading causes. The aetiology of CKD depends upon precision in diagnostic facilities and underlying lifestyle and dietary pattern of the population.

Anaemia is an important complication of chronic disease which is very common in patients with CKD. There are many factors which contribute to anaemia and one of them is lack of erythropoietin. Anaemia is also responsible for the reduced quality of life of CKD patients, development of left ventricular hypertrophy and exacerbation of left Ventricular dilation and hypertrophy. So the correction of anaemia is very important as it reverses most of the cardiovascular abnormalities. It also improves quality of life, sleep pattern, nutrition, sexual function, menstrual regularities, immune responsiveness and platelet function.[19,20] In our study around 85.0% were anaemic with average haemoglobin level of 7.4 gm%. In western countries correction of anaemia is done with erythropoietin only[21] but in India and other developing countries as shown by this study it done mainly with blood transfusion. This is due to non-affordability of cost for erythropoietin by the patients.[22] Due to financial barriers current study observed that only 20.0% of the patients were able to continue once a week (HD) Such situation was observed in resource poor setting like in Nepal where only 22.0% afford to continue HD.[17]

Though, a patient can be maintained with HD for a long time, after renal transplant patient can lead a near normal and independent life[23] Even though transplantation is the best modality of renal replacement therapy worldwide[24], only 8 patients in current study able to afford it due to financial constraints. Lack of kidney transplantation service in the country and expensive cost per and post transplantation could be the major contributors to less number of kidney transplantation. Fifteen deaths in current study was observed due to long standing nature of HD and renal transplantation observed as a distant remedy for a rural population with cost constraints with significant NCDs burden.

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