Original Research Paper

Medicine

A study of clinical features and hematological profile of patients of End Stage renal disease on Dialysis.

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ABSTRACT Chronic kidney disease(CKD) is defined as an absolute reduction in glomerular filtration rate below 60 ml/min/1.73 m2 for 3 months or more, with or without other evidence of kidney damage or the presence of kidney damage for 3 months or more, as evidenced by structural or functional abnormalities of kidney, with or without reductions in GFR.
End stage kidney failure denotes CKD that necessitates kidney replacement therapy (dialysis) or kidney transplantation. Patients with ESRD who require renal replacement therapy (RRT) will have to be maintained on either hemodialysis(HD) or peritoneal dialysis(PD).
Aims and Objectives
1- To study various clinical features in patients with ESRD on HD or PD
2- To compare hematological parameters in patients of ESRD on HD or PD
Materials and methods- This prospective study was conducted in 34 patients of ESRD in Department of Medicine, Bhabha Atomic Research Centre And Hospital, Mumbai from July 2007 to July 2010.All patients of ESRD who were either on HD or PD were selected. These patients were subjected to thorough clinical examination and laboratory investigations.Statistical analysis was performed with software SPSS version 15.
Conclusion- ESRD has wide clinical and hematological spectrum. Thorough clinical assessment and detail lab investigations are vital for staging and prognosis. Findings of pedal edema, oliguria, dyspnea and anemia are commonly seen in this study.

KEYWORDS : End stage renal disease (ESRD), hemodialysis(HD), peritoneal dialysis(PD).

Introduction:

End stage renal disease may be associated with protean disease complications. However complications related to cardiovascular system, bone and mineral metabolism and hematological system are of greatest significance.

Chronic kidney disease is defined as an absolute reduction in glomerular filtration rate below 60 ml/min/1.73 m2 for 3 months or more, with or without other evidence of kidney damage or the presence of kidney damage for 3 months or more, as evidenced by structural or functional abnormalities of kidney, with or without reductions in GFR.

End stage kidney failure denotes CKD that necessitates renal replacement therapy (RRT) (Dialysis) or Kidney transplantation. Patients with ESRD on RRT will have to be maintained either on HD or PD. Dialysis is required for treatment of various acute and chronic kidney diseases.

Leading cause of ESRD is Diabetes Mellitus, currently accounting for nearly 45% of newly diagnosed cases. Over one quarter (27%) of patients have ESRD that has been attributable to Hypertension. Other important include Glomerulonephritis, Polycystic kidney disease and Obstructive uropathy [4].

Older age, male sex, non black race, diabetes mellitus, malnutrition and underlying heart disease are important predictors of death in ESRD.

In the absence of national registries, no reliable data are available on the incidence and prevalence of ESRD in India[1,2,5].

Only 3% to 5% of all patients with ESRD in India get some form of renal replacement therapy. Thus, planning for prevention of CKD on a long term basis is the only practical solution in India[3]. Increasing awareness of renal disease amongst the population and general practiioners could results in early diagnosis of chronic renal failure and give opportunity for preventive strategies to delay the onset of ESRD[3].

In view of increasing incidence of CKD patients on renal replacement therapy, the study was conducted on the clinical and other parameters in patients undergoing HD and PD.

Aims and Objectives

1- To study various clinical features in patients with ESRD on HD or PD.
2- To compare hematological parameters in patients of ESRD on HD or PD.

Materials and Methods:

This was a prospective study carried out in Department of Medicine, Bhabha Atomic Research Centre and Hospital, Mumbai from July 2007 to July 2010.

Selection of cases:

All patients attending medicine OPD and nephrology OPD were screened and 34 patients of ESRD who were either on HD or PD were selected .These patients were subjected to thorough clinical examination and laboratory investigations on initiation of study and at the end of 12 months.

Inclusion criteria:

1) Age-more than 18 years and less than 85 years
2) An estimated glomerular filteration rate (eGFR) of less than 15ml/min/1.73m2

Exclusion criteria:

The following patients were excluded from study:
1) Renal transplant
2) Patients on dialysis for short periods
3) Mentally impaired.
4) Cirrhosis of liver
5) Immunodeficiency syndrome
6) Malignancy
7) Terminal illness
8) Patients on tube feeding
9) Patients on total parental nutrition.

Cases fulfilling above criteria were selected for the study after obtaining a written informed consent. Their records were reviewed. Data was collected in terms of clinical findings & laboratory parameters. Data was analysed using standard statistical tests. Statistical analysis was performed with software SPSS version 15. Results are presented in form of tables .

Results—

(A) Distribution Of Patients by age and sex:

Patients were categorized according to their age into three groups. Less than 40 years,40-50 years, and more than 50 years.

Table 1: Distribution of Study Population -Hemodialysis Group.

Age(yrs)	Sex Male	Sex Females	Total
<40	0	1	1
40-50	5	3	8
50>	10	1	11
Total	15	5	20

The study population consisted of 20 patients on hemodialysis. Of

these 15 were males and 5 were females. In this group, majority of patients 11 (55%) were of 50 years and above. The youngest patient was 29 years a old and oldest was 69 years. The mean age was 52.7 years.

Table 2: Distribution of study population in Peritoneal dialysis Group.

Age(yrs)	Sex Male	Sex Females	Total
<40	2	1	3
40-50	2	1	3
50>	6	2	8
Total	10	4	14

This group was composed of 14 patients. Of these 10 were male and 4 were females. In this group, majority of patients 8 (57.14%) were more than 50 years of age. The youngest patient was 37 years old and oldest was 72 years of age. The mean age was 54 years.

In this study out of 34 patients, 73.52% were males and 26.38% were females, showing a clear male preponderance with male : female ratio of 3:1. This male preponderance is supported by other studies [6,7,8]. The mean age of all patients was 53.22 years.

(B) Signs and Symptoms:
Table 3: **Incidence of signs and symptoms in hemodialysis and peritoneal dialysis group**

Sign and symptoms	Number of patients	Percentage
Pedal edema	14	41.17%
Oliguria	8	23.52%
Breathlessness	5	14.70%
Proteinuria	4	11.76%
Vomiting and abdominal pain	3	8.00%
Weakness and cramps	1	2.94%
Hematuria	1	2.94%

In this study, patients were found to have following signs and symptoms in decreasing order of frequency:

Pedal edema 41.17%, oliguria 23.52%, breathlessness 14.70%, proteinuria 11.76%.

Constitutional symptoms of weakness and cramps 2.94%, vomiting and abdominal pain 8% and hematuria 2.94%.These clinical findings are comparable   with other studies of Angela et [9] al,Lillian[10],Paul w crawford[11] etc.

(C) Comparison of Blood pressure (mm of Hg) in HD and PD group.

As per JNC VII classification of blood pressure, patients were classified into following groups:

Blood Pressure	Systolic	Diastolic
Normal	120	80
Prehypertension	120-139	80-89
Stage 1 hypertension	140-159	90-99
Stage 2 hypertension	>160	>100

Table 4: Number of patients with various Blood pressure in Hemodialysis group

Blood pressure	At start of study		At end of study	
	Systolic	Diastolic	Systolic	Diastolic
Normal	1	0	1	4
Prehypertension	3	10	5	1
Stage 1	3	9	6	9
Stage 2	2	2	0	0

Hemodialysis group: At the start of study, majority of patients were prehypertensives with mean value of systolic pressure as 150.5 mm of Hg and diastolic pressure was 84 mm of Hg.

At the end of 12 months, majority of patients were in stage 1 hypertension. Mean value of systolic pressure was 147.5 mm of Hg and diastolic pressure was 89 mm of Hg.

This indicates that there was a drop in mean systolic blood pressure where as a rise in mean diastolic blood pressure, however this

difference is not statistically significant (p-0.283).

Table 5: Number of patients with various Blood pressure in peritoneal dialysis group

Blood pressure	At start of study		At end of study	
	Systolic	Diastolic	Systolic	Diastolic
Normal	1	0	1	0
Prehypertension	2	7	2	5
Stage 1	6	3	1	5
Stage 2	5	3	4	3

Peritoneal dialysis group:At the start of study,majority of patients were in prehypertension stage with mean value of systolic pressure as 146.71 mm of Hg and diastolic pressure as 88 mm of Hg. At the end of 12 months, there were equal number of patients in prehypertension and stage 1 hypertension group, with mean value of systolic pressure as 150.7 mm of Hg and diastolic pressure as 88.71 mm of Hg.

This indicates that there was rise in mean systolic blood pressure as well as in the mean diastolic pressure,however this difference is not statistically significant(p-0.222).Similar findings seen in other studies like ,Fenton[12].

Thus, patients on PD had better control of hypertension   than HD patients due to better volume control.

(D) Comparison of hematological parameters:
The hematological parameters studied were Hb (Normal range 11-12 gm/dl), serum iron 50-150 ug/dl, serum TIBC 200-300 ug/dl and percentage saturation 30-50%. Each group is divided into appropriate class .Percentage saturation was calculated as serum Iron/TIBC x100.

Table 5: Comparison of hematological parameters (at start of study)

Parameter	Mean values	
	HD	PD
Hemoglobin	10.67	10.19
Total iron binding capacity	217	207
% saturation	46.77	44.81
Serum iron	73.6	92.57

Table 6: Comparison of hematological parameters (at end of study)

Parameter	Mean values	
	HD	PD
Hemoglobin	10.61	11.17
Total iron binding capacity	218.7	225.07
% saturation	39.74	44.99
Serum iron	76.1	106.64

Hemodialysis: At initiation of study mean Hb in HD group was 10.67gm/dl, while at the end of 12 months of study mean Hb was 10.61gm/dl. Mean$\pm$ standard deviation of Hb was 10.7$\pm$1.4.

Mean Hb decreased in HD patients after 12 months of dialysis. This was statistically not significant (p-0.263)

At initiation of study, mean value of percentage saturation was 46.77% while 39.74% at end of study.Mean value of percentage saturation decreased in HD group patients after 12 months of dialysis. This was statically significant (p-0.00).

Peritoneal dialysis: At initiation of study mean Hb in PD group was 11.17gm/dl. Mean$\pm$ standard deviation of Hb was 11.9$\pm$1.6.Mean Hb increased in PD group patients after 12 months of dialysis. This was statistically not significant (p-0.132)

At initiation of study, mean value of percentage saturation was 44.81% while 44.9% at end of study. Mean value of percentage saturation raised after 12 months of dialysis. This was statistically significant (p-0.00)

Thus in this study, HD group shows low levels of Hb compared to PD group. Hemodialysis patients were clearly more likely to have comorbid conditions at baseline and had low eGFR and Hb level.

Peritoneal dialysis patients had better control of anemia than HD. Observational data suggest that anemia is less common in PD than HD group, possible because of subcutaneous erythropoietin and less blood loss . Residual function is better preserved in PD than in HD patient.This data suggest that more efficient iron metabolism in PD patient than in on HD patients.Similar findings seen in other studies like Elias[6].

Conclusions:

ESRD has wide clinical and hematological spectrum. Thorough clinical assessment and detail lab investigations are vital for staging and prognosis. Findings of pedal edema, oliguria, dyspnea and anemia are commonly seen in this study.

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