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Original Research Article

A Study to Assess the Changes in the Hematological Manifestation in Chronic Kidney Disease Patients

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Abstract

Chronic kidney disease (CKD) is a global public health problem, with greater burden and very high cost of care especially in developing countries like India. The objective of this study is to assess the hematological profile of our subjects with CKD. Patients admitted as inpatients in the Department of medicine at Sardar Patel Medical College Hospital, during the period of 2018-2021 were included in this study.13.00% patients had microcytic hypochromic anemia, 91.00% patients had normocytic normochromic, 25.00% patients had relative neutrophila, 11.00% patients had leucocytosisand 9.00% patients had thrombocytopenia. Anemia is a very common clinical manifestation in patients of Chronic Kidney Disease. The most common morphological type of Anemia seen in our study was Normocytic normochromic type. Management of anemia with Iron and Erythropoeitin therapy is an important therapeutic intervention in the optimum treatment of patients with Chronic Kidney Disease.

Keywords: CKD, Hb, CBC.

Introduction

Chronic kidney disease (CKD) is a global public health problem, with greater burden and very high cost of care especially in developing countries like India. The National Kidney Foundation in India states that, kidney diseases rank 3rd amongst the life-threatening diseases after cancer and heart disease. About 200,000 persons landed into terminal kidney failure every year and millions more suffer from lesser forms of kidney diseases.[1]

Apart from decreased erythropoietin, changes in red blood cells (RBCs) indices may be caused by vitamin B12, iron and folic acid deficiencies, which are consequences of dietary insufficiency or blood loss or by decreased erythrocytes' life span.[2,3] Other causes of anemia in CKD may include gastrointestinal bleeding; severe hyperparathyroidism and systemic inflammation.[4]

Other affected hematological parameters in CKD include total leukocytes and its differential counts, platelet count, bleeding time and prothrombin time. White blood cells (WBCs) count, platelet count and bleeding time were within normal ranges in CKD subjects.[5] Other findings reported include eosinophilia and prolonged bleeding time.[6] Few literatures exist on hematological profiles of subjects with CKD in our environment. The objective of this study is to assess the hematological profile of our subjects with CKD.

Materials and Methods

Hospital based cross-sectional study was conducted on Patients admitted as inpatients in the Department of medicine at Sardar Patel Medical College Hospital, Bikaner.

Inclusion Criteria

1. Patients with CKD diagnosed on the basis of clinical and laboratory diagnosis.
2. Age > 14 years

Exclusion Criteria

1. Paediatric patients
2. Pregnant patients
3. Patients with known haematological disorder
4. Patients on drugs causing bone marrow suppression.

The details regarding age, sex, weight, monthly income the primary disease leading to CKD, tests used in diagnoses ultrasound abdomen, blood urea, creatinine, were collected from the case charts.

Results

In present study, maximum patients (49.00%) were from 45-60 yrs age group. 57.00% patients were male and 43.00% patients were female.

Table 1: Associated wise distribution of study subject

Associated disease	No of cases	Percentage
DM	31	22.00
HT	26	26.00
Nephritis	22	22.00
Rheumatic heart disease	1	1.00
Others	52	52.00

In present study, 26.00% patients were from HT, 31.00% patients were from DM and 22.00% patients were from nephritis.

Table 2: Renal function test in study subject

Renal function test	Mean	SD
Serum creatinin (mg/dl)	8.20	3.47
Blood urea (mg/dl)	144.66	50.57

In present study, serum creatinin level was 8.20±5.47 mg/dl and blood urea level was 144.66±50.57 mg/dl

Table 3: WBC wise distribution of study subject

CKD stage	No of cases	Percentage
II	12	12.00
III	58	58.00
IV	28	28.00
V	2	2.00
Total	100	100.00

In present study, 58.00% patients were present with CKD stage III and 28.00% patients had CKD stage IV

Table 4: WBC wise distribution of study subject

WBC (per mm^3)	No of cases	Percentage
<4000	4	4.00
4000-11000	76	76.00
>11000	20	20.00
Total	100	100.00

In present study, 20.00% patients were present with leucocytosis and 4.00% patients were present with leucopenia.

Table 5: RBC wise distribution of study subject

RBC (Lakh per mm^3)	No of cases	Percentage
<2	15	15.00
2.00-4.5	82	82.00
>4.5	3	3.00
Total	100	100.00

In present study, 20.00% patients were had RBC count less than 2 lakh per mm^3 and 4.00% patients were had RBC count more than 4.5 lakh per mm^3

Table 6: Hemoglobin wise distribution of study subject

Hemoglobin (gm/dl)	No of cases	Percentage
<7	42	42.00
7-11.5	49	49.00
>11.5	9	9.00
Total	100	100.00

In present study, 42.00% patients were had severe anemia

Table 7: Platelet count wise distribution of study subject

Platelet count (Lakh per mm^3)	No of cases	Percentage
<1.5	22	22.00
1.5-4.5	74	74.00
>4.5	4	4.00
Total	100	100.00

In present study, 22.00% patients were had thrombocytopenia.

Table 8: MCV wise distribution of study subject

MCV (fl)	No of cases	Percentage
<80	23	23.00
81-90	74	74.00
>90	3	3.00
Total	100	100.00

In present study, 23% patients had MCV <80 fl, 3.00% patients had MCV >90fl.

Table 9: PBF wise distribution of study subject

PBF	No of cases	Percentage
Microcytic hypochromic	13	13.00
Normocytic normochromic	91	91.00
Relative neutrophila	25	25.00
Leucocytosis	11	11.00
Thrmboctyopenia	9	9.00

In present study, 13.00% patients had microcytic hypochromic anemia, 91.00% patients had normocytic normochromic, 25.00% patients had relative neutrophila, 11.00% patients had leucocytosisand 9.00% patients had thrombocytopenia.

Discussion

Chronic kidney disease is progressive renal disease characterised by various manifestations and haematological abnormalities.

The prospective clinico-hematological study of chronic kidney disease involving 100 patients was undertaken during study period and diagnosis was made with available clinical and laboratory data.

The observations were compiled, results analysed and discussed with previous similar studies. 100 patients who were admitted in the hospital were the study population.

Diabetes was the leading cause of CKD among the study group, with diabetic nephropathy constituting 31.00% as native kidney disease. Out of which 12.00% had associated hypertension. Hypertension as a cause was seen in 26 cases. Other major causes of CKD were chronic glomerulonephritis, chronic interstitial nephritis, obstructive nephropathy and chronic pyelonephritis. Cystic kidney disease, Lupus nephritis and ARF contributed 5 cases each. Autosomal dominant polycystic kidney disease, Multicystic renal dysplasia and Juvenile nephronophthisis constituted the cystic kidney disease. Diabetes and hypertension are frequent causes of CKD as seen in the present study. Other causes being obstructive nephropathy, chronic glomerulonephritis, cystic kidney diseases and tubulointestitial diseases. Sardenberget al[7] was also found that DM and HT was common cause of CKD. In present study, serum creatinin level was 8.20±5.47 mg/dl and blood urea level was 144.66±50.57 mg/dl.

Agarwal et al (2005),[8] in a population based study found mean creatinine to be 2.89+ 2.2 mg/dl (range 1.9-10.7 mg/dl). The mean s. creatinine in the present study was higher because it was a hospital based study conducted in a tertiary care hospital.

In present study, 58.00% patients were present with CKD stage III and 28.00% patients had CKD stage IV

Khanam et al 2007 [9] et al was found that CKD stage III patients more than 50.00%

In present study, 42.00% patients were had severe anemia. Study by Khanamet al[9] showed a gradual fall in the hemoglobin levels in CKD as the stage progress. But the mean hemoglobin was lower in each stage when compared to the present study.

The present study demonstrated that the average RBC count is low in CKD. The RBC indices are within the normal range. The present study agrees with studies by Talwar et al[10] also showed low RBC count. The fall in RBC significantly correlates with the stage of CKD, with lower counts observes as the stage progresses. CKD patients with diabetes had lower mean hemoglobin and RBC count in stage IV as compared to non-diabetics. This difference was not observed in stage III and stage V. But the difference in stage IV was 0.9 g/dl hemoglobin and 0.38 x1012/l which was statistically not significant. The absolute reticulocyte count in the present study is lower than normal with a mean of 21.8 ±18.8x109/l. The fall in ARC increases gradually as the stage progresses.

The pattern of total and differential leukocyte count has been poorly studied, yet this evaluation may be of critical importance to diagnose inflammatory illnesses and allergic reactions. In present study, 13.00% patients had microcytic hypochromic anemia, 91.00% patients had normocytic normochromic, 25.00% patients had relative neutrophila, 11.00% patients had leucocytosisand 9.00% patients had thrombocytopenia.

Similar result observed by Talwar et al [10] also showed majority of cases had normocytic

normochromic anemia (61%) followed by dimorphic anemia (18%) and microcytic anemia (12%). Arun S et al (2012), observed normocytic normochromic anemia in 60.22% case.

Conclusion

Anemia is a very common clinical manifestation in patients of Chronic Ki dney Disease. The most common morphological type of Anemia seen in our study was Normocytic normochromic type. Management of anemia with Iron and Erythropoeitin therapy is an important therapeutic intervention in the optimum treatment of patients with Chronic Kidney Disease.

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