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Study Of Haemotological Profile In Patients With Chronic Kidney Disease –A Hospital Based Cross Sectional Study

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Abstract:
Background*: CKD is associated with a variety of hematological abnormalities which include anemia, infections and bleeding diathesis. However, the exact relationships between hematological parameters and the severity of CKD are not well understood. Also, the underlying mechanisms remain under investigation. The present study aimed to evaluate the association of different blood parameters and comorbidities among hospitalized CKD patients in rural tertiary care hospital in India (1)(2)*
Materials and Methods*: A Cross sectional observation study was carried out over a period of three months (January-March) in 2023 to evaluate the hematological changes in patients of chronic renal disease admitted in AH&RC, BG Nagara, Mandya. Detail clinical history of patients was collected and after informed consent blood samples were taken for hematological and biochemical tests including hemoglobin estimation total and differential leucocyte count, platelet count, hematological indices and blood urea and creatinine levels*.
Results*: The study included a total of 100 cases with chronic renal disease. Majority of cases (44 cases- 44%) were in the age group of above 60 years. Amongst total 100 cases, 74 cases (75%) were male patients while 25% that is, 26 cases were female. 96% of the patients under this study were anemic. The mean hemoglobin was 9.544 g/dl. Majority of patients (84.38%) had normocytic normochromic type of anemia which was followed by microcytic hypochromic anemia (15.63%). There was not any significant change in leukocyte count in the study. Platelet count was normal in majority of patients (48 cases). Thrombocytopenia was seen in similar number of patients.*
Conclusion: *Our study confirmed that CKD is associated with various hematological manifestations, with anemia being a common feature. The severity of anemia increased with advancing CKD stages. Majority of patients exhibited normocytic normochromic anemia, followed by microcytic hypochromic anemia. Leukocyte count did not show significant changes, platelet count remained relatively stable across CKD stages .*

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I. Introduction

Chronic kidney disease (CKD) is a global public health concern, affecting millions of individuals worldwide. While the impact of CKD on renal and cardiovascular systems is well-documented, the association between CKD and hematological abnormalities has gained significant attention in recent years. Hematological abnormalities in CKD encompass a wide range of disturbances, including alterations in RBC morphology and function, abnormalities in WBC counts and function, and disturbances in platelet number and function. These abnormalities contribute to an increased risk of anemia, impaired immune response, and an enhanced prothrombotic state, all of which further exacerbate the burden of CKD. (1)(5)

II. Material And Methods

A Cross sectional observation study was carried out over a period of three months (January-March) in 2023 to evaluate the hematological changes in patients of chronic renal disease admitted in AH&RC, BG Nagara, Mandya. Detail clinical history of patients was collected and after informed consent blood samples were taken for hematological and biochemical tests including hemoglobin estimation total and differential leucocyte count, platelet count, hematological indices and blood urea and creatinine levels

Study Design: Cross Sectional observation study

Study Source: Outpatient and inpatients attending medicine department at Adichunchanagiri hospital and research center.

Study Duration: January 2023 – March 2023 .

Sample size: 100 patients.

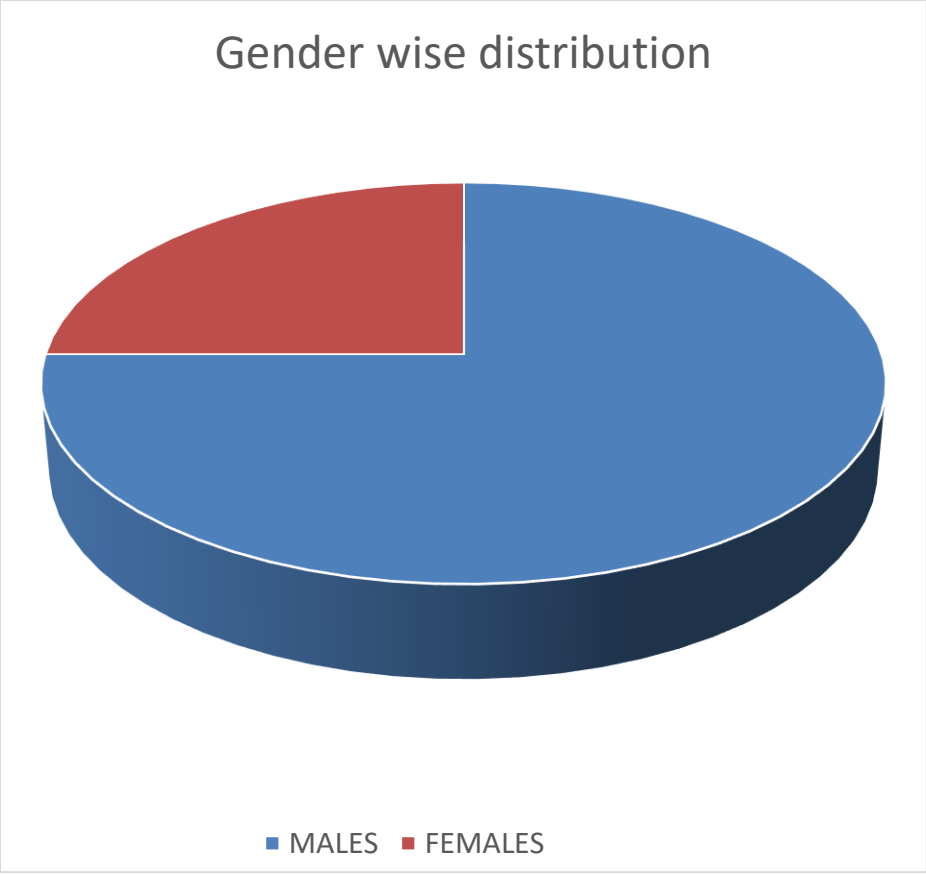
Inclusion criteria:
1. Patients with age > 18 years
2. Patients with different stages of CKD irrespective of underlying etiology.

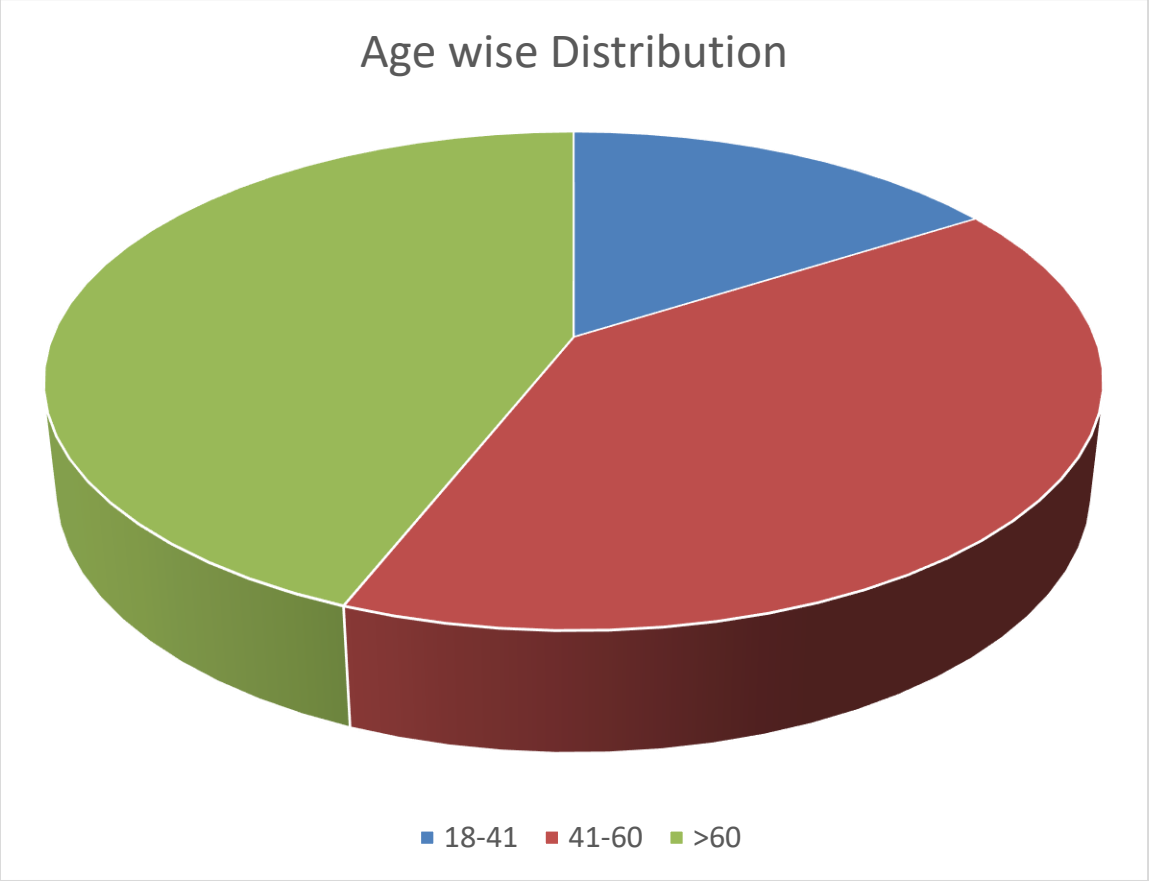
Exclusion criteria:
Patients who are known case of -
Ischemic heart disease
Chronic liver disease
Hypo/ hyperthyroidism
COPD
Connective tissue disorder.

Lab Investigations:
- CBC, WBC, Platelet counts, Ultrasound abdomen and Pelvis, ECG, Urea, creatinine, S.electrolytes.

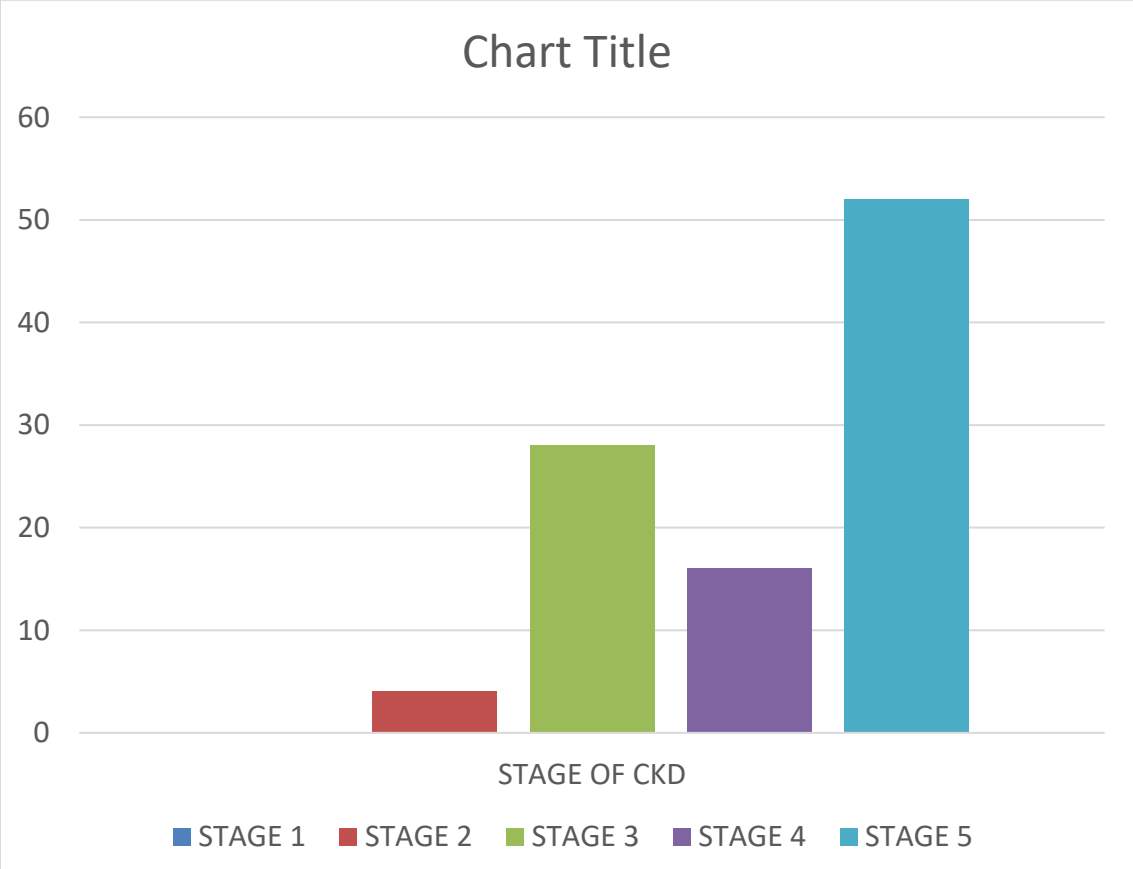
Distribution of subjects based on Gender
Male : 74(75%)
Female : 26 (25%)

Distribution of subjects based on age
18 – 40 years – 16 (16%)
41 – 60 years – 40(40%)
Above 60 years – 44 (44%)




Age wise Distribution
18-41
41-60
>60

III. Result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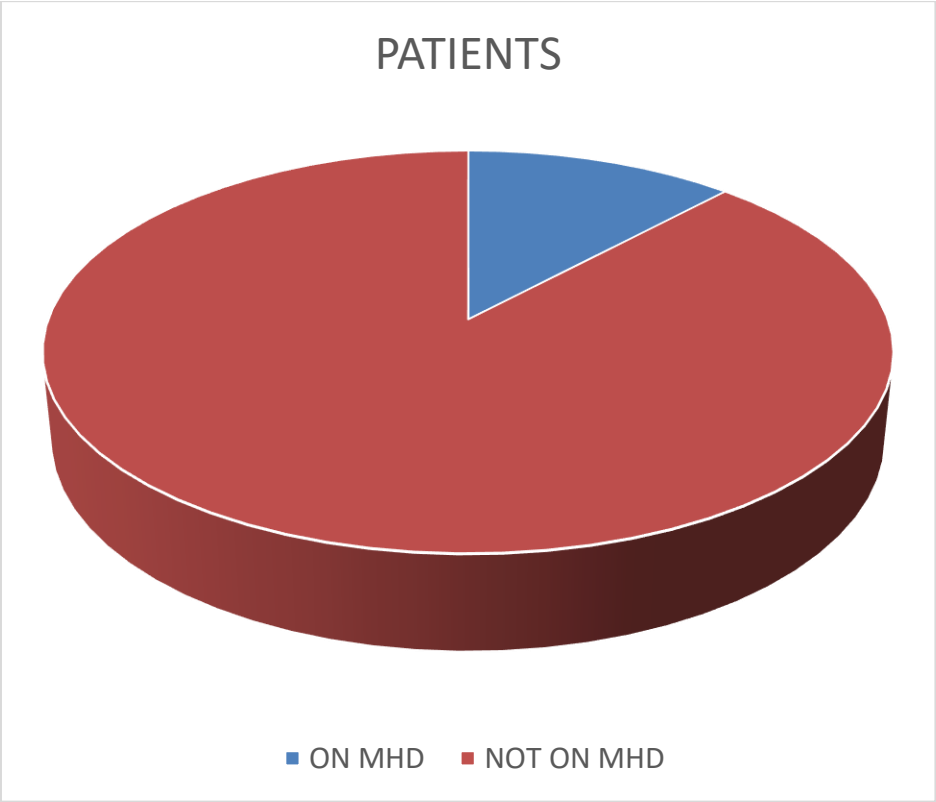
STAGE OF CKD
STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5



***MHD- Maintainance haemodialysis**

Following KDIGO guidelines Anaemia in CKD is defined as Hb<13gm/dl in males and Hb<12gm/dl in females. 96% of the study population had anaemia

Hb%	Stage 2	Stage 3	Stage 4	Stage 5
<7 (severe)	0	0	4(32%)	8(15%)
7-11(moderate)	0	12(43%)	10(52%)	44(85%)
>11(mild)	0	16(57%)	2(16%)	0
Total	0	28(100%)	16(100%)	52(100%)

P-value
0.002

Leukocyte count:

In present study total leucocyte count was normal in majority of the patients 67 cases . Leucopenia was seen in 3 patients and leukocytosis was seen in 30 patients.

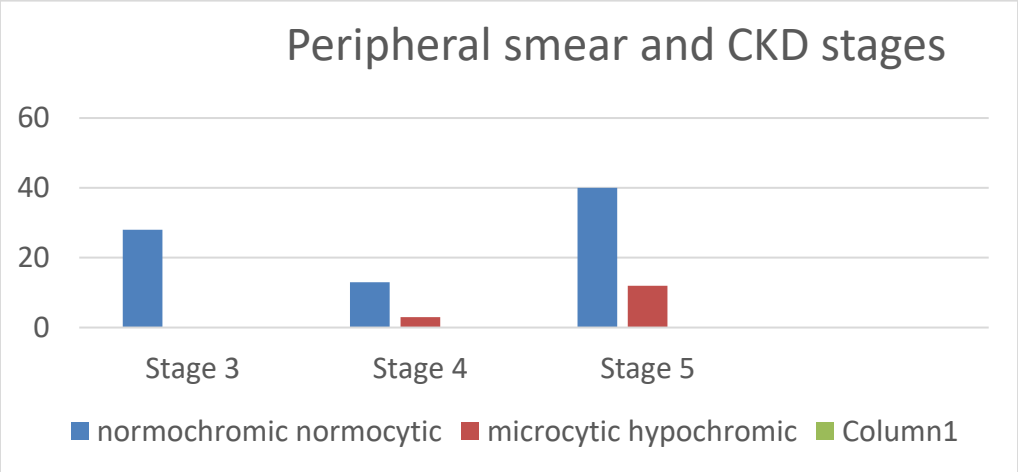
Platelet count:

In this study platelet count was normal in 48% of the patients (48 cases) (. Thrombocytopenia was seen in 48% of patients as well(48 cases) and Thrombocytosis was seen in 4%(4 cases) of patients.

Platelet count	Number	Percentage	P-value
<1.5 lakhs/cumm	48	48%	0.0897
1.5-4.5 lakhs/cumm	48	48%	
>4.5 lakhs	4	4%	

Peripheral smear:

In present study normocytic normochromic type of anemia was seen in 81 out of 96 patients. Normocytic normochromic anemia was most common type of anemia in all stages of CKD patients .



IV. Discussion

1. Renal dysfunction gives rise to a variety of hematological manifestations. Renal failure typically affects the red blood cells, leucocytes and platelets causing anemia, increased incidence of infections and bleeding.(3)
2. 96% of the patients under this study were anemic. The mean hemoglobin was 9.544 g/dl. In present study Anemia was graded as mild (Hb% >11 gm%), moderate (7-11 gm %) and severe (<7gm%). Moderate grade anemia was most common in all stages of CKD (62 cases).
3. The mean hemoglobin decreased from stage 3(11 g/dl) to stage 5(8.4 g/dl) and this correlation was statistically significant (p=0.002).
4. In present study majority of patients (84.38%) had normocytic normochromic type of anemia which was followed by microcytic hypochromic anemia (15.63%).
5.There was not any significant change in leukocyte count in the study. Few patients with leucocytosis (30 out of 100 patients) may have had concurrent infection which was not studied. In this study mean platelet count was 1.8 L/cumm.
6.Platelet count was normal in majority of patients (48 cases). Thrombocytopenia was seen in similar number of patients. Mean platelet count decreased from stage 3 to stage 5, but this correlation was not statistically significant.

V. Cross Referances

[1] Studies Done By Panduranga G Et Al, The Mean Hemoglobin Decreased From Stage 3(9.87) To Stage 5(8.37) And This Correlation Was Statistically Significant (P=0.004).
[2] Moderate Grade Anemia Was Common In All Stages Of Ckd, In The Studies Done By Dewan Et Al, (50% Cases) And Chakravarti Et Al, (55.26%).
[3] Study Done By M Huang Et Al, Mean Platelet Count Decreased From Stage 3 To Stage 5, But This Correlation Was Not Statistically Significant.
[4] Platelet Count Was Normal In Majority Of Patients (77 Cases - 78.57%). Thrombocytopenia Was Seen In 19 Out Of 98 Patients (19.39%) In Study Done By Panduranga G Et Al.
[5] Studies Done By Chakravarti Et Al, (77.19% Of N/N) And Dewan Et Al, (96.87%N/N). Hematocrit Was Decreased In All Stages.

VI. Conclusion

- Overall, our study confirms that CKD is associated with various hematological manifestations, with anemia being a common feature. The severity of anemia increased with advancing CKD stages.

- The majority of patients exhibited normocytic normochromic anemia, followed by microcytic hypochromic anemia.
- While leukocyte count did not show significant changes, platelet count remained relatively stable across CKD stages.
- These findings contribute to a better understanding of the hematological profile in CKD patients and emphasize the importance of early detection and management of anemia in this population.
- Further investigations are warranted to explore the underlying mechanisms and potential interventions for improving hematological outcomes in CKD.

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