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OBSERVATION ON HAEMATOLOGICAL ABNORMALITIES IN PATIENTS WITH CHRONIC KIDNEY DISEASE (CKD)

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Abstract

Hematological abnormalities were observed in a cross sectional study of 53 patients suffering from chronic kidney disease (CKD) with a mean serum creatinine level of 8.0 mg/dl. The age range of the patients was 23 - 75 years with a mean of 46.8 years. The mean haemoglobin level, haematocrit, total RBC, total WBC, Platelet count and reticulocyte count were found to be 9.4 gm/dl, 0.27 l/l, 3.3 x 1012/l, 9.5x 109/l, 345.1 x 109/l and 0.62% respectively. The mean red cell indices were as MCV 86.3 fl, MCHC 34.1 gm/dl, MCH 29.2 pg. Normochromic and normocytic anaemia were found in 75.5 % cases while microcytic hypochromic anaemia in 18.8 % cases. Echinocytes (60%) and acanthocytes (37%) were found to be the most common morphological abnormality of RBC. It is concluded that anaemia and abnormalities in RBC morphology commonly occur in chronic kidney disease and that routine haematological examination is helpful in the diagnosis of kidney disease.

Introduction

Hematological abnormalities are common in patients with chronic kidney disease. Erythropoietin deficiency, chronic blood loss, iron deficiency, haemolysis and toxic suppression of the bone marrow contribute to the pathogenesis and morphological type of anaemia [1, 2]. Concomitant infection in CRF and bone marrow suppression affects the count of WBC [3,4]. Similarly, microangiopathy associated with kidney disease and uremic toxins influence the circulating platelet number [1,5]. Microangiopathy and uremic toxins also cause morphological abnormalities of all the haemopoietic cells [1]. All these haematological abnormalities may affect disease progression, influence management plan and outcome of treatment of patients suffering from chronic kidney disease.

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Aims and Objectives

The aims and objectives of this study were to observe the haematological abnormalities in CKD and to determine the type of anaemia in these patients.

Methods and Materials

This was an observational cross sectional study. Pre dialysis CKD patients on admission into the Nephrology department of Chittagong Medical College Hospital were included in this study. CKD patients with primary hematological disorders were excluded from the study. 5 cc venous blood were collected from the ante-cubital vein in each case. Hemoglobin and haematocrit estimations were done by cyanmethaemoglobin method (Photometer 5010, Human) and Wintrobe's methods respectively while the cell counts were done by manual method using improved Neubauer counting chamber. WBC differential count and RBC morphology were studied on Leishman-stained blood smear and reticulocyte count was done using brilliant cresyl blue stain. The results were recorded in printed form and subsequently analysed.

Results and Observation

A total of 53 patients suffering from chronic kidney disease (CKD) were included in this study. There were 33 male and 20 female patients. The mean age of the patients was 46.7 years (age range 23 – 75 years) and the mean serum creatinine level was 8.0 mg/dl. The observed results were illustrated in Table I, II, III & IV:

Tabl–I: Age and sex distribution of 53 CKD patients

Sex	Male	33
	Female	20
Age	Mean	46.7 years
	Range	23 – 75 years

Table-II: Hematological findings in 53 CKD patients

Variables	Mean + SD
Haemoglobin (gm/dl)	9.41 + 2.13
Haematocrit (l/l)	0.27 + 0.15
Total RBC (x1012/l)	3.33 + 1.12
Total WBC (x109/l)	9.56 + 3.1
WBC differential count (%)	
Neutrophil	73.19 + 10.51
Lymphocytes	20.17 + 8.77
Monocytes	2.67 + 1.99
Eosinophils	3.98 + 3.7
Platelet (x109/l)	345.13 + 88.5
Reticulocyte (%)	0.62 + .06
MCV (fl)	86.37 + 11.4
MCH (pg)	29.2 + 2.19
MCHC (gm/dl)	34.13 + 3.27

Table–III: Morphological type of anaemia in 53 CKD patients

Type of anaema	No. of cases	% of cases
Normochromic normocytic	39	73.58
MIcrocytic hypochromic	10	18.86
Macrocytic	4	7.54

Table–IV: Morphological changes in RBC

Morphological changes	No. of cases	% of cases
Echinocyte	32	60
Acanthocyt	20	37.3
Contracted cell	11	20.7
Fragmented cell	3	5
Helmet cell	4	7.5
Pincher cell	3	5
Pencil cell	1	1.8
Elliptical cell	1	1.8

Discussion

Hematological abnormalities commonly occur in renal diseases. Anaemia is the most common haematological abnormality that occurs in chronic kidney disease, which is reflected by reduction of haemoglobin, haematocrit or total RBC count. We found lower values of all these parameters in this study. In our study anaemia was found in all cases and the mean haemoglobin, haematocrit and total RBC count were found to be 9.41 gm/dl, 0.27 l/l and 3.33 X 10 9 /l respectively. Consistent with other studies normochromic and normocytic anaemia was found to be the predominant type (73.58%) [1,6].

However, other morphological type of anaemia also occurs in chronic kidney disease [2,6]. We found microcytic and hypochronic anaemia, and macrocytic anaemia in 18.86% and 7.54% of cases respectively. The different morphological types of anemia in CKD is not unusual as the aetiology of anaemia in CKD is multifactorial that includes deficiency of erythropoietin and iron, chronic blood loss, haemolysis and marrow failure [1,2]. A number of morphological abnormalities of RBCs also occur in kidney diseases [7,8,9]. Echinocytes, Acanthocytes and contracted cells were found in 60%, 37.3% and 20.7% cases respectively in our study. Other abnormalities recorded in a few cases were helmet cells, pincher cells, pencil form cell and elliptical cell. In our study no changes were found in the total and differential WBC count. Nevertheless, leukocytosis, leucopoenia, neutrophilia and neutropenia can occur in CKD depending on the underlying cause and associated complications [1,10]. We also did not find any change in the total platelet count though both thrombocytopenia and thrombocytosis occur in CKD [5,10,11].

Conclusion

Presence of anaemia, its morphological type and associated morphological abnormalities of RBC provide evidences of renal disease. Routine haematological examination including peripheral blood film study should be performed in all suspected cases of kidney disease.

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