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General Medicine

ETIOLOGICAL PROFILE OF 50 CASES 0F ANAEMIA IN CKD

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ABSTRACT

Background And Objectives: Anaemia is a common and significant complication of chronic kidney disease (CKD). When present it may cause symptoms such as fatigue and shortness of breath. It is associated with reduced quality of life and increased cardiovascular disease, hospitalizations, cognitive impairment and mortality. As kidney disease progresses, anaemia increases in prevalence affecting nearly all patients with stage V CKD. In patients with CKD, anaemia is defined as the situation in which the concentration of haemoglobin (Hb) in the blood is below 2 times the SD of the mean Hb of the general population. As the pathogenesis of anaemia in CKD is mutlifactorial, this study is intended to know various etiological factors responsible for anaemia in CKD patients.

Methods: 50 patients who met with inclusion criteria and exclusion criteria are subjected to detail clinical examination and investigations. Depending upon data obtained, results are evaluated and the percentage of various types of anaemia in CKD was calculated.

Results: At the end of study, anaemia of chronic disease (60%) constitutes the commonest cause of anaemia in CKD, followed by iron deficiency anaemia (30%) and megaloblastic anaemia (10%) due to vitamin B12 deficiency.

Conclusion: Among 50 cases of anaemia in CKD, anaemia of chronic disease due to erythropoietin deficiency was the most common cause followed by iron deficiency anaemia. Usually clinical examination and routine simple investigations will clinch the diagnosis in most of the cases.

KEYWORDS : Anaemia, Haemoglobin (Hb), Chronic kidney disease (CKD), Iron, Erythropoietin (EPO), Hepcidin.

INTRODUCTION:

Anaemia is an important and common complication experienced by patients with CKD. When present it may cause symptoms such as fatigue and shortness of breath. In patients with CKD, anaemia is defined as the situation in which the concentration of haemoglobin (Hb) in the blood is below 2 times the SD of the mean Hg of the general population. In CKD, anaemia may occur at early stages (CKD stages 2 and 3, of the KDIGO guidelines). The Hb levels decreases when the estimated glomerular filtration rate (eGFR) is around 70ml/min/1.73m^2 (men) and 50ml/min/1.73m^2 (women). The prevalence of anaemia depends on its definition, but generally increases in frequency and severity in the more advanced stages of CKD to as high as 90% of patients.

Kidney failure produces numerous changes that destabilize homeostasis. An important example is diminished erythropoiesis, with anaemia being a common complication of kidney disease. Anaemia in CKD is typically normocytic, normochromic, and hypoproliferative. The pathogenesis of anaemia in chronic kidney disease is complex, but a central feature is a relative deficit of erythropoietin. The critical role of the hypoxia-sensing system plays a critical role in mediating erythropoietin synthesis and release. Iron deficiency is a second important factor in the anaemia of chronic kidney disease. The dynamics of iron metabolism have clarified the role of chronic inflammation and hepcidin as key mediators of impaired iron utilization.

METHODS:

This study comprises 50 cases of CKD with anaemia, admitted to Government General Hospital, Vijayawada, Krishna District, Andhra Pradesh between August 2019 to January 2020. Case selection was random with respect to age and sex.

Inclusion Criteria:

1. The study comprises CKD patients with anaemia presented to Government General Hospital, Vijayawada.

Exclusion Criteria:

1. Patients with known haematological abnormalities.
2. Patients with any other known chronic disease like arthritis, chronic liver disease, autoimmune diseases etc.

INVESTIGATIONS:

All patients were investigated routinely for complete blood picture (Hb%, RBC, WBC, TC, DC, platelet count and ESR) with peripheral smear. Screening of urine for RBC, Albumin, Sugar, Microscopy and stool for Microscopy and occult blood was done.

Special investigations such as red cell indices (MCV, MCH, MCHC and RDW), absolute reticulocyte count, parameters of Iron metabolism (iron, ferritin, transferring, TIBC and transferrin saturation index), vitamin B12 and folic acid.

CLINICAL FEATURES:

The signs and symptoms of anaemia with CKD may include:

- weakness
- fatigue, or feeling tired
- headaches
- dizziness
- difficulty breathing or shortness of breath
- problems with concentration
- pallor

RESULTS:

50 cases of CKD with anaemia were included in the study. Among 50 cases, males outnumbered females (male 36 and female 14) with male to female ratio being 2.6: 1.

The study includes age group from 25 year to 70 year, among this majority are in the age group of 50 to 60 years (46%) followed by age group less than 50 years (22%).

METHOD OF DIAGNOSIS:

Anaemia is defined as Hb concentration < 12.0 g/dL in women and <13.0 g/dL in men. The initial evaluation of anaemia in CKD involves a focused history and physical examination. Blood testing including complete blood cell count with red blood cell indexes were done. In patients with CKD, special emphasis should be placed on testing for iron deficiency and occult blood loss because of their frequent occurrence in this population.

Anaemia in CKD is typically normocytic and normochromic with high ferritin levels: pointing towards erythropoietin deficiency.

Erythrocytic microcytosis or macrocytosis helps to point out factors other than erythropoietin deficiency that may be contributing to anaemia. Because of the frequency of iron deficiency in this population, iron indexes should be assessed in all patients with CKD and anaemia. The most commonly used iron tests are measurement of serum ferritin and TSAT. The former reflects primarily on the body's stores of iron. In patients with CKD, serum ferritin concentrations are often increased independent of iron status by the presence of inflammation, requiring a more holistic approach to diagnosis. TSAT is

a measure of circulating iron. Plasma total iron bound to transferrin varies from 2 to 4 mg, whereas the daily need for iron in bone marrow is much higher, necessitating rapid turnover of iron from tissue stores and transport to the bone marrow. In the general population, either serum ferritin concentration < 30 ng/mL or TSAT < 15% are strongly suggestive of iron deficiency. However, both iron tests tend to be inaccurate for the diagnosis of iron deficiency in patients with CKD. The results of both tests reflect not only iron status, but also other factors that limit the ability to gauge iron status. In haemodialysis patients, there is no level of either test that optimizes both sensitivity and specificity. Among haemodialysis patients, iron deficiency is likely with serum ferritin concentration < 300 ng/ ml or TSAT < 20%. In non–dialysis-dependent CKD, iron deficiency is probably present with serum ferritin concentrations < 100 ng/mL or TSAT < 15%. However, it must be recognized that iron deficiency may still be present in both populations with considerably higher values of either test.

DISCUSSION:

Anaemia of CKD is a multifactorial process due to relative EPO deficiency, uraemic-induced inhibitors of erythropoiesis, shortened erythrocyte survival, and disordered iron homeostasis. Recent work has identified hepcidin excess as a main contributor to the disordered iron homeostasis and anaemia of CKD by impairing dietary iron absorption and iron mobilization from body stores. CKD patients have increased iron losses, estimated at 1–3 g per year in haemodialysis patients, due to chronic bleeding from uraemia-associated platelet dysfunction, frequent phlebotomy, and blood trapping in the dialysis apparatus. CKD patients, particularly haemodialysis patients, also have impaired dietary iron absorption.

In addition to true iron deficiency, many CKD patients have functional iron deficiency, characterized by impaired iron release from body stores that is unable to meet the demand for erythropoiesis (also called reticuloendothelial cell iron blockade). These patients have low serum transferrin saturation (a measure of circulating iron) and normal or high serum ferritin (a marker of body iron stores). Improving our understanding of the molecular mechanisms of the disease for anemia decreases adverse outcome.

CONCLUSION

Anemia is a common feature of CKD associated with poor outtcomes. The current management of patients with anemia in CKD is controvertial, with recent clinical trials demonstrating increased morbidity and mortality related to erythropoiesis stimulating agents. Here we examine recent insights into the molecular mechanisms underlying anemia of CKD. These insights hold promise for the development of the new diagnostic tests and therapies that directly target the pathophysiologic processes underlying this form of anemia.