EVALUATION OF PREVALENCE AND PATTERN OF ANEMIA – A HOSPITAL BASED STUDY IN ASEER PROVINCE, KINGDOM OF SAUDI ARABIA

INTRODUCTION

Haemoglobin surveys carried out in various regions shows that anemia constitutes a public health problem of considerable importance in under-developed and tropical areas of the world.¹ Prevalence of anemia in Saudi Arabia was 30 to 56%.² World Health Organization (WHO) report, 32.3% nonpregnant women of child bearing age are suffering from anemia in Saudi Arabia.³ Anemia prevalence is higher among individuals with certain chronic conditions, including chronic kidney disease (CKD), human immunodeficiency virus (HIV), rheumatoid arthritis (RA), inflammatory bowel disease (IBD), congestive heart failure (CHF), and cancer.⁴ Iron (Fe) is an essential metal ion for living beings; although it is the fourth most abundant mineral in the earth’s crust, it is the most prevalent nutritional deficiency worldwide.⁵ Iron in the form of heme is vital to many metabolic functions including oxygen transportation in hemoglobin. Iron is also a component of multiple enzymes, including cytochromes, necessary for energy generation and drug metabolism.⁶ Through the donation or acceptance of an electron, iron exists in either a reduced ferrous (Fe²⁺) or an oxidative ferric (Fe³⁺) state. Major causes of iron deficiency include blood loss, the maternal–fetal bridge, malaria, hook worm infections, diet and malabsorption of iron.⁷ Reports have also indicated that Helicobacter pylori can bind and extract iron from hemoglobin, transferrin, and lactoferrin.⁸ Iron deficiency (ID) is defined as a decrease in total iron levels, regardless of clinical expression. When the deficiency impairs erythropoiesis, it may result in a decrease in hemoglobin, with subsequent development of iron deficiency anemia (IDA). The diagnosis of anemia is simple and objective: the WHO defines it as a decline in blood hemoglobin to a level less than 13 g/dL in men and 12 g/dL in women. However, confirming that ID is the mechanism responsible for this anemia is not always easy. Sometimes, a simple blood cell count strongly suggests this origin, with a typical pattern of microcytosis, hypochromia, and an elevated red cell distribution width (RDW). However, up to 40% of cases of “pure” IDA are normocytic. The next step in assessing anemia is to

SUMMARY: We aim to investigate the prevalence and characteristics of anemia among the patients in the hospital based study in Aseer province. A total of 41 patients were studied. The patient selection was random and non consecutive. 87.8% (n=36) were male and 12.2 % (n=5) were females. 58.5% patients were anemic. Analysis of patients with anemia revealed 45.8% patients had diabetes mellitus, 54.16% patients had hypertension and 20.83% of patient had anemia of chronic kidney disease. 54.1% patients had microcytic anemia, 45.9% patients had normocytic anemia and none of the patients had macrocytic anemia. Anemia in hospitalized patients has become an increasingly frequent diagnosis, and its prevalence correlates with the number of comorbidities presented. It is significantly associated with the increased risk of mortality in hospitalized patients

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determine the so-called iron metabolism. A typical pattern of ID is a decrease in sideremia, plasma ferritin, and transferrin saturation. The least reliable parameter for diagnosis of ID is probably the measurement of sideremia (total amount of iron bound to serum proteins), as it could be detected as an artifact due to contamination of laboratory equipment, shows a nocturnal rhythm, and can return to normal levels several hours after ingestion. In the absence of inflammation, serum ferritin reflects total iron deposits in the body. Thus, a low serum ferritin (<30 ng/L) unequivocally means iron deficiency. Clinical consequences of iron deficiency include central nervous system dysfunction including cognitive impairment, decreased physical capacity, impaired work performance due to chronic fatigue, pregnancy complications, reduced immunity, gastrointestinal disturbances (e.g. glossitis, stomatitis, gastritis), and impaired temperature regulation in a cold environment. Thus anemia certainly appears to be a risk factor that should be targeted for correction with likely beneficial results. However, anemia is often under-recognized and consequently under-treated. Studies have indicated that the prevalence of anaemia is affected by health status, and hence is higher in inpatients as opposed to community dwelling adults. In this context this study was conducted to understand the prevalence of anemia in general population of hospitalized patients.

**METHOD**

An observational cross sectional study was carried out on a group of patients with an average age of 40 years (either sex) presenting to our Aseer hospital fulfilling the WHO criteria of anemia (haemoglobin (Hb) <13 g/dl in males, Hb <12 g/dl in females). A total of 41 patients were studied. Microcytic anemia was defined as MCV below 80 fl, normocytic as MCV between 80 and 100 fl and macrocytic anemia by an MCV above 100 fl.

**Statistics:** Only descriptive statistics are reported (means with 95% confidence intervals). Further analysis was inappropriate.

**RESULTS**

In our investigation the average was found to be 40 years. 87.8% (n=36) were male and 12.2% (n=5) were females (Fig. 1). 58.5% patients were anemic. Analysis of patients with anemia revealed 45.8% patients had diabetes mellitus, 54.16% patients had hypertension and 20.83% of patient had anemia of chronic kidney disease (Fig. 2).

Anemia characterization on peripheral smear showed that the most common type of anemia was microcytic as is depicted (Fig. 3.). 54.1% patients had microcytic anemia, 45.9% patients had normocytic anemia and none of the patients had macrocytic anemia. Only 9.70% of patients received folic acid treatment for anemia.

![Fig.1. Demographic characterization of subjects](image)

![Fig.2. Analysis of patients with anemia of chronic disease revealed that diabetes, hypertension and anemia of chronic renal disease were common.](image)
DISCUSSION

Anaemia is a public health problem that affects populations in both rich and poor countries. Although the primary cause is iron deficiency, it is seldom present in isolation. More frequently it coexists with a number of other causes, such as malaria, parasitic infection, nutritional deficiencies, and haemoglobinopathies. Anemia in pregnancy is associated with adverse consequences both for the mother and the foetus. Studies have shown that the adverse consequences of maternal anemia may affect not only the neonate and infant but also increase the risk of non communicable disease when the child grows into an adult and the risk of low birth weight in the next generation. It is well known that normal haemoglobin distributions vary with age and gender, at different stages of pregnancy, and with altitude and smoking.

Anemia may be either relative (due to increased plasma volume with a normal red blood cell mass) or absolute (due to a decreased red blood cell mass). It is important to rule out causes of relative anemia, such as pregnancy, excessive hydration or macroglobulinemia, as they represent disturbances in plasma volume rather than a true decrease in red blood cell mass. Similarly decreased plasma volume, caused by dehydration, may mask a real decrease in circulating red blood cell mass. Use of a morphologic classification scheme in combination with red blood cell indices and the reticulocyte count allows for practical classification of anemia into broad groups. This will facilitate selection of additional laboratory tests to determine the underlying cause of the anemia. Macrocytic anemia is described as anemia with MCV >100 fl. MCV increases slightly with increasing age but usually not enough to produce significant macrocytosis. The two common disorders that produce macrocytosis are megaloblastic anemias due to either vitamin B12 or folate deficiency. In our study, microcytic anemia was the most prevalent anemia accounting for 54% and normocytic anemia was 46%. Anemia was prevalent in 45.8% of diabetic patients. When diabetes affects kidneys (diabetic nephropathy), they may not be able to produce enough erythropoietin, a hormone that controls the production of red blood cells. 54.16% of patient with hypertension also exhibited anemia. 20.83 % of the patients with chronic kidney disease were reported to have anemia. Kidney function usually declines with age, although this may not always be the case. It has been demonstrated that anaemia is more prevalent at a low creatinine clearance, the level at which serum erythropoietin was also found to be low. A creatinine clearance below 60 ml/min has also been found to be a risk factor for anemia.

CONCLUSION

Anemia is a common finding in hospitalized patients and most anemic patients have some degree of renal insufficiency. In view of the negative effect of anemia on health function, it may be a common and important contributor to the mortality and morbidity of these hospitalized patients.
References:

   http://dx.doi.org/10.1155/2013/636585
12. Schrier SL. It’s tough to be old and anemic. Blood 2004; 104: 2214-15

35