ORIGINAL ARTICLE

MALABSORPTION; ACASE OF MICROCYTIC ANEMIA IN PAKISTAN

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ABSTRACT

Introduction: Iron deficiency anemia (IDA) is the most common micronutrient deficiency that has affected more than 1.5 billion individuals worldwide. IDA in Pakistan is quite prevalent. Usually IDA treatment is undertaken per oral but in certain cases a refractory state of anemia develops. This state is usually not taken seriously by clinicians and is overruled. Current study was done to see a prospect of refractory anemia (IDA) in light of malabsorption; one of the major causes of IDA.

Material and Methods: IDA diagnosis was carried out by performing CBC along with serum ferritin and serum iron. A total of 100 patients were selected (IDA patients) and were administered with oral $FeSO_4$ stat along with ascorbic acid. Another sample from each IDA patient was taken 2 hours after the dose administration. Individuals showing no elevation in serum iron levels after $FeSO_4$ administration were labelled as patients suffering from malabsorption.

Results: A total sum of 100 IDA patients were selected in the study. Among them 95% (n=95) showed response to oral iron administration, while 5% (n=5) showed no response to oral iron and therefore, were suffering from IDA due to malabsorption.

Conclusion: This study revealed that a substantial number of IDA patients suffer from malabsorption. Keeping this figure in mind, clinicians should be cautious and should shift to parenteral iron as soon as a refractory anemia is suspected.

KEYWORDS: Hypochromia; Microcytic Anemia; Malabsorption; Iron Deficiency Anemia; Anemia

INTRODUCTION

Anemia affects almost one-third of the world population .Iron deficiency anemia (IDA) occurs as a consequence of Iron deficiency (ID). ID is the most common globally disseminated micronutrient deficiency, whereas, the prevalence of iron deficiency anemia (IDA) is almost half of ID prevalence. More than2 billion people are suffering from IDA throughout the world.

IDA is notonly a public-health concern in underdeveloped and developing countriesalone, but it isestimated that almost 5-10% of population in developed countries also suffer from it .Pakistan, being a country where quite a large chunk of population lives below the poverty line, has quite a substantial number of IDA patients. Prevalence of IDA in Pakistan is 65-78%, 39% and 50%, as documented among children, adolescents and women of child-bearing age respectively.

High risk groups include children up to 5 years of age, adolescents during growth gush, women of child-bearing age and pregnant women . Moreover, complications may include chronic diseases association with IDA namely; chronic heart failure,

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chronic kidney disease, bowel diseases and even cancer . Infants and adolescents suffering from IDA can show growth retardation, delayed development, behavioral issues, impaired neurocognitive abilities, diminished immune function and decreased learning Adults, on the other hand can have loss of vigor, malaise, pica etc.

Major risk factors of developing IDA include chronic loss of blood, decreased iron intake, malnutrition, increased demand of iron in body, poor socio-economic status, cultural taboos, multiparity and malabsorption . Malabsorption occurs when sufficient iron is not absorbed through the intestine .Malabsorption of iron is most commonly observed in patients suffering from gastrointestinal (GI) disorders. Most prominent of them are coeliac disease, inhibited hydrochloric acid secretion (usage of proton pump inhibitors), acute upper GI bleeding, inflammatory bowel disease, angiodysplasia, atrophic gastritis, hiatal hernia and Helicobacter pylori gastritis.

Data of IDA due to malabsorption in Pakistani population is dearth. This accounted for designing of current study where malabsorption is being found out as causing the most common microcytic anemia i.e., IDA.

MATERIALS AND METHODS

This multicenter study was carried out in Baqai Institute of Hematology, Fatima Hospital and Muhammadi Blood Bank (NumaishChowrangi), Karachi from March 2018 to July 2018. A total of 100 diagnosed patients of IDA were selected based on decreased ferritin level and deranged iron profile. Patients on iron therapy were not included in this study.

Everyone under study was asked to give venous blood twice. First blood sample was drawn in EDTA and gel vacutainers (ATLAS-LABOVAC Italiano), followed by administration of Ferrous Sulphate ($FeSO_4$) 2 tablets of 200mg stat along with one tablet of Cecon®-500; Ascorbic Acid, Abbott (as $FeSO_4$ absorption is increased in acidic pH). After 2 hours a second blood sample was drawn from each individual in gel vacutainers (ATLAS-LABOVAC Italiano). EDTA samples were taken to perform CBC whereas clotted samples were taken to perform serum ferritin and serum iron profile.

CBC was performed on automated hematology analyzer SYSMEX® XNL-500 (Tokyo, Japan). Serum ferritin was performed on ROCHE automatic special chemistry analyzer COBAS® e-411 (Basel, Switzerland). Iron profile was performed on ROCHE automatic chemistry analyzer COBAS® c-311 (Basel, Switzerland). Statistical analysis was carried out by IBM SPSS v.22 (Chicago, USA).

RESULTS

A total of 100 adult patients were considered for this study. Among them 11% (n=11) were males while 89% (n=89) were females, with a mean age of 45 years. Everyone was assessed and diagnosed with IDA. IDA was labelledbased on hemoglobin (Hb), red cell indices (MCV, MCH, MCHC), RBC count, RDW, serum iron levels, total iron binding capacity (TIBC), transferrin saturation (TSAT) and serum ferritin levels. Once the oral stat $FeSO_4$ dose was administered, 5% (n=5) patients did not show any elevation in serum iron levels. Females were 4.5% (n=4) and males 9.1% (n=1). It was observed that 95% (n=95) showed moderate to significant elevation in serum iron levels. According to the results of this study 5% of the individuals, that did not show elevated serum iron levels, were patients of malabsorption syndrome and probably the IDA which they were suffering from was due to very same reason. Rest of the 95% of IDA patients may be suffering from any other etiological factor.

DISCUSSION

Anemia is a highly prevalent global public-health concern. Almost 43% of children of age less than 5 years, 29% non-pregnant women and 38% of the pregnant women are suffering from anemia globally. Although according to studies the prevalence of anemia has decreased substantially, but due to increasing population of the world, the number continues to elevate.

Normally 1-2 mg of iron is absorbed by the duodenum and proximal jejunum per day. This is the exact same amount of iron that is required in an adult. Two types of iron are available; Heme (10%) and Non-Heme (90%). Almost 15-20% of heme iron is reabsorbed by a normal body. Other sources of heme iron are animal origin foods and are found in the form of either hemoglobin or myoglobin. Heme is taken up by enterocytes through endocytosis where ferrous iron (Fe^{2+}) is released. Contrary to that, non-heme iron is taken up in the form of ferric oxide (Fe^{3+}), where first it has to be converted in ferrous form and then absorbed into the enterocytes .

Any sort of obstruction of iron absorption in the GI region will cause a decreased iron intake which is called malabsorption. Such patients do not respond to oral iron therapy and therefore they should administered with intravenous (IV) iron. IV iron has been in practice since long and it has proven its efficacy at many levels. Parenteral iron is specially recommended in patients suffering from GI disorders. Previously high molecular weight dextran was used as an iron therapy agent but it was found associated with anaphylaxis. It has now been removed from the United States and European markets. It is therefore recommended now that iron should be administered IV after a test dose .

There are at least ten IV or intramuscular (IM) parenteral iron formulations available and approved for iron therapy. Among them iron dextrans, iron polymatose, iron sucrose, iron isomaltoside 1000, ferumoxytol, ferric gluconate, ferric carboxymaltose are present. Ferric carboxymaltose, iron isomaltoside 1000 and ferumoxytol are the three most stable and reliable iron compounds. These can esily be administered in high single doses as well.

Our study has revealed that in our population, the prevalence of IDA due tomalabsorption is 5% which is not a small number. Clinicians should be aware that in case their patient is going into a refractory state, they should immediately stop oral iron. The patient's blood sample should be tested for a complete blood count (CBC) and reticulocytes count along with iron studies and serum ferritin levels. Occult blood test should be ordered to rule out any microscopic blood loss from the GI tract. A refractory anemia with decreased iron stores should be referred to GI department for further evaluation and to rule out GI involvement. A comprehensive history of the patient is inevitable. Occupation, history of menstruation in females, number of children, history of surgery, duodenal or peptic ulcers, dietary habits, alcohol intake, history of medication and usage of contraceptives in case of married women should be taken.

CONCLUSION

It is therefore noteworthy that clinicians should be well-aware of the fact that our populace does have a substantial number of malabsorption patients. It should be taken into consideration as soon as a clinician feels that the iron therapy is refractive and his/her patient is not responding properly oral iron therapy. Our study has opened some new venues which require further evaluation and study at a bigger level. Therefore, a properly conducted study is required at the national level to reveal exact number of patients that are suffering from IDA due to malabsorption.

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