Research Paper

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The Prevalence, Clinical Manifestations, And the Diagnosis of Iron Deficiency Anaemia in Andhra Pradesh, India

Medical Science

KEYWORDS : Iron deficiency anaemia, Prevalence, Clinical manifestations, Diagnosis

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ABSTRACT

The aim of this article is to study about the frequency of Iron Deficiency Anaemia and to find out the accurate diagnosis of iron deficiency anaemia in correlation with haematological and biochemical parameters. Iron deficiency anaemia is the most common nutritional disorder in the world and is common in developing countries. Iron deficiency anaemia can result either from nutritional deficiency or chronic blood loss. Other causes of anaemia include chronic disease, renal failure, bone marrow disorders and vitamin deficiencies. This article also discusses the signs and symptoms of iron deficiency anaemia. To date various researchers have investigated the prevalence of anaemia and it has been found in significant number.

INTRODUCTION:

According to the world health report by WHO, iron deficiency anaemia is the foremost prevalent disease causing morbidity in the world [1]. To date various researchers have investigated the prevalence of anaemia and it has been found in significant number. Iron deficiency anemia is the most common and widespread nutritional disorder in the world[2], and can be suspected when there is decreased haemoglobin level for age and sex; microcytic hypochromic erythrocyte morphology and reduced red cell indices that are MCV, MCH, MCHC. But for the confirmation of Iron Deficiency Anemia (IDA), biochemical tests such as serum ferritin, serum iron, percentage saturation of transferrin and serum total iron binding capacity should be done.

IRON METABOLISM:

The human body obtains iron from the diet, absorbing approximately 1–2 mg a day from an average daily intake of 10–15 mg. Iron is essential for the formation of Hb, Mb and a cofactor for cytochrome enzymes, which are essential for numerous cellular metabolic functions. As iron is toxic when present in abundance, tight regulation is required to avoid iron deficiency [3]. Dietary iron is obtained either from inorganic sources, or animal sources. Non-heme iron is found in plants such as green leafy vegetables, wholegrain cereals, nuts and dried fruits. Non heme iron, present in ferrous form is better absorbed than ferric form. Heme iron is present in meat, fish is well absorbed than non-haem iron. The acidic environment of the stomach and certain foods are known to increase the bioavailability of dietary iron [4]. Iron exists in the body in different forms ,65% in the form of Hb (heme and non heme), 4% in the form of Mb, 1% in the form of cytochromes, 0.1% in combination with transferin in the blood, 15-30% stored in the liver in the form of ferretin and hemosiderin. The stored iron levels in the liver may vary according to age and gender [5]. Approximate stored iron levels [6] include 300 mg in premenopausal females, 600 mg in postmenopausal females, and 800 mg in males.

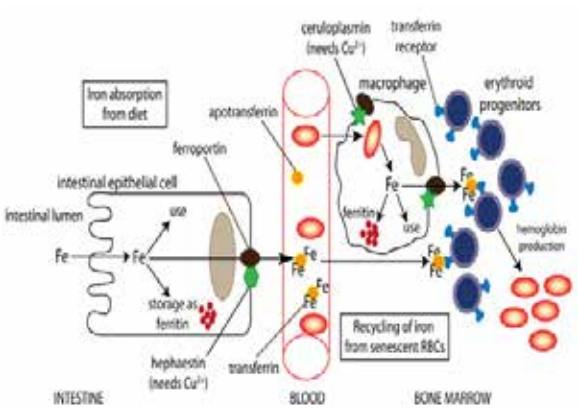

Fig 1: Iron absorption

When iron is absorbed from the small intestine, is stored as ferritin in intestinal epithelium or transported to the plasma and combines with apotransferrin, to form transferrin. It occurs through specific iron channels, called ferroportins, and is facilitated by hephaestin (hepsidin) produced by the liver, which is the master regulator of iron homeostasis [7],. by preventing the excess iron absorption. Hepsidin contain copper and hence deficiency will decrease iron absorption. The iron is loosely combined with transferrin and can be easily released to any tissues.

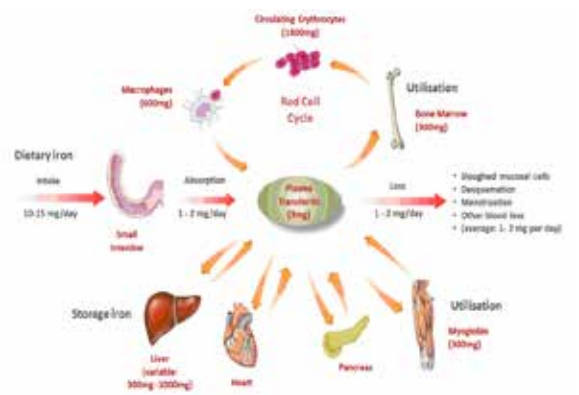

Fig 2: An Overview of Iron Metabolism

After being metabolized, iron is excreted through urine and feces. Approximately 1-2 mg of iron is lost in each day as a result of sloughing of cells. In women, approximately 0.006 mg iron/kg/day is lost during normal menstruation [8]. Iron balance is fundamentally regulated by the rate of erythropoiesis and the size of the iron stores [9].

CLINICAL MANIFESTATIONS: -

1. Fatigue

Fatigue is a common complaint of patients who are anaemic. Latent iron deficiency, that is, iron deficiency without any anaemia at all, may result in fatigue [10].

2. Pica

Pica is the habitual ingestion of unusual food substances, the most common of which is earth or clay [11].

3. Changes in epithelial tissues

Defective structure or function of epithelial tissue seen especially affected are the nails, the tongue and mouth, the hypo pharynx and the stomach.

5. Dysphagia : -

Patients with sideropenic dysphagia feel discomfort in the area of the neck near cricoid cartilage and feel difficult to swallow solid foods. The most common anatomic lesion is a "web" of mucosa at the junction between the nasopharynx and the esophagus.

6. Gastritis and achlorhydria
Gastric biopsy demonstrated the presence of "gastritis" in about 75% of patients with iron deficiency anaemia [12]. This results into decreased gastric juice secretion and finally there will be loss of ability to secrete acid, pepsin and intrinsic factor.

Dysphagia, esophageal web, and atrophic glossitis with iron deficiency anemia, Koilonychia (spoon nails) together called as Plummer-Vinson syndrome [13].

10. Excessive Menstruation
Iron loss through menstruation is common. Maternal iron deficiency anaemia may be associated with preterm delivery and higher maternal mortality [14].

11. Blue sclera
Blue sclera were seen more often in patients with iron deficiency anaemia (87%) [15].

12. Cholelithiasis
Iron deficiency alters metabolism of liver, and leads to cholesterol stone formation in gall bladder [16].

13. Restless legs syndrome. [17].

METHODS:
The blood cell counts, such as R.B.C, Hb levels, W.B.C, Reticulocyte and R.B.C's indices namely MCV, MCH, MCHC were measured by using Advica 120 automated hematology analyzer. But for the confirmation of IDA, biochemical tests such as serum ferritin, serum iron, percentage saturation of transferrin and serum total iron binding capacity are required and measured by ELISA and Immunoturbidimetric assay.

In this study required data collected from 300 blood samples from Sai Apollo Diagnostic center, Kadapa, Y.S.R Dt, A.D.M.R Hospital, Ramanthapur, Hyderabad, Rangareddy Dt, Premananda Hospital, Tirupathi, Chittoor Dt to determine the frequency of iron deficiency anaemia in anaemic patients.

RESULTS:
Table 1: Sex Distribution of IDA

	IDA
Sex	No (%)
Male	150(50%)
Female	150(50%)
Total	300(100%)

Studies showed out of all IDA patients, 30.60% were housewives, 27.76% farmers, 22.20% employees, 11.11% service holders, 2.78% businessman and 5.55% others.

TABLE 2: Age Distribution of IDA

Age	IDA
	No (%)
0-15	8.33(2.78%)
16-30	33.33(11.11%)
31-45	75(25%)
46-60	133(44.44%)
>60	50(16.67%)
Total	300(100%)

Of 300 patients with IDA patients, 150 were male and 150 were female, M: F ratio is 1:1

TABLE 3: Occupation of the IDA

		IDA
Occupation		No (%)
	Agriculture	10(27.78%)
	Housewife	91.66(30.56%)
	Employee	66.66(22.22%)
	Student	33.33(11.11%)
	Business	8.33(2.78%)
	Others	16.66(5.55%)
	Total	300(100%)

DISCUSSION:
The extent of anaemia depends on the presenting complaint. If the patient is suffering with iron deficiency anemia, the Hb level is most probably 8 gm/dl or still lower.

The MCV and MCH values are reduced in acute diseases, and MCHC is reduced in chronic or severe disease. The extent of change in red cell indices depends partly on duration [18] and partly on severity of anaemia. The hypochromic red cell is a direct reliable indicator of iron deficiency through by measuring IDA, indirectly through iron-deficient erythropoiesis [19].

Under steady-state conditions, the serum ferritin level correlates with total body iron stores; thus, the serum ferritin level is the most convenient laboratory test to estimate iron stores. As iron stores are depleted, the serum ferritin falls to <15 g/Lg/L. Such levels are diagnostic of absent body iron stores. During pregnancy, serum ferritin is a reliable indicator of the iron status in the first trimester and becomes less reliable after 20th week due to physiological dilution of plasma [20]. The serum iron level represents the amount of circulating iron bound to transferrin. The TIBC is an indirect measure of the circulating transferrin. The normal range for the serum iron is 50–150 g/dL, the normal range for TIBC is 300–360 g/dL. In iron deficiency anemia serum iron and iron binding capacity are reduced. which is normally 25–50%. Transferrin saturation (TfS) is a measure for the iron load of circulating transferrin. When the transferrin saturation value falls below 16%, are noted in association with both iron deficiency and anaemia of chronic disorders. Transferrin receptors (sTfR) are disulphide-linked transmembrane proteins that facilitate the entry of transferrin bound iron into cells. TfR values do not increase in the anaemia of chronic disease. Thus, the estimation of TfR has been reported to be a reliable indicator of iron deficiency [21].

CONCLUSION:
Iron deficiency anemia is the most common nutritional disorder in the world and is common in developing countries. A prospective study and required data collected from the blood samples of Sai Apollo Diagnostic center, Kadapa, A.D.M.R Hospital, Ramanthapur, Hyderabad, Premananda Hospital, Tirupathi, to determine the frequency of iron deficiency anaemia in anaemic patients. Haematological parameters like blood cell counts and R.B.C. indices namely MCV, MCH and MCHC were studied. The MCV, MCH, and MCHC values were reduced in IDA patients. For the final confirmation Biochemical parameters like estimation of serum iron, serum ferritin and percentage saturation of transferring data collected and analysed. Out of 300 patients of IDA, 133 patients were in age group of 46-60 years, 75 in 31-45 years, 50 in >60 years, 13.33 in 16-30years and 8.33 in < 15 years age group. It should be noted that data showed that IDA is more common in women between 30-50 years age group and in men between 50-70 years age group and our study showed that IDA is most commonly prevalent in 46-60 years age group which includes 62.5% men and 37.5% women.

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