

RESEARCH ARTICLE

IRON DEFICIENCY ANEMIA IN PREGNANCY

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ABSTRACT

Anemia can be considered the most common cause of hematological disorder that more frequent occurs in pregnancy. In developing countries, anemia is a cause of serious different disease, besides many other important effects on the pregnant and the fetus it contributes significantly high maternal mortality and morbidity. According to world Health Organization statistics, up to 56% of all women living in developing countries are anemic the most common cause of anemia in pregnant woman is lack of iron (ferritin deficiency). Less than that, it is caused by folic acid deficiency. In some populations, 82% of pregnancy are anemic. The most risk are women from low socio-economic people and young women. Anemia is easily definition by estimating the hemoglobin concentration and also examining a peripheral blood smear for the characteristic red blood cell changes. The supply of iron is indicated during pregnancy to prevent the possible complications.

Key words: Hemoglobin, Maternal, Iron.

INTRODUCTION

Anemia can define as a shortage of functioning red blood cells (RBCs) and therefore that leads to a different lack of oxygen-carrying ability, causing unusual multiple complications during life time¹. These (RBCs) are manufactured in the bone marrow of body. They have a life expectancy of about 120 days. In addition, the body needs iron, folic acid for erythropoiesis. If there is a shortage of one or more of these ingredients or there is an increased loss of (RBCs), anemia develops. Any pregnant woman with a Hb of less than 11 gm/dl at the start of pregnancy she must be treated as anemic. The reason is that when the pregnancy progresses, the blood will be diluted, and the woman will eventually become anemic.

Incidence: Generally, in tropical countries, the incidence of anemia² in pregnancy is about 40-80%. While in developed countries, it ranges between 10-23%. And approximately it is responsible for 22% of maternal death in developing countries.

Erythropoiesis during a period of pregnancy: The many various factors required for erythropoiesis are proteins (erythropoietin), and minerals (iron), trace elements (zinc, cobalt, copper), vitamins (folic acid, and vitamin B12 [cyanocobalamin], also vitamin C, pyridoxine; riboflavin), in addition to hormones (androgens, thyroxine). and the common deficiencies of iron and folate, there is a growing body of evidence to implicate vitamin A (very important for cell growth and differentiation maintenance of epithelial integrity also normal immune function), Zn (important in building protein synthesis and nucleic acid metabolism) in nutritional anemias. Anemia is a state of low circulating hemoglobin (Hb) in which concentration has clear fallen below a threshold lying at two standard deviations below the median of a healthy population of the same age, and sex, stage of pregnancy.

The WHO definition for diagnosis of anemia in pregnant woman is a Hb concentration of less than 11 g/dl (7.45 mmol/L), a hematocrit of less than 33%.

Classification of anemia in pregnancy

We can classify the anemia into two types³

A. Pathological Anemia in Pregnancy:

Hemorrhagic Anemia

- Acute hemorrhagic Following bleeding in early month of pregnancy or abortion.
- Chronic hemorrhagic: as by hookworm infestation, gastrointestinal bleeding.

Deficiency Anemia

- Iron deficiency
- Folic acid deficiency
- B12 deficiency
- Protein deficiency

Physiological Anemia During Pregnancy

During pregnancy there is usually increase in plasma volume up to 50%, RBC 33% and Hb 18-20% mass. The dilution of blood that happen in pregnancy is a natural process and starts at approximately at the 18 week of pregnancy and progresses until the 32nd to 34th week of pregnancy (Breyman, 2010). In addition, there is clear demand of extra iron during pregnancy especially in the second half of pregnancy. Subsequently, physiological anemia is due to combined effect of hemodilution and negative iron balance.

Clinical features of iron deficiency anaemia

Symptoms: There may be no symptoms sometimes, especially in mild and moderate anemia. But the patient may complain of feelings of weakness, and exhaustion, lassitude, indigestion and loss of appetite, palpitation, dyspnea, giddiness and edema, rarely, generalized anasarca and even congestive cardiac failure can occur rarely in severe cases (Johnson, 2010).

Signs: There may be no signs especially also in mild anemia. Possible to exist pallor, and glossitis, stomatitis. Patients sometimes have edema due to hypoproteinemia. Soft systolic murmur can be heard in mitral area due to hyper dynamic circulation.

Diagnosis: A typical iron deficiency anemia usually shows the following blood values:

- Hb: less than 11 gm%.
- MCV: less than 75% micro mole m³ (meter cube).
- RBC: less 4 million/ mm³.
- PCV: less than 30%.
- MCHC: Less than 30%.
- MCH: less than 25 pg.

Serum iron is below 30 micro gr/ 100 ml. Total iron binding capacity increases to 400 micro gr/100ml. Serum ferritin falls below 15 micro gm/L. To classification the degree of anemia one must look for Hb%, RBC count, and PCV.

- Mild anemia means: Hb- 8-10 gm%.
- Moderate: 7-8 gm%.
- Severe: Less than 7 gm%.

To decided degree of anemia one must examine the PBF (Peripheral Blood Film), hematological indices like MCV, MCH, and MCHC, etc. To detect the cause of anemia, should carefully follow the basic protocols.

- History taking,
- Blood for PBF and malarial parasites,
- Physical examination,
- Routine examination of stool to detect helminths and occult blood,
- Urine is examined for the protein, and sugar, and pus cells,
- X ray chest in sometimes suspected cases of pulmonary tuberculosis; but in case not responding to therapy, also bone marrow study should be undertaken.
- Kidney function tests like BUN and creatinine, etc.
- Effects of anaemia on pregnancy:

Maternal effects (Sharma, 2003):

Mild, anemia maybe not have any effect on pregnancy and labor except that the pregnant women will have low iron stores and maybe become moderately to severely anemic in subsequent pregnancies. Moderate anemia maybe causes increased weakness, and lack of energy, and fatigue, poor work performance. Severe anemia is always associated with poor outcome. The woman maybe has palpitations, tachycardia, and breathlessness, increased cardiac output leading on to cardiac stress which can cause de-compensation and cardiac failure which may be cause death. and increased incidence of pre-term

labor (28.2%), and pre-eclampsia (31.2%) and sepsis have been associated with anemia.

Fetal effects (Sharma, 2003): Irrespective of maternal iron stores in the pregnancy, the fetus still obtains the need of iron from maternal transferrin, which is trapped in the placenta, and actively transports iron to the fetus. Gradually, such fetuses tend to have decreased need of iron stores due to depletion of maternal stores. Adverse perinatal outcome in the form of preterm and small babies for gestational age, and increased perinatal mortality rates have been clearly observed in the neonates of anemic mothers. Iron supplementation to the pregnant mother during pregnancy improves perinatal outcome. And mean weight, Apgar score and hemoglobin level three month after birth were significantly greater in babies of the supplemented group comparative than the placebo group.

Differential Diagnosis (Pavord et al., 2012)

- Infection,
- Hemoglobinopathies
- Nephritis

Treatment of iron anemia during Pregnancy (<http://www.health.sa.gov.au/ppg/Default>)

***Dietary prescription:** Choose diet rich in iron and portion like meat, eggs, and green vegetable etc.

Medication Therapy:

Depending on

- Severity of anemia,
- Duration of present pregnancy,
- Existence complicating factor.

Oral: For prophylaxis usually recommends 100 mg of elemental iron daily with 0.5 mg folic acid. for treatment is required more than 180 mg of elemental iron per day. Three tablets of ferrous sulphate are required per day. This may increase incidence of side effects so that some recommend 120 mg elemental iron per day, which is actually more suitable for supplementation rather than treatment. Diet which have high content of inhibitor for iron absorption. One needs to change a brand only when the pregnant woman cannot tolerate it. Addition of folic acid helps in improving the results in supervised supplementation. Up to 10% of pregnant women may have side effects with oral iron tablet in the form of gastrointestinal symptoms such as nausea, vomiting, and constipation, abdominal cramping, diarrhea which are related to the dose. It is possible to reduce the dose. If this does not work enough, another preparation (carbonyl) iron or hemoglobin preparations may be better tolerated⁹. Response to therapy feeling of well, and improved look also better appetite. Hematological, there is reticulocyte response in 5- 10 days with a rise in (Hb) concentration about from 0.3 g to 1.0 g per week and hematocrit subsequently. If there is no significant clinical or hematological improvement within about 3 weeks, at this point diagnostic re-evaluation is needed. The most reasons of failure to respond to oral therapy are incorrect diagnosis non-iron deficiency microcytic anemia, such as thalassemia, and pyridoxine deficiency, lead poisoning, non-compliance, or bleeding hemorrhoids, co-existing infection, faulty iron absorption and concomitant folate deficiency.

Parenteral iron therapy: The rise in hemoglobin concentration is the same as with oral iron supplement (up to 1 g per week).

Indications

- Poor tolerance to oral therapy.
- Poor absorption of iron for example in chronic diarrhea, ulcerative colitis, and coeliac disease or inflammatory bowel disease.
- Non-compliance
- Oral iron is not effective after treatment with sufficient duration.
- Women near term and complain with severe anemia.
- Presence of concurrent disease like chronic renal failure when pregnant woman is on hemodialysis or being treated with erythropoietin.

Technique of giving parental iron during pregnancy:

Intravenous route: It is essential to have all the resuscitation equipment before giving test dose, and drugs ready Iron dextran (Imferon) is diluted in normal saline or 5% dextrose, then given slowly initially¹⁰. It can be given faster if there is no reaction, If the calculated dose is more than 2500 mg, it should be even in 2 separate doses on two consecutive days. One should look carefully for any reaction in the form of chest pain, rigor, and chills, fall in blood pressure, and dyspnea, anaphylactic reaction. For any such reaction, infusion should stop quickly and anti-histaminic and corticoids, epinephrine it should be given.

The intramuscular route: It is more popular in several States and is associated with less side effects. Before giving intramuscular injection, it is important to test for hypersensitivity. Oral iron should be stopped before and full dose of iron can be given daily on alternate buttocks by deep intramuscular injection. Giving iron sorbitol is associated with toxic reaction such as headache, nausea and vomiting. Disadvantages of intramuscular route are pain, sterile abscess formation place of injection, and nausea, vomiting, headache, also fever, lymphadenopathy, allergic reactions and rarely anaphylaxis.

Blood transfusion:

Advantage of blood transfusion (Milman, 2006):

- Supplies natural content of blood antibodies,
- Increased O₂ carrying capacity quickly,
- Stimulating by erythropoietin,
- Hemoglobin from hemolyzed RBC,
- Improvement is expected after three days.

Prognosis (The American College of Obstetricians and Gynecologists)

Maternal aspect

- If detected early and proper treatment is instituted, anemia improves promptly.
- Substantial chances of recurrence in next pregnancy.
- Contributes to about 2,1-% maternal death in developing countries.

Fetal aspects:

- Anemia develops at neonatal period.
- Preterm labor.
- LBW (Low Birth Weight).

Other Complications of severe anemia (Pasricha, 2010):

During labor: Uterine inertia, PPH, Cardiac failure, Shock. During puerperium: Subinvolution, Puerperal sepsis, Failing lactation.

DISCUSSION

Iron deficiency is the commonest cause of anemia in pregnancy. It usually occurs due to low iron stores in the body before to pregnancy. The growing fetus usually depletes what stores there are and takes priority for any iron available. Less often, anemia in pregnant woman is caused by folic acid deficiency. Pregnancy can be complicated by sickle cell trait and anemia. In some populations, as many as 82% of pregnant women are anemic. They are generally women live in lower socio-economic groups in developing countries as well as pregnant teenagers (Bryant, 2009). Women who suffer from heavy periods and those who became pregnant soon after the birth of a child are at high risk of becoming anemic. The symptoms such as tiredness and general weakness will be like those of any other type of anemia. In severe cases, the woman will complain from short of breath even at rest.

If the anemia is prolonged, other symptoms and signs of iron deficiency anemia may develop such as a smooth, shiny, tongue and tenderness of the skin at the corners of the mouth. these advanced signs are rare. The diagnosis is usually made by examining a full blood count and noting the low hemoglobin concentration as well as the characteristic small, pale red blood cells under the microscope. The diagnosis can be confirmed by measuring the amount of storage iron in the body as well as the levels of iron binding proteins in the blood. The diagnosis of folate deficiency can be confirmed by estimating the red blood cell folate levels. When the anemia is caused by shortage of iron, it is treated with iron supplements, preferably ferrous sulphate tablets, the side effects of iron are increased when the daily dose increase. The side effects are stomach upsets and constipation which are problematic in pregnancy (Simpson, 2010) If the anemia does not respond to iron treatment for an adequate period, other causes of anemia should be evaluated. If the anemia is treated and corrected, there should be no problem. In majority cases, the management of anemia in pregnancy is easy worthwhile if the pregnant women their guardians remain attentive to protect the health of mother and baby both. They need to ensure proper antenatal checkup, perinatal and postnatal cares and take regularly all medical advice.

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