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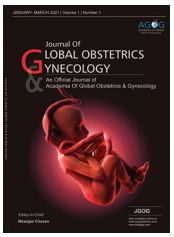
Review Article



Management of Severe Anemia in Pregnancy

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ABSTRACT

Anemia is one of the most common medical disorder encountered in pregnancy especially in developing countries in India. World Health Organization (WHO)/World Health Statistics data shows that 40.1% of pregnant women worldwide were anemic in 2016.There is marginally decrease in prevalence of anemia in pregnant women in India from 58% in NFHS-3 (National Family Health Survey-2005-06) to 50 % in NFHS-4 survey (2015-16) The normal physiologic changes of pregnancy causes to hemodilution leading to physiologic anemia of pregnancy. The most common cause of anemia during pregnancy is iron deficiency anemia (approximately 75%). Nutritional deficiency and inadequate supplementation during pregnancy can present with severe anemia. Severe anemia may have adverse effects on the mother and the fetus and is associated with poor perinatal outcome. Prematurity, spontaneous abortions, low birth weight, and fetal deaths are complications of severe maternal anemia. Severe anemia can be treated with parenteral iron or blood transfusion depending on the period of gestation and severity of anemia. Parenteral iron comes with multiple options but as ferric carboxymaltose must be preferred for safety reasons as proved well controlled clinical trials.

Key words: Anemia, Blood, Complications, Diagnosis, Therapy, Iron deficiency

INTRODUCTION

Anemia is one of the most common medical disorders encountered during pregnancy, especially in the developing countries. It has many maternal and perinatal adverse effects, contributing to high maternal mortality.

DIAGNOSIS OF IRON DEFICIENCY ANEMIA IN PREGNANCY

History and Clinical Examination

A history of fatigue, alopecia, pica, restless leg syndrome, and pagophagia should be asked for.

Examine for pallor, koilonychia, atrophic tongue papillae, glossitis, and stomatitis.

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Severe cases present with congestive cardiac failure such as orthopnea, edema, raised jugular venous pulse, and pulmonary crepts and would require urgent treatment.[1]

Investigations

Hemoglobin and severity of anemia — Hb and hematocrit should be done at first visit, 28–30 and 36 weeks. Sahil's methods are reliable for estimation of hemoglobin.

The most commonly used method is complete blood count.[2]

ICMR Classification of anemia:[2]

- Mild - 10–11 g/dL
- Moderate - 7–10 g/dL
- Severe - 4–7 g/dL
- Very severe <4 g/dL.

Peripheral Blood Smear

RBC indices and morphology are recommended as the first step in the evaluation of pregnancy associated anemia and it helps to differentiate the type of anemia.

Normal smear — Normocytic (normal size RBC), normochromic (normal color RBC)

Iron deficiency [Figure 1] — Microcytic (small RBC), hypochromic (pale RBC), anisocytosis (variation in size),

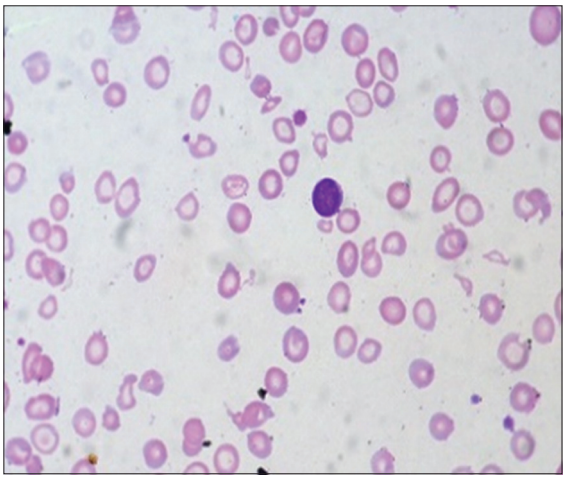

Figure 1: Peripheral blood smear: Microcytic hypochromic red blood cells with anisocytosis in iron deficiency anemia

poikilocytosis (variation in shape), with or without target cells.

Malarial parasites can be seen.[2]

Aplastic anemia shows low/no count.[2]

Sickle cells can be demonstrated.

Target cells in thalassemia.[2]

RBC Indices

IDA is characterized by microcytosis, (low MCV < 80 fl) and hypochromia (Mean Corpuscular Hemoglobin {MCH} < 27 pg) and blood film may show presence of characteristic microcytic cells or pencil cells. A marked increase in RDW occurring early after the initiation of therapy can be used for confirmation of IDA.[1]

RBC count — decreases in anemia (N 3.2 million/c mm)

PCV — < 32%, (N37–47%)

MCH — Decreases

MCHC — Decreases, one of the most sensitive indices (N26–30%).[2]

Blood indices help in differentiating microcytic anemia on peripheral blood smear.

Serum Ferritin

Serum ferritin is a more sensitive and specific marker for iron deficiency anemia than serum iron, transferrin saturation. For confirming iron deficiency in pregnancy low serum ferritin values is regarded as the best test. Some studies suggest that serum ferritin cut off of 30 μg/dl to be used for diagnosis and management of iron deficiency anemia in pregnancy.[1]

- Hb electrophoresis or chromatography is indicated to exclude genetic diseases such as β-thalassemia
- In cases of megaloblastic anemia, Vitamin B12 should be measured since vitamin B12 deficiency is a common condition. Folic acid deficiency anemia, instead, is less frequent
- Bone marrow activity — reticulocyte count (*n* 0.2–2%), higher bone marrow activity is seen in:
  - Hemolytic anemia

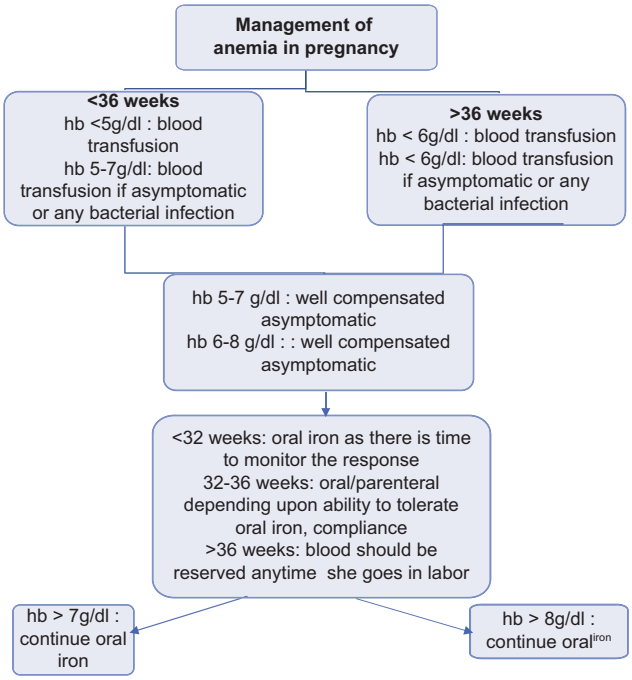

Chart 1: Management of severe anemia in pregnancy

- Following acute blood loss
- Iron deficiency anemia on treatment.[2]

TREATMENT OF SEVERE ANEMIA IN PREGNANCY

The choice of the treatment of anemia depends on the cause of anemia and its severity, gestational age, risk factors, and comorbidities. Management of severe anemia in pregnancy is summarized in Chart 1.

Parenteral Iron

Indications of parenteral iron:

- Poor compliance to oral iron therapy
- Intolerance to oral iron therapy
- Gastrointestinal side effect where oral iron is contraindicated
- Malabsorption syndrome
- Severe anemia with chronic bleeding
- Women on hemodialysis
- Iron deficiency anemia presenting late in pregnancy.

Contraindications to parenteral iron:

- Iron overload states like thalassemia
- Hypersensitivity to iron
- Anemia not caused by iron deficiency like hemolytic anemia
- History of eczema, asthma, and allergy
- Active renal disease
- Acute and chronic infection
- Disturbance in iron utilization hemosiderosis hemochromatosis.

Adverse effects of parenteral iron:

- Acute anaphylaxis: Collapse, fever, rigor, nausea, and vomiting
- Delayed reactions: Fever, arthralgia, myalgia, and lymphadenopathy

- Local reactions: Staining of skin, abscesses, and thrombophlebitis
- Exacerbation of joint pain in rheumatoid arthritis.

Parenteral iron dose calculation:

- Total dose in mg = 2.4*wt in kg* deficit (target hb-actual hb) +500.[3]

Iron Sucrose

IV iron sucrose complex has a better a side effect profile than oral iron and is safe and efficacious in pregnancy. The maximum dose in a single administration should not exceed 200 mg. The infusion time should be at least 15 min for 100 mg and 30 min for 200 mg. Multiple doses may be required.[4]

Ferric Carboxymaltose

FCM is the first-choice IV iron preparation in cases in which parenteral iron therapy is recommended. FCM is a stable complex. FCM was found to be safe and effective IV iron product in pregnancy according to many randomized studies. It has lesser side effects compared to oral iron. FCM does not cross the placenta. The maximum daily dose is 1000 mg/20 mL. The administration rate should be 100–500 mg/min. Administration time is a minimum of 15 min for doses of 500–1000 mg. It can be given in the antenatal and postnatal period.[5]

Role of Erythropoietin

Some studies have shown recombinant human erythropoietin (RhuEPO) to be safe and effective in severe anemia in peripartum period. It should be used with IV iron. It is advised to patients with antepartum and postpartum hemorrhage. It can also be given to patients with rare blood groups. However, currently, there is insufficient evidence for routine use of EPO in pregnancy except in cases with renal disease.[6]

Blood Transfusion

Indications of blood transfusion in pregnancy with iron deficiency anemia:

Antepartum period	Intrapartum period	Postpartum period
Pregnancy <36 weeks a. Hb<5 g/dL with or without signs of cardiac failure or hypoxia b. 5–7 g/dL with presence of impending heart failure, hemodynamic instability orb. acute hemorrhage Pregnancy>36 weeks a. Hb<7 g/dL even without signs of cardiac failure or hypoxia b. Severe anemia with decompensation or acute hemorrhage with decompensation c. Hemoglobinopathy/Bone marrow failure syndromes or malignancy	a. Hb<7 g/dL (in labor) Decision of blood transfusion depends on medical history or symptoms b. Severe anemia with decompensation or acute hemorrhage with decompensation	a. Anemia with signs of shock/ acute hemorrhage with signs of hemodynamic instability b. Hb<7 g %: Decision of transfusion depends on medical history or symptoms

GENERAL PRINCIPLES OF BLOOD TRANSFUSION

- Consent for blood transfusion

A valid consent should be taken from the patient prior to administering a blood transfusion.

In case of an emergency, if it is not possible to take consent, provide information on blood transfusion retrospectively.[3] The indication of transfusion and consent should be documented in the patient's medical record.

- Blood grouping and cross-matching

Blood grouping should be done immediately and cross matched bag should be kept ready. Group and screen samples used for provision of blood in pregnancy should be less than 3 days old.[6]

- Urine (Foley's) catheter should be inserted pre-transfusion
- Diuretics should be given pre-transfusion to prevent fluid overload which may lead to complications such as cardiac failure and pulmonary edema. Input output record should be maintained
- Pretransfusion antihistaminic drugs and steroids should be given prophylactically to prevent transfusion reaction
- The initial administration of blood should be very slow as a life-threatening reaction may occur
- Blood should be started within 30 min after removal from the refrigerator and completed within 4 h of commencement of transfusion. Blood transfusion should not exceed 15–20 drops per minute
- In case of fever, chills, breathlessness, or any other feature of adverse transfusion reaction transfusion should be stopped immediately. Steroids should be given and patient should be monitored.

MANAGEMENT OF LABOR IN SEVERE ANEMIA

First Stage

- The patient should be propped up
- Oxygen should be given if required
- Intermittent chest auscultation
- Secure intravenous access with wide bore cannula
- Minimal vaginal examination
- Strict asepsis to be maintained
- Partograph to be maintained
- Fluid restriction
- Start antibiotic prophylaxis.

Second Stage

- Cut short the second stage. Assisted vaginal delivery – Ventouse or forceps to prevent maternal exhaustion and blood loss
- Avoid unnecessary episiotomies, tears if present to be repaired immediately
- Strict asepsis to be maintained
- Restrict intravenous fluids
- Oxygen if required should be given in concentrated form to avoid fluid overload.

Third Stage

- Active management of third stage
- Keep uterotonics ready. Injection methergine is contraindicated in patients with congestive heart failure. Hence, tablet misoprostol 800 microgram is preferred. Oxytocin if required can be given as concentrated infusion – oxytocin 20 units in 500 ml of RL at a rate less than 125 ml/h (Even a small amount of blood can cause decompensation)
- Look for genital trauma.

Puerperium

- Watch meticulously at least for 6 h postpartum for any signs of failure
- Prophylactic antibiotics can be given if episiotomy was given
- The mother should have adequate rest
- Urine output should be monitored and it should be more than 30 ml/h
- Iron and folate therapy should be continued for least 3 months to build up iron stores
- Any infection must be treated such as urinary tract infection and respiratory tract infection
- Contraceptives should be advised
- Consider thromboprophylaxis in appropriate cases.

COMPLICATIONS OF SEVERE ANEMIA DURING PREGNANCY

During Pregnancy

- Poor weight gain
- Decrease immune response
- Preterm labor
- Congestive cardiac failure at 30–32 weeks
- Decreased work capacity.

During Labor

- Dysfunctional labor
- Congestive heart failure. Injection methergine is contraindicated in patients with congestive heart failure. Hence, tablet misoprostol 800 microgram is preferred. Oxytocin if required can be given as concentrated infusion – oxytocin 20 units in 500 ml of RL at a rate less than 125 ml/h
- Inability to stand even slight blood loss.

Puerperium

- Puerperal sepsis
- Subinvolution
- Lactation failure.

CONCLUSION

Anemia is a major indirect cause of maternal mortality. Timely diagnosis and prompt management of severe anemia in pregnancy can reduce the maternal and fetal outcome.

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