Anemia in Pregnancy

Malek Al Qasem , MD
MFM, Mutah university 2023

Introduction

- Anemia is common in pregnancy

(from 5.4% in developed countries to more than 80% in developing countries)

- Anemia in pregnancy has been associated with maternal and fetal adverse outcomes

Introductions

- Hb used to define anemia in pregnancy is lower than in non-pregnant patient
- an increased requirement of iron in pregnancy so the iron deficiency remains the most common cause of anemia in pregnancy and warrants a preemptive approach to prevent a further reduction in Hb
- Anemia secondary to sickle cell disease and autoimmune hemolytic anemia merit special attention because there are risks secondary to red blood cell transfusion and risks to withholding transfusion

Normal physiological changes in pregnancy

Alterations of hematological parameters particularly in a reduction of hemoglobin (Hb) concentration :

- **Total blood volume increases by 50 %**
- **Plasma volume rises from 6 weeks gestation progressively increasing to a peak at 32 weeks' gestation (due to hormone-mediated vasodilation subsequent activation of the renin-angiotensin aldosterone system)**

Physiological anemia

During pregnancy :

- angiotensinogen rises with estrogen production
- Increased vasopressin leading to salt and water retention
- RBC mass increases from early 2nd trimester around 30-35% a lesser degree compared with plasma volume
- The increase in RBC mass results from an increased
- erythropoietin level in response to circulating progesterone and placental lactogen
- The disproportionate increase in plasma volume to RBC mass leads to a decreased Hb and hematocrit levels

World Health Organization

Anemia in pregnancy defined as :

- **By Hb <110 g/l in the first trimester**
- **<105 g/l in the second and third trimesters**
- **<100 g/l in the postpartum period**

Complications of anemia in pregnancy

65% ↑ in Anaemia

↑Risk of stroke

Folate deficiency

↑Cerebral complications

61% ↑ infection

25% ↑ Miscarriage

↑ Still birth rate

↑ Pelvic inflammation

Thrombophlebitis

Papillary necrosis

↑ Rate of meningitis

↑ Perinatal mortality

↑ Bone crisis

↑ Rate of amnionitis

↑ Caesarean section rate

↑ Sickle chest syndrome

↑ Pulmonary complications

13% ↑ Premature birth

25% ↑(IUGR)

Splenic sequestration

↑ Infertility

5% ↑ Hypertension

↑ Painful crisis

↓ Placenta weight/

↑Placenta praevia rate

↑Maternal Mortality

Anemia in pregnancy

- Microcytic anemia – iron or thalassemia
- Megaloblastic anemia – b12 or folate
- Heamoglobinopathy –sickle cell anemia

Microcytic Anemia

Thalassemia

- Adult Hb consists predominantly of HbA composed of α and β globin
- Adult Hb also consists of a small proportion of HbA2 (α2δ2) and HbF (α2γ2)
- Thalassemia refers to the reduced production

of α and/or β globin chains due to mutations in the α and/or β globin genes

The laboratory parameters suggestive of thalassemia consist of a microcytic, hypochromic anemia

Thalassemia overview

- Microcytic hypochromic anemia
- Worldwide commonest inherited single gene disorders
- Absent or decreased normal @ and B globulin chains
- Autosomal recessive condition
- Heterozygous called trait
- Homozygous called disease.
- Women with trait status no special care
- Women with HbH may have successful pregnancy
- Close medical evaluation and follow up
- Increase risk of neural tube defect due to folic acid deficiency

Management and counseling

- **All women should be offered heamoglobinopathy screening**

To:

- **Identify early those at risk of affected baby**
- **Offer prenatal diagnosis**
- **To prevent infant morbidity and mortality**
- **Counsel:**
- **Maternal and fetal risk**
- **If fetus affected involve pediatricians**
- **Folic acid 5 mg before and during pregnancy**
- ***No specific intrapartum or postpartum care***

Alpha thalassemia

- Alpha major incompatible with life
- HbH disease:
- Mild to moderate hemolytic anemia
- Adult: worsened in pregnancy
- Hepatosplenomegaly
- effect of pregnancy on alpha thalassemia:
- Normal outcome alpha trait
- Maternal risk
- 1. gestational hypertension 50%
- 2.pre eclampsia 30%
- 3.placenta abruption
- 4.obstracted labor-- large baby—
- 5.APH , PPH and DIC

Alpha thalassemia

- ***Effect of alpha thalassemia on pregnancy:***
- **Alpha trait normal outcome**
- **Alpha major:**
- **Incompatible with life baby.. Severe anemia…hydrops fetalis…**
- **Abnormal organogenesis .. Polyhydroaminosis .. placentomegaly**
- **Stillbirth**

Beta thalassemia

- **Effect of pregnancy on B thalassemia:**
- **Trait ---mild anemia**
- **Major—risk of blood transfusion increasing**
- **Effect of B thalassemia on pregnancy:**
- **Trait--- normal outcome**
- **Major— a. fetal hypoxia due to maternal anemia**
- **b. IUGR**
- **c. preterm birth**
- **Maternal complications of iron overload**
- **If short stature with pelvic bone deformity --- CPD -- risk of CS increasing**

Iron deficiency anemia

- The most common type of anemia during pregnancy 75% of cases
- Is caused by blood loss, insufficient dietary intake, or poor absorption of iron from food
- Diagnosis :if microcytic do iron study
- Ferritin level has the greatest sensitivity and specificity

Signs and symptoms

- Irritability
- Angina (chest pain)
- Palpitations (feeling that the heart is skipping beats or fluttering)
- Breathlessness
- Tingling, numbness, or burning sensations
- Glossitis (inflammation or infection of the tongue)
- Angular cheilitis (inflammatory lesions at the mouth's corners)
- Koilonychias (spoon-shaped nails) or nails that are brittle
- Poor appetite
- Dysphagia (difficulty swallowing) due to formation of esophageal webs (Plummer-Vinson syndrome)
- Restless legs syndrome

Lab test

Parameters

- ↓
- **ferritin, hemoglobin, mean corpuscular volume, mean corpuscular hemoglobin**
- ↑
- **total iron-binding capacity, transferrin, red blood cell distribution width**

Treatment

RCOG guidelines recommendations:

Iron supplement for all women after 12 weeks if there is no contraindications

Daily elemental iron 30 mg prophylaxis
60-120 mg treatment

Iron dosage

- Ferrous sulfate 325 mg ----65 mg elemental iron
- Ferrous gluconate 300 mg – 34 mg elemental iron
- Ferrous fumarate is a large compound compared to ferrous sulfate.
- 300 mg ------ 98.6 mg iron
- Foods rich in ascorbic acid (vitamin C) enhances iron absorption

Indications for IV iron therapy

1. can’t take iron by mouth

2.can’t absorb iron adequately through the gut have inflammatory bowel disease or other intestinal illnesses that are aggravated by oral iron supplements

3.can’t absorb enough iron due to blood loss

4.need to increase iron levels fast to avoid medical complications or a blood transfusion

All types of treatment can increase Hb by 0.8g/dl/week

Side effects

IV iron has minimal side effects, but should be monitored for:

- **Gastrointestinal pain such as nausea and cramping**
- **Difficulty breathing**
- **Skin irritations/rash**
- **Chest pain**
- **Low blood pressure**
- **Anaphylaxis which can include difficulty breathing, itching, and rash**

Megaloblastic anemia

- Impaired DNA synthesis ---ineffective erythropoiesis
- Folic acid deficiency 2nd most common during pregnancy
- Less common B12 deficiency ?difficult to detect (folic acid supplements masking B12 deficiency)
- Slowly progressive
- Tend to occur mostly in 3rd trimester
- Usually symptoms: weight loss , anorexia ,Glossitis , may bleeding due to thrombocytopenia

Megaloblastic anemia

Lead to poor outcomes :

- **1.placenta abruption**
- **2.preeclampsia**
- **3.IUGR**
- **4.PTL**
- **5. folic acid deficiency may lead to open neural tube defects**

Megaloblastic anemia

- Laboratory:
- Macrocytic normochromic anemia
- Peripheral blood smear hypersegmented neutrophils---oval macrocytes ---
- And Howell-Jolly bodies
- Erythrocyte folate level the best indicator than the serum level

Treatment

- **Folate deficiency: treated with folic acid 1mg/day with in 10 days WBC and Platelet normalize**
- **Hb increases after several weeks**
- **B12 deficiency: IM cobalamin 1mg monthly or sublingual**

Hemoglobinopathies

- Genetic abnormalities
- Hb A -qualitative (structural abnormalities)
- sickle cell disease quantitative(decreased number of normal globin)
- (thalassemias)

Sickle cell anemia

- Autosomal recessive
- Sickle shaped RBCs
- Common in--- African Americans 8%
- ---- Middle East ,Indian
- Risk of sickling increased during pregnancy (metabolic requirements)
- Risk of vascular stasis +hypercoagulable status

Sickle cell disease

- Hb S sickle cell anemia
- Hb S C sickle cell hemoglobin C
- Hb S – Thal sickle cell – thalassemia
- Hb SS Homozygosis most common phenotype (Sudi Arabia)
- Less soluble and tends to polymerize and distort RBCs
- ---- hemolytic anemia ---extravascular hemolysis--- chronic anemia ---microvascular obstruction --- ischemia –infraction(vaso-occlusive crisis)

Sickle cell anemia

- Points:
- 1.Pregnant with sickle cell trait have twice the frequency UTIs
- SCA patients should be screened UTIs each trimester
- Blood pressure checked every visit
- One in four child will be effected if parents have SC trait
- Clear care for those women

Pregnancy and Sickle cell disease

- 1. spontaneous miscarriage
- 2.IUGR
- 3.IUFD
- 4.SGA
- 5.preeclampsia
- 6.preterm labor
- 7.UTI more 2 time

Diagnosis

- Normocytic normochromic anemia
- The reticulocyte count increased 3-15 %
- Lactate dehydrogenase elevated
- Hepatoglobin is decreased
- Peripheral blood : sickle cell, target cell ,Howell-Jolly bodies

***Screening and diagnosis by hb electrophoresis (Hb S 85-100%, absent Hb A , normal Hb A2 , Hb F elevated more than 15 %)

Management

- Hydroxyurea not recommended in pregnancy(sould stopped 3 month before pregnancy)
- Infections treated with antibiotics.
- Severe anemia needs blood transfusion in more severe plasma exchange.
- Pain crises managed with O2 , hydration (vomiting and nausea common),analgesia
- Before pregnancy should receive pneumococcal vaccine
- Folate supplements 4 mg/day
- Low dose Aspirin prophylactic PET
- Iron supplements only by indication

Management

- Fetal well being twice weekly since 32 weeks
- Low-molecular weight heparin any antenatal hospital period if no contraindications
- Fetal growth weekly in 3rd trimester
- Avoid dehydration , stress intrapartum
- Avoid pethidine ---increased risk of seizures
- After delivery early ambulation and wear stocking to prevent thromboembolism
- Contraception : excellent options Mirena and POP
- COC– avoid
- Medroxyprogesterone acetate decrease pain crises

Blood transfusion in sickling patients

- May precipitate a crisis if sudden increases Hct
- Hb 6-8 glDL is typical for HbSS
- Consider transfusion :
- Severe anemia
- Multiple pregnancy
- Per eclampsia
- Acute chest syndrome
- Acute renal failure
- ** target level <30 % of sickle cells in circulation
- Partial exchange transfusion

Time and mode of delivery

- SCD normal growing fetus Induction of labor or CS(by indication) at 38 weeks
- SCD not an indication for CS
- Prepare cross matched blood before delivery
- Hematologist should be consulted
- Continuous intrapartum fetal monitoring

Key points

- Offer screening for anemia at booking and 28 weeks this allows time for treatment
- Hb < 11 or 10.5 in 2nd trimester need investigation
- Anemia risk for Preterm labor
- The parenteral iron should only be considered for intolerant women
- At term iron deficiency anemia treated with blood transfusion

Thank you