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Imad S. Mufarrij, MS, MD, FACOG
C. Professor of OBGYN and Co-Director of
Minimally Invasive Surgery fellowship
George Washington University
Director, OBGYN Education, Holy Cross Hospital

MEDICAL CARE OF PREGNANT WOMEN



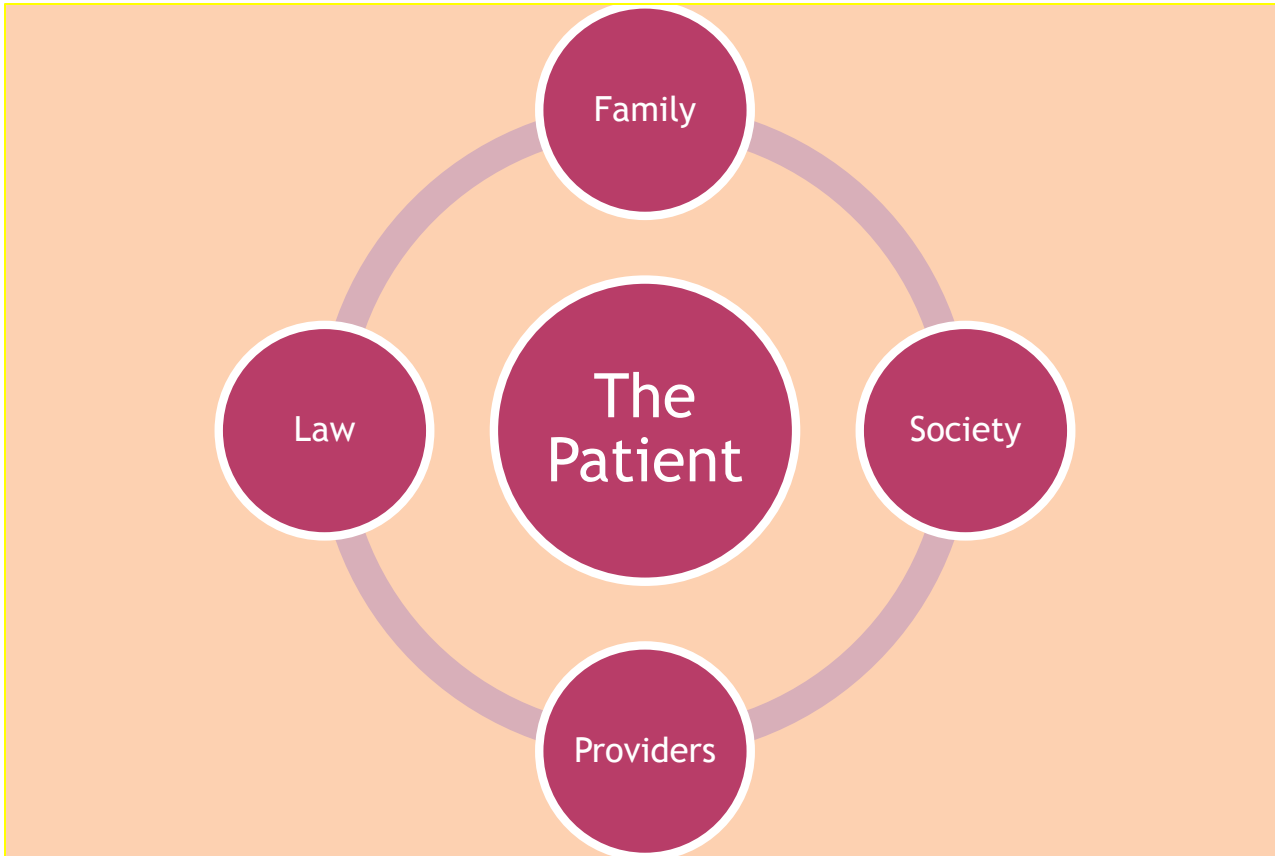
Anemia in Pregnancy

KEY ISSUES

- ◉ Anemia
- ◉ Thrombophilia and Pregnancy
- ◉ Infections
- ◉ Abnormal Pap Smear
- ◉ Vulvovaginal Disorders
- ◉ Breast
- ◉ Pulmonary
- ◉ Vaccination
- ◉ Cancer

KEY ISSUES

- Fitness
- The Workplace
 - Safety
 - Discrimination
 - Disability
- Psychosocial
 - Domestic Violence
 - PPD



BEYOND PREGNANCY PREVENTION-NUTRITION-FITNESS

- ◉ Personal Health
- ◉ Family Health

ANEMIA

- Centers for Disease Control and Prevention defines anemia as a hemoglobin or hematocrit value less than the fifth percentile of the distribution of Hgb or Hct in a healthy reference population based on the stage of pregnancy.
- Classification derived from an iron-supplemented population lists the following levels as anemic:
 - 1st trimester Hgb (g/dL) and Hct (percentage) levels below 11 g/dL and 33%, respectively
 - 2nd trimester: below 10.5 g/dL and 32%
 - 3rd Trimester: below 11 g/dL and 33%

Anemia Classification

Acquired

- Deficiency anemia (eg, iron, vitamin B₁₂, folate)
- Hemorrhagic anemia
- Anemia of chronic disease
- Acquired hemolytic anemia
- Aplastic anemia

Inherited

- Thalassemias
- Sickle cell anemia
- Hemoglobinopathies (other than sickle cell anemia)
- Inherited hemolytic anemias

Anemias Characterized by Mechanism

Decreased red blood cell production

- Iron, B12 or Folic acid deficiency
- Bone marrow disorders
- Bone marrow suppression
- Low levels of erythropoietin
- Hypothyroidism

Increased red blood cell destruction

- Inherited hemolytic anemias
- Sickle cell anemia
- Thalassemia major
- Hereditary spherocytosis
- Acquired hemolytic anemias
- Autoimmune hemolytic anemia
- Hemolytic anemia associated with TTP, Hemolytic Uremic Syndrome and malaria
- Hemorrhagic anemia

ANEMIAS CLASSIFIED BY MCV

MICROCYTIC (MCV < 80 FL)

- ◉ Iron deficiency anemia
- ◉ Thalassemias
- ◉ Anemia of chronic disease
- ◉ Sideroblastic anemia
- ◉ Anemia associated with copper deficiency
- ◉ Anemia associated with lead poisoning

NORMOCYTIC ANEMIA (MCV80-100FL)

- Hemorrhagic
- Early iron deficiency
- Chronic disease
- Bone marrow suppression
- Chronic renal insufficiency
- Endocrine dysfunction
- Autoimmune hemolytic
- Hypothyroidism or hypopituitarism
- Hereditary spherocytosis
- Hemolytic anemia associated with paroxysmal nocturnal hemoglobinuria

MACROCYTIC ANEMIA (MCV > 100FL)

- Folic acid deficiency
- Vitamin B12 deficiency
- Drug induced hemolytic anemic (zidovudine)
- Associated with:
 - Reticulocytosis
 - Liver disease
 - Alcohol abuse
 - Acute myelodysplastic syndrome

PHYSIOLOGIC CHANGES

- Increased iron requirements: blood volume expands by ~50% (1000 ml) and RBC mass by 25% (300ml)
- Total iron determined by intake, loss, and storage
- Functional iron > 70% rest is in storage
- Most (80%) of functional iron is in RBC's as hemoglobin and the rest is in myoglobin and respiratory enzymes

IRON DEFICIENCY

Defined as abnormal values on biochemical test results, increases in hemoglobin concentrations of more than 1 g/dL after iron treatment, or absent bone marrow iron stores on a marrow iron smear.

Spectrum of iron deficiency:

- iron depletion (stored iron is low)
- iron deficient erythropoiesis (both stored and transport iron are low)
- iron deficiency anemia (stored, transport, and functional iron are low)

Table 1. Normal Iron Indices in Pregnancy

Test	Normal Value
Plasma iron level	40–175 micrograms/dL
Plasma total iron-binding capacity	216–400 micrograms/dL
Transferrin saturation	16–60%
Serum ferritin level	More than 10 micrograms/dL
Free erythrocyte protoporphyrin level	Less than 3 micrograms/g

LAB RESULTS IN IRON DEFICIENCY

- Microcytic,
- Hypochromic anemia
- Low plasma iron levels
- High total iron-binding capacity
- Low serum ferritin levels,
- Increased levels of free erythrocyte protoporphyrin

SERUM FERRITIN

- ◉ Level has the highest sensitivity and specificity for diagnosing iron deficiency in anemic patients
- ◉ Levels of less than 10-15 micrograms/L confirm iron-deficiency anemia

DIETARY RISK FACTORS

- Reduced intake of iron rich foods such as clams, oysters, liver, beef, shrimp, turkey, enriched cereals, beans, and lentils
- Diet poor in absorption enhancers such as orange juice, grapefruit, strawberries, broccoli, and pepper
- Foods that diminish iron absorption: dairy, soy, spinach, coffee, and tea
- Pica

OTHER RISK FACTORS

- Gastrointestinal disease affecting absorption
- Heavy menses
- Short interpregnancy interval
- Blood loss at delivery exceeding that of an uncomplicated vaginal delivery
 - Placentation Problems
 - Macrosomia
 - Fibroids
 - Multiple Gestation

IRON SUPPLEMENTATION WITHOUT ANEMIA

- ◉ Decreased maternal anemia at delivery .
- ◉ Questionable benefit regarding perinatal outcomes.
- ◉ The only downside is GI intolerance, except in patients with hemochromatosis or other genetic disorders.

WHO SHOULD BE SCREENED DURING PREGNANCY?

- All pregnant women should be screened for anemia during pregnancy.
- Those with iron deficiency anemia should be treated with iron and vitamins.
- Patients with other anemias require further evaluation.

- The CDCP recommends screening for iron deficiency anemia in pregnant women and universal iron supplementation to meet the requirements of pregnancy except in certain genetic disorders (hemochromatosis).
- Treatment maintains maternal iron stores and enhance neonatal iron stores.
- A typical diet provides 15 mg of elemental iron per day.
- The RDDA of ferrous iron during pregnancy is 27 mg, which is present in most prenatal vitamins.
- Supplementation is important because the typical American diet and endogenous stores cannot meet increased iron requirements.
- Sustained-release or enteric-coated preparations dissolve poorly and may be less effective

CONSEQUENCES

- Iron deficiency anemia during pregnancy has been associated with an increased risk of
 - low birth weight
 - preterm delivery
 - perinatal mortality
 - possible association between maternal iron deficiency anemia and postpartum depression, with poor results in mental and psychomotor performance testing in offspring

THE ASYMPTOMATIC PATIENT WITH MILD ANEMIA

- ⦿ 1st and 3rd trimester Hct < 33%
- ⦿ 2nd < 32%
- ⦿ Awareness of variable factors such as smoking, race, high altitude residence
- ⦿ For African-American adults, the Institute of Medicine recommends lowering cutoff levels for H/H of 0.8 g/dL and 2%, respectively

EVALUATION OF ASYMPTOMATIC PREGNANT WOMEN WITH MILD TO MODERATE ANEMIA

- ◉ CBC, RBC indices, serum iron and ferritin levels
- ◉ Peripheral smear inspection is helpful for the diagnosis of hemolytic or parasitic disease
- ◉ Hgb electrophoresis
- ◉ Ferritin, transferrin saturation, and free erythrocyte protoporphyrin, along with low H/H
- ◉ Diagnosis is often presumptive

Table 2. Iron Supplements

Preparation	Dose
Ferrous fumarate	106 mg elemental iron per 325 mg tablet
Ferrous sulfate	65 mg elemental iron per 325 mg tablet
Ferrous gluconate	34 mg elemental iron per 300 mg tablet
Iron dextran	50 mg elemental iron per milliliter, intramuscularly or intravenously
Ferric gluconate	12.5 mg iron per milliliter, intravenously only
Iron sucrose	20 mg iron per milliliter, intravenously only

MANAGEMENT OF MILD TO MODERATE IRON DEFICIENCY ANEMIA IN PREGNANCY

- ◉ Empirical iron Rx
- ◉ Look for reticulocytosis may be observed 7-10 days after iron therapy, followed by an increase in H/H in subsequent weeks
- ◉ Inadequate response necessitates revisiting diagnosis or checking for coexisting conditions (malabsorption, noncompliance, blood loss)

TRANSFUSION

- ⦿ Hypovolemia from blood loss
- ⦿ Operative delivery planned
- ⦿ The need for transfusion in women with antepartum complications can be predicted in only 24% of those who ultimately require blood products
- ⦿ Operative delivery, atony, placenta previa, retained POC's, placental abruption, and D.I.C

Table 3. Biochemical Tests for Diagnosis of Anemia

Test	Results Indicating Iron Deficiency Anemia	Results Indicating Thalassemia	Results Indicating Anemia of Chronic Disease
Iron level	Decreased level	Normal	Decreased level
Total iron-binding capacity	Increased capacity	Normal	Decreased capacity
Ferritin level	Decreased level	Normal	Increased level
Iron/total iron-binding capacity	Less than 18%	Normal	More than 18%

WHEN TO TRANSFUSE

⦿ Maternal Indications

- Hemodynamic instability
- Anticipation of further loss (Accreta complex, fibroids..)

⦿ Fetal Indications

- abnormal fetal oxygenation, resulting in nonreassuring fetal heart rate patterns, reduced amniotic fluid volume, fetal cerebral vasodilatation, and fetal death

PARENTERAL IRON

- ⦿ Not commonly needed if a patient tolerates and complies with an oral regimen
- ⦿ Helpful in presence of malabsorption
- ⦿ Ferrous sucrose is safer than iron dextran since less anaphylaxis and death (v. rare in both) are less likely

ERYTHROPOIETIN

- The use of adjuvant erythropoietin with iv iron alone was associated with a significantly shorter time to the targeted hemoglobin level and improved indices (reticulocyte count, Hct levels) in less than 2 weeks after treatment was initiated
- Other than a shorter time to normalize indices, no advantage was found between iv iron and Erythropoietin
- Comparable safety

AUTOLOGOUS TRANSFUSION

- ◉ May be useful if excess blood loss is predictable (placenta previa, accreta, fibroids)
- ◉ May be considered at 32 weeks if Hct is 32 or above
- ◉ Predictability of need is difficult so this approach is not considered cost-effective

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THANK YOU

