Boston Medical Center Maternity Care Guideline
Guideline: IRON DEFFICIENCY ANEMIA
Accepted: 04/2015, 11/2019
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Introduction:

Normal pregnancies are associated with physiologic decreases in hemoglobin.[1] Levels below the Centers for Disease Control and World Health Organization endorsed values for hemoglobin and hematocrit by trimester can be considered anemia and warrants treatment (Table 1).[1-3] Iron deficiency anemia is characterized as a microcytic, hypochromic anemia with evidence of depleted iron stores, low serum ferritin levels, low plasma iron levels, and high total iron-binding capacity (Table 2).[3,4] Iron deficiency anemia is associated with increased risk of LBW, preterm delivery, perinatal mortality, postpartum depression, and complications with postpartum hemorrhage.[3] Treatment to improve iron stores is indicated when laboratory studies indicate anemia in pregnancy.

Diagnosis:

Iron deficiency anemia is the most common form of anemia. Primary screening is done via complete blood count (CBC). Diagnosis is obtained by abnormal hematocrit, though this may be non-specific for the origin of anemia (Table 1).[2] Ferritin <10-15 is diagnostic for iron deficiency anemia (Table 2).[3] Reduced mean corpuscular volume (MCV) may be associated with iron deficiency anemia or microcytic anemia of another origin such as thalassemia which is common in ethnically diverse populations such as those at BMC (Table 3; Figure 1).[3,5]

- **First trimester** – Hemoglobin <11 g/dL (approximately equivalent to a hematocrit <33 percent)
- **Second trimester** – Hemoglobin <10.5 g/dL (approximate hematocrit <31 or 32 percent)
- **Third trimester** – Hemoglobin level <10.5 to 11 g/dL (approximate hematocrit <33 percent)
- **Postpartum** – Hemoglobin 10 g/dL (approximate hematocrit <30 percent)

Ref: https://www.uptodate.com/contents/anemia-in-pregnancy

Table 2. Normal lab values for iron studies

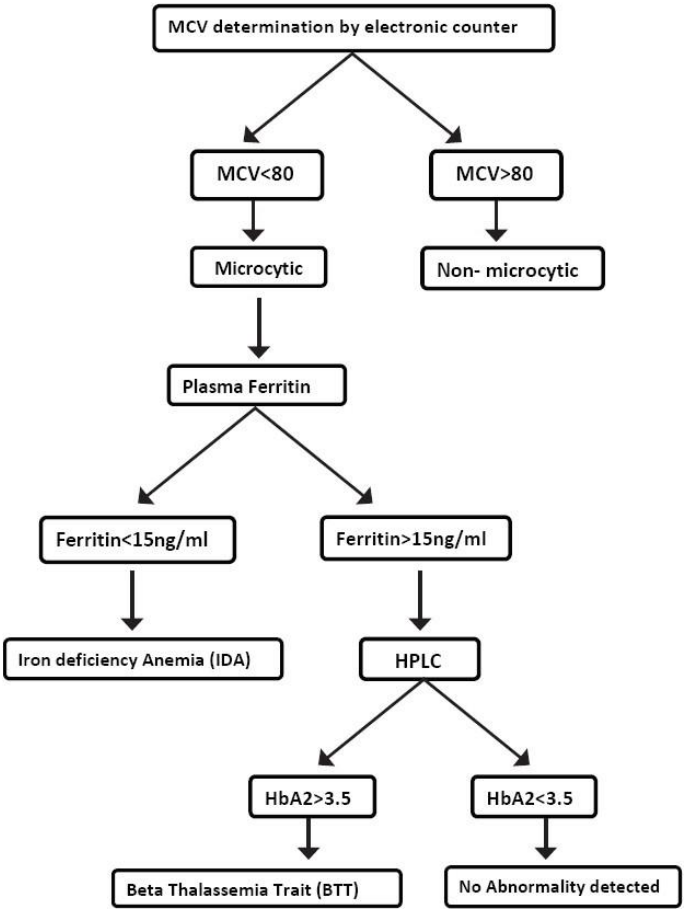
Iron Studies	Normal Values
Plasma iron level	40-175micrograms/dl
Plasma TIBC	216-400 micrograms/dl
MCV	80-100
Transferrin	16-60%
Serum ferritin level	>10micrograms/dl
Free erythrocyte protoporphyrin level	<3 micrograms/g

ACOG, 2008.[3]

Table 3. Interpretation of Results of iron studies

Test	Fe def anemia	Thalassemia	Anemia chronic disease
Iron level	Normal or Decreased	Normal	Decreased
MCV	Normal or decreased	Decreased	Decreased
Ferritin	Decreased	Normal	Increased
TIBC	Increased	Normal	Decreased
Iron/total iron-binding capacity	<18%	Normal	>18%

ACOG, 2008.[3]



http://www.ajts.org/articles/2009/3/2/images/AsianJTransfusSci_2009_3_2_99_53883_u2.jpg

Treatment and Management

1. Borderline values should be managed with dietary and nutrition recommendations.[3,4]
    - Increase in iron rich foods such as meats, beans, dark leafy green vegetables, and iron fortified foods. Cooking in a cast iron pot also increases dietary iron levels.
    - WIC patient resource for foods high in iron http://www.mass.gov/eohhs/docs/dph/wic/nutrition/iron-boosts-what-moms-need-most.pdf

2. Oral supplementation is recommended when Hct is lower than expected norms by trimester. CDC recommends 60-120mg elemental iron/day.[2-4]

Preparation	Concentration	Dose
Ferrous sulfate	65mg elemental iron per 325mg tablet	1-3 tabs daily
Ferrous fumarate	106mg elemental iron per 325mg tablet	1-2 tabs daily
Ferrous gluconate	34mg elemental iron per 300mg tablet	1-4 tabs daily

ACOG, 2008.

    - To increase absorption of iron supplementation take iron on an empty stomach
    - Take iron with a Vitamin C containing beverage
    - Avoid milk/calcium at the time of iron supplementation
    - Encourage high fiber diet. Consider Rx for Colace to offset risks of constipation with iron supplementation.

3. Consider IV iron therapy when Hct $\leq$ 28 or no improvement/worsening of Hct despite oral therapy, or patient symptomatic for anemia.[3,4]

Logistical Practice for BMC and CHC Providers

Procedure for IV iron (<18yo) [<37.6 weeks GA]:

1. Place referral for Pediatric Heme/Onc in EPIC. The pediatric team will place orders and schedule patient.
2. Order CBC and iron studies at time of referral

Procedure for IV iron (>18yo) [<37.6weeks GA]:

1. To order IV iron, must log in to EPIC as a "Non-Oncology Physician - Outpatient [T00230]"

Create “Orders Only Encounter” and Non-Onc treatment plan

Follow the link below to EPIC tip sheet
https://share.bmc.org/emerge/AmbulatoryOutpatient/3.%20Tip%20Sheets/3.%20Specialty%20Tip%20Sheets/Non-Oncology%20Tip%20Sheets%20-%20Gi,%20Renal,%20Rheum,%20Derm,%20Surgery/BMC%20Placing%20Iron%20Orders.pdf

2. Call or EPIC message for scheduling appt. Pts will be seen at Short Stay Procedure Unit located on the third floor of the Moakley building.

Epic In Basket Message: “P BMC HemOnc ChemoInfusion” pool
Email infusion@bmc.org
Phone 617-638-6428

Patient Education

For the first time, it will take approximately two hours. You should see a response in 10-14 days unless the patient has renal disease and then consider giving EPO also with renal/MFM consult.

Risks of allergic reactions to IV iron: “While it is prudent to take all reactions seriously, we believe most reactions are due to infusional symptoms (rather than a true allergy), and should be managed as such. [S]erious adverse events with IV iron are extremely rare, with an estimated frequency of less than 1:200,000. Information about the frequency of infusional and allergic reactions associated with IV iron has been evaluated in the following studies.”[4]

- **ACOG: Nutrition in Pregnancy**

  https://www.acog.org/Patients/FAQs/Nutrition-During-Pregnancy#iron

References:

1 Bauer K. Hematologic changes in pregnancy. Up to Date. 2014.

2 CDC. Maternal Health Indicators. http://www.cdc.gov/pednss/what_is/pnss_health_indicators.htm#Maternal%20Health%20Indicators Updated 2011. Accessed 4/2015.

3 ACOG. Anemia in Pregnancy. ACOG Practice Bulletin 95. Obstet Gynecol, 2008; 112(1):202-207.

4 Schrier S, Auerbach M. Treatment of the adult with iron deficiency anemia. Up to Date 2015.

5 ACOG. ACOG Practice Bulletin No. 78: hemoglobinopathies in pregnancy. Obstet Gynecol. 2007 Jan;109(1):229-37.