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WOMEN'S HEALTH GUIDLINE
ANEMIA IN PREGNANCY
MANAGEMENT GUIDELINE

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MANAGEMENT GUIDELINES

Background

Anemia is very common in pregnant women, and 99% of such women in the United States are iron deficient. Iron deficiency is seen frequently because of prior menstrual losses, prior pregnancy related losses, and nutritional factors. As a result of a dilutional effect, the normal hemoglobin (Hgb) and hematocrit Hct) for third trimester pregnant women at sea level is 11 g/dL or 33±3 %, but anemia varies by trimester:

1st trimester below	Hgb 11 g/dL	Hct 33%
2nd trimester below	Hgb 10.5 g/dL	Hct 32%
3rd trimester below	Hgb 11 g/dL	Hct 33%

To standardize care we have chosen an oral treatment cut-off of Hgb < 10.5 and a parenteral cut-off of Hgb < 6 (see therapy below)

Diagnosis

Sophisticated studies are usually not needed in the work up of a woman with pregnancy associated anemia. The CBC that revealed the low hemoglobin/hematocrit will usually also reveal a low MCV (microcytosis), a low MCH (hypochromia), and an increased RDW (anisocytosis), characteristic of iron deficiency. Women with mild (or acute) anemia may not yet have these typical red cell morphologic changes however.

The most sensitive and specific test for iron deficiency during pregnancy is a low serum ferritin, which reflects total body iron stores. Normal values are 40-200 ng/mL. Serum iron, TIBC (transferrin), and the per cent transferrin saturation, are all less accurate indices during pregnancy. Hemoglobin electrophoresis should be reserved for women who, on the basis of their ethnicity or family history, are suspected of having a hereditary hemoglobinopathy (e.g., thalassemia, sickle cell disease, etc.).

Management Guidelines

A. Oral Iron Therapy

Most women with iron deficiency can be treated with oral iron. Ferrous sulfate 325 mg contains 57 mg of elemental iron, and is the most efficient form; it is given once or twice daily. The evidence is unclear as to the value of adding ascorbic acid. Oral iron commonly causes gastrointestinal symptoms. These are usually dose dependent, but may be severe enough that women will not, or cannot, adhere to their regimen, even with stool softeners and/or acid reducing agents. Slow-release iron formulations may prevent gastric irritation, but not constipation, and are significantly more expensive.

Ferrous gluconate causes fewer GI symptoms, but it only has 34 mg of elemental iron. Liquid formulations of ferrous sulfate (2 mL = 50 mg of elemental iron) are available, and may be more acceptable to women who can't take pills. Stools will become black after taking iron, and asking about stool color is a good way to check adherence to therapy.

To see if the patient is responding to (or taking) therapy, a reticulocyte count may be obtained 7 days after starting treatment. The normal value is 1.0-2.4%, and it should rise to at least 4-5%.

A rise in the hemoglobin or hematocrit will usually not occur until 3-4 weeks. It may also be prudent to prescribe supplemental folic acid, at least 1 mg daily, as this nutrient will also commonly be deficient in women who are iron deficient.

To recap:
When to treat orally?
Hgb < 10.5 g/mL

Anemia may become severe enough to cause symptoms (fatigue, tachycardia, etc.). Since acute post partum hemorrhage is such a common event (approximately 5 per cent of births), this has the potential to becoming a life-threatening condition.

Fetal growth and oxygenation will usually not be affected until the maternal hemoglobin is less than 6 g/mL however.

On the other hand, maternal morbidity and mortality is noted at a maternal hemoglobin less than 7 g/mL. In symptomatic or worrisome cases, where adherence is a limiting factor, parenteral iron therapy may be considered sooner.

There are 3 parenteral iron therapy options available in the United States at the present time: iron dextran, ferric gluconate, and iron sucrose. Iron dextran is no longer widely used because of its significant risk of anaphylaxis (0.6%), or other hypersensitivity reactions (0.2-3%). It is also usually given intramuscularly, and is painful, can cause skin discoloration, and is unpredictably absorbed. Ferric gluconate and iron sucrose are both given intravenously, and are safe and effective alternatives, although they are somewhat more expensive. Iron sucrose has the lowest rate of serious adverse reactions (anaphylaxis 0.002%, hypersensitivity 0.005%), and so is our drug of choice.

Who to treat:
-Initiate Oral Fe++ at Hgb <10.5 prior to 36 wks
Please consider both folate 1 mg and stool softeners, as well.

Hgb 8 -10.4 ->treat once a day
Hgb < 8 ->treat twice a day

-Initiate IV Fe++ sucrose at Hgb <7 and GA 36w or greater

-If Hgb <6 and GA >37w, ACOG strongly suggests considering transfusion for fetal perfusion concerns.

-If Admitted for L&D with Hgb <7 and is high risk for maternal hemorrhage or is known to be having a cesarean, please transfuse at admission

How to treat parenterally:
Our current suggestion is to give iron sucrose 300 mg in 250 mL of normal saline IV over 1 hour. A test dose (25 mg IV slow push) is not necessary, but may be considered at the discretion of the provider. The woman's exact dose can be calculated, taking into account her

weight and the current and desired hematocrit, but, since most women who will be receiving the drug are severely anemic.

We have elected to empirically give 3 doses of 300 mg (total of 900 mg) at 24-48 hour intervals. The patient should be observed and vital signs and fetal heart rate documented prior to her discharge. The hemoglobin or hematocrit may be repeated 7 days after the last dose, as hematopoeisis proceeds rapidly after intravenous iron administration.

The more detailed approach would include calculation of total iron deficit by the following formula:

(WT(kg) x (Hgb_{target}-Hgb_{actual}) X 2.4) + (500 if weight >35kilo) or (15mg/kg if wt <35 kilo)

Use of this calculation will often require a 4th day of infusion, which may impede patient adherence, so please set the patient's expectations accordingly.

If you wish to see if total iron stores have been replenished, a serum ferritin may provide guidance, and a second course of iron sucrose considered.

To recap:
When to treat parenterally?
-Hgb $\leq$ 7.0 and > 36 wks EGA -> treat with parenteral iron sucrose
-Hgb $\leq$ 7.0 admitted L/D, high risk for PPH, or ces del -> transfuse 2 units pRBCs
-Hgb $\leq$ 6.0 > 37 wks EGA -> transfuse 2 units pRBCs

How to treat parenterally?
Administer Iron Sucrose 300 mg in 250 mLs of normal saline IV over 60 minutes every 24 - 48 hours X 3 doses

Serious Adverse Reaction
In the rare event of a serious adverse reaction, the infusion should be stopped, the patient's circulation sustained with normal saline, and preparations for possible respiratory support (endotracheal intubation) initiated. The following drugs should be administered: epinephrine 0.3-0.5 mL of a 1:1000 solution SQ every 5 minutes, diphenhydramine 50 mg IV, and methylprenisolone 125 mg IV.

C. When to screen / treat?
Given the expected response to oral therapy is approximately 4 weeks and parenteral therapy is 2 weeks, we want our screening and treatment to achieve maximum Hgb levels by term.

Screening for anemia should occur at:
- First prenatal visit
- 24 -28 weeks
- Any transfer prenatal from outside Anchorage unit
- 36 weeks

Treatment
- Hgb $\geq$ 10.5 no therapy
- Hgb < 10.5 -> treat with oral iron, 1 mg folate, and stool softeners
- Hgb $\leq$ 7.0 and > 36 wks EGA -> treat with parenteral iron sucrose
- Hgb $\leq$ 7.0 admitted L/D, high risk for PPH, or ces del -> transfuse 2 units pRBCs
- Hgb $\leq$ 6.0 > 37 wks EGA -> transfuse 2 units pRBCs

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