

Physiologic anemia of pregnancy: HEMODILUTION

- 20-30% increase in RBC mass
- 30-50% increase in plasma volume
- Peaks in late 2nd & early 3rd trimester

Anemia in pregnancy

	Hb
1 st trimester	< 110 g/L
2 nd trimester	< 105 g/L
3 rd trimester	< 110 g/L

Common causes:

- Iron deficiency
- Acute blood loss

Increased iron requirements in pregnancy

- 300 mg for the fetus & placenta
- 500 mg for expansion of RBC mass
- 200 mg for losses

= **1000 mg total**

Iron supplementation in pregnancy:

30 mg elemental iron po daily
→ provided by most prenatal vitamins

Treatment:

- Dietary considerations:
 - Dietician consult
 - Heme iron rich foods: lean meat, seafood
 - Non-heme iron rich foods: veggies, beans, cereals, dairy products, etc
- Trial of iron: presumptive diagnosis of IDA
 - Iron therapy given to pts w/o evidence of other causes of anemia w/o obtaining iron studies
- Transfusion?

PO iron therapy: 100-200 mg elemental iron/day x 3 months once Hb normalized

- Decrease absorption: food, antacids, PPIs, H2RAs
- Iron decreases absorption of other meds: levothyroxine

IV iron therapy**Indications**

- Non-compliance
- Intolerance
- Malabsorption
- Ongoing bleeding
- Severe anemia

Contraindications

- History of anaphylaxis
- Active infection
- First trimester

IM iron therapy: not recommended

- Painful
- Skin staining
- Less predictable absorption

Transfusion

- Hypovolemic blood loss
- Severe anemia, Hb < 60 g/L
→ associated w/ abnormal fetal oxygenation
- Operative delivery in pt with anemia

Iron sucrose: 20 mg elemental iron/mL

→ 100-300 mg elemental iron per infusion

- Multi-dose infusions to a total of 1000 mg

→ Iron deficit = body weight (kg) x (target-actual Hb) x 0.024 ÷ 500 mg

Example order: 300 mg iron sucrose IV once daily x 3 days

→ Max infusion rate: 100 mg/h

Monitoring

- Maternal vital signs & fetal HR prior to infusion
- Maternal vitals & fetal HR q15 min during first infusion hour, then hourly until infusion complete
- Maternal vitals 1h post infusion

NOTE: anaphylaxis kit must be readily available

→ IV iron sucrose SEs overlap with S/S of anaphylaxis

Iron supplementation in non-anemic pts

- Check ferritin in pts at risk of iron depletion:
 - Previous anemia
 - Multiple pregnancies
 - Consecutive pregnancies w/ <1 year interval in-between
 - Vegetarians
- If ferritin < 30, iron 60 mg po daily

Postpartum considerations: anemia = Hb < 100 g/L

- Contributing factors:
 - Antepartum anemia not corrected
 - Blood loss during delivery
 - Breastfeeding

Anemia in infants/children: normal ranges for Hb & hct, and causes of anemia, vary with age, sex, race

- Hb < 2.5 percentile for age, sex, race
- Serum ferritin < 12 ug/L
- Simplified, WHO definition:

Age	Hb (g/L)
6 mo – 5 y	< 110
5 – 12 y	< 115
12 – 15 y	< 120

Common causes

- Birth – 3 months: physiologic anemia (6-9 wks of age)
 - When born, Hb is high (165) → EPO decreases at birth, RBC counts lower, Hb decreases (110)
- 3-6 mo: hemoglobinopathy (hereditary)
- Toddlers/children: acquired causes (iron deficiency anemia)

Drug causes of anemia

- Nitrofurantoin: avoid near delivery; avoid in neonates
- SMX/TMP: avoid, esp in 1st tri & near term; avoid in neonates

Iron deficiency anemia in children: growth + lack of adequate intake

Risk factors

- Prematurity/low birth weight
- Low socioeconomic status
- Early introduction of cow's milk
- Excessive cow's milk intake
- Prolonged exclusive breastfeeding
- Diet low in iron
- Medical conditions
 - Interfere w/ iron absorption
 - Malabsorption
 - Blood loss

Screening

- Risk assessment: 9-12 months, 6 months later; annually in children 2-5 years
- S/S: often asymptomatic
 - Lethargy
 - Irritability
 - Poor feeding
 - Pallor
- Lab screening: high risk population
 - 9-12 mo, 6 mo later, annually from 2-5 years

Outcomes of IDA in children

- Developmental delays
- Behavioral disturbances
 - Decreased motor activity
 - Decreased social interaction
 - Decreased attention to tasks

Prevention of IDA in children

- Breastfeeding
 - Exclusive until 4-6 mo, then breastfeed with food
- Iron fortified formula (if can't breastfeed)
- Discourage cow's milk (until 12 mo)
 - At 12 mo: max 750 mL/day
- Iron rich foods (iron fortified cereal, pureed meats)

Treatment of IDA in children

- Dietary change
- Oral ferrous sulfate: 3-6 mg/kg/day (divided doses)
- Liquid preparations can stain teeth
 - Mix with water or juice
 - Use a dropper
 - Brush teeth/rinse mouth after administration
- GI side effects uncommon at these doses
- Recheck Hb in 4 weeks

Anemia of prematurity (AOP): anemia secondary to impaired EPO production (occurs 3-12 weeks of life)

→ Other contributory factors are blood draws & a reduced RBC life span

Symptoms

- Tachycardia
- Increased apneic episodes
- Increased oxygen requirements
- Poor weight gain

AOP management

- Iron supplementation
- RBC transfusion