Management of Iron Deficiency in Neonates

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SUMMARY

- While **iron deficiency (ID) is not common in healthy, full-term neonates**, it is **significantly more prevalent** in preterm, low birth weight, and high-risk infants. Monitoring and early supplementation in those groups is essential for preventing neurodevelopmental consequences.
- The **timing** of iron deficiency matters: **Early-life deficiency**, particularly in the **first 6–12 months**, is far more damaging than later-onset iron deficiency. This is why prevention and early detection in high-risk neonates are crucial.

How Common Is Iron Deficiency in Neonates?

- Prevalence of ID in healthy, full-term neonates is estimated to be low (less than 5%) in high-income countries, assuming good maternal iron status.
- Iron deficiency is **more common in the following neonatal populations**:
  - **Preterm infants**:
    - Most iron accumulation occurs in the missed third trimester.
    - Up to **30%** may show signs of iron deficiency without supplementation.
  - **Low birth weight infants**:
    - Reduced iron stores due to overall lower body mass and blood volume.
  - **Infants of diabetic mothers**:
    - May have abnormal iron distribution, favoring other organs over the brain and liver.
  - **Infants with intrauterine growth restriction (IUGR)**:
    - May have depleted iron stores due to placental insufficiency.
  - **Infants of mothers with iron deficiency anemia**:
    - Maternal iron deficiency can affect fetal iron stores, especially if severe.
  - **Delayed cord clamping not practiced**:
    - Immediate cord clamping reduces the infant's blood and iron volume by up to 30%.

What Is the Impact of Iron Deficiency on Neonates?

- **Neurodevelopmental**
  - Cognitive and behavioral delays
  - Impaired motor development
  - Diminished language and social-emotional skills
  - Deficits may persist **even after iron levels are corrected** if the deficiency occurs during critical windows of brain development
- **Hematological**
  - Prolonged microcytic, hypochromic anemia
  - Decreased oxygen-binding capacity can affect tissue oxygenation and growth
- **Growth and Immunological**
  - May impair physical growth and weight gain
  - Alteration in immune function may increase susceptibility to infections
- **Psychosocial**
  - Behavioral problems
  - Increase risk of developing attention-deficit symptoms

Who Should Receive Screening?

- All neonates should be screened early for iron deficiency

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What IV Iron Therapies Are Recommended for Neonates?

- IV iron is rarely used in neonates and is generally reserved for specific, high-risk cases where oral iron is not effective, tolerated, or feasible.
- Considered in only selected circumstances, including:
  - **Severe Iron Deficiency**
    - Failure of oral iron therapy due to poor absorption or gastrointestinal intolerance
    - Need for rapid iron repletion for symptomatic anemia, critical illness, or preoperative optimization
    - Concurrent erythropoietin therapy in preterm infants with anemia of prematurity, where iron demand is high
  - **Gastrointestinal Issues or Malabsorption**
    - Necrotizing enterocolitis (NEC)
    - Short bowel syndrome
    - Chronic diarrhea or enteropathy
    - Prolonged parenteral nutrition

What About Oral Iron?

- Liquid oral iron solution is typically the first-line treatment in neonates and infants because it is effective, safe, and well-absorbed in most cases.

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