Hemoglobin/Hematocrit

Prevention of anemia

1. Term, healthy infants have sufficient iron for at least the first 4 months of life. Human milk contains very little iron. Exclusively breastfed infants are at increasing risk of ID after 4 completed months of age. Therefore, at 4 months of age, breastfed infants should be supplemented with 1 mg/kg per day of oral iron beginning at 4 months of age until appropriate iron-containing complementary foods (including iron-fortified cereals) are introduced in the diet. For partially breastfed infants, the proportion of human milk versus formula is uncertain; therefore, beginning at 4 months of age, partially breastfed infants (more than half of their daily feedings as human milk) who are not receiving iron-containing complementary foods should also receive 1 mg/kg per day of supplemental iron.

2. For formula-fed infants, the iron needs for the first 12 months of life can be met by a standard infant formula (iron content: 10–12 mg/L) and the introduction of iron-containing complementary foods after 4 to 6 months of age, including iron-fortified cereals. Whole milk should not be used before 12 completed months of age.

3. The iron intake between 6 and 12 months of age should be 11 mg/day. When infants are given complementary foods, red meat and vegetables with higher iron content should be introduced early. To augment the iron supply, liquid iron supplements are appropriate if iron needs are not being met by the intake of formula and complementary foods.

4. Toddlers 1 through 3 years of age should have an iron intake of 7 mg/day. This would be best delivered by eating red meats, cereals fortified with iron, vegetables that contain iron, and fruits with vitamin C, which augments the absorption of iron. For toddlers not receiving this iron intake, liquid supplements are suitable for children 12 through 36 months of age, and chewable multivitamins can be used for children 3 years and older.

5. All preterm infants should have an iron intake of at least 2 mg/kg per day through 12 months of age, which is the amount of iron supplied by iron-fortified formulas. Preterm infants fed human milk should receive an iron supplement of 2 mg/kg per day by 1 month of age, and this should be continued until the infant is weaned to iron-fortified formula or begins eating complementary foods that supply the 2 mg/kg of iron. An exception to this practice would include infants who have received an iron load from multiple transfusions of packed red blood cells.

6. Additional RDA for iron in different ages available on page 414 of the **Pediatric Nutrition Handbook 5th Ed**.

Management:

If the Hb level is less than 11.0 mg/dL at 12 months of age (additional hemoglobin ranges available on p. 411 of **the Pediatric Nutrition Handbook 5th Ed**.), then further evaluation for IDA is required to establish it as a cause of anemia. If there is a high risk of dietary ID as described in point 6 above, then further testing for ID should be performed, given the potential adverse effects on neurodevelopmental outcomes. Additional screening tests for ID or IDA should include measurement of:

- SF and CRP levels; or
- CHr concentration.
- CBC/plt/dff

Serum ferritin below 15ug/mL, low MCV (<70fL), low RBC (<4 x10^{12}/L) and RDW > 17 all suggest iron deficiency anemia.

If a child has mild anemia (Hb level of 10–11 mg/d) and can be closely monitored, an alternative method of diagnosis would be to document a 1 g/dL increase in plasma Hb concentration after 1 month of appropriate iron-replacement therapy (3-6 mg/kg/d for 4 weeks), especially if the history indicates that the diet is likely to be iron deficient.

References:

Baker, R,; Greer, F. The Committee on Nutrition. “Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0-3 years of Age). *Pediatrics* Vol. 126 No. 5 November 1, 2010

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