

Anemia occurs when the amount of hemoglobin (found in the red blood cells) drops below normal. Hemoglobin is necessary for the transportation of oxygen throughout the body. There are many different types of anemia, but we will limit this page to the most common ones.

Iron and Vitamin Deficiencies

Iron deficiency anemia is the most common of the anemias and is usually due to bleeding. In women, iron deficiency may be due to heavy menstrual periods, but in older women and in men, the bleeding is usually from disease of the intestines. In children and in pregnant women, the body needs more iron, and iron deficiency may be due simply to not eating enough iron in the diet. Iron deficiency may also result from some extreme diets. Treatment of iron deficiency usually involves iron supplements. In older women and in men, there is usually also some further testing to determine why the person is iron deficient.

Pregnant and nursing women frequently develop this deficiency since the baby requires large amounts of iron for growth. Lack of iron can lead to low birth weight babies and premature delivery. Pre-pregnant and pregnant women are routinely given iron supplements to prevent these complications. Newborns who are nursing from deficient mothers tend to have iron deficiency anemia as well.

Blood tests may show a normal or low hemoglobin, decreased iron, ferritin, and all red blood cell indices. The total iron-binding capacity (TIBC) or transferrin will be increased. The ferritin test is considered to be the most specific for identifying iron deficiency anemia.

Vitamin B12 deficiency is less common than iron deficiency and is usually not due to dietary deficiency of vitamin B12. The most common cause is a disease called pernicious anemia, in which the body stops making a substance (called "intrinsic factor") that is needed to absorb vitamin B12 from the diet. Vitamin B12 deficiency can also cause nerve problems, often causing numbness and tingling that start first in the hands and feet. Hemoglobin is low, but red blood cell indices are usually increased.

Folic acid deficiency can cause the same pattern of changes in hemoglobin and the red cell indices as does vitamin B12 deficiency. Folic acid is found in many foods, especially in green, leafy vegetables. Folic acid is also added to most grain products in the United States so that deficiency in folic acid is rarely seen in the U.S. today. During pregnancy, however, there is an increased need for folic acid so deficiency can develop during this time. This is especially dangerous because deficiency in folic acid can cause problems in the development of the brain and spinal cord of the baby. Pregnant women usually need folic acid supplements.

Anemia of Chronic Disease (ACD) is a condition of impaired iron utilization where functional iron (hemoglobin) is low but **tissue iron** (such as in storage) is **normal or high**. ACD is seen in a wide range of chronic malignant, autoimmune, leukemia, inflammatory and infectious disease conditions.

In rheumatoid arthritis there is frequently co-existence of ACD and iron deficiency anemia resulting from gastrointestinal bleeding due to drug therapy. ACD, also known as hypoferrremia of inflammatory disease and anemia of inflammation, is often diagnosed as mild iron deficiency anemia.

Risk Group The elderly are among the highest risk group for ACD, but anyone regardless of age who has chronic inflammatory disease such as rheumatoid arthritis or infection can be at risk.

Symptoms ACD can be present in numerous situations associated with inflammation, infection, and cancer. When infection, fever--even mild, or history of cancer or suspicion of cancer is present with low hemoglobin but elevated ferritin, anemia of chronic disease should be considered.

Detection When ACD is suspect fasting serum iron will be low, serum ferritin elevated, transferrin iron saturation percentage low, total iron binding capacity low, transferrin low and the serum transferrin receptor normal. The cause of anemia will dictate **treatment**. Once inflammation, infection or presence of pathogen is identified and treated, anemia may be resolved. In cases where cancer is the cause of anemia, cancer treatment and therapy take priority over removal of iron that has resulted from transfusion or infusion.

Supplementation with **iron** for those with ACD is not warranted until the underlying cause of disease is cured. Harmful **pathogens are nourished by iron and cancer cells require iron** to grow and proliferate.

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