
Nutrition Education

Fact Sheet



Anemia

Defining Anemia

Anemia is a medical condition when the number of red blood cells is below normal. When this happens, not enough oxygen is going to body tissues. There are many reasons for anemia and the treatment will depend upon the cause.

Two lab values that come from blood tests measure red blood cells. They are hemoglobin (Hb or Hgb) or hematocrit (Hct or Hcrt). Normal hemoglobin levels are for adult men: 14-18 g/dL and for adult women 12-16 g/dL. Normal hematocrit levels are 42%-52% for adult men and 37%-48% for adult women. Anemia is often defined as when there is a hemoglobin level below 12g/dL. "Normal" levels can vary.

Reticulocytes are slightly immature red blood cells. If your hemoglobin is low, a "reticulocyte count" is done. This test shows whether the bone marrow is producing red blood cells at the right rate.

Other lab tests that can help identify the type of anemia are: serum iron, total iron binding capacity (TIBC), iron/TIBC ratio, serum ferritin, serum erythropoietin, vitamin B12 and folate. Whether there is blood loss internal or external bleeding, menstruation, etc. is an important factor, too.

Consequences

Anemia can affect the quality of your life by lowering your energy level, making you feel tired and making it difficult to go about your daily activities. Anemia is a common problem for people with HIV infection. Today with highly active anti-retroviral treatments almost 50% of HIV-infected people have anemia. Before HAART 90% had anemia. It can occur at any stage of HIV infection, may become more severe with disease progression and has been associated with shorter survival times.

Common symptoms of anemia

Tiredness, low energy, fatigue	Shortness of breath	Pale skin
Dizziness	Headache	Anxiety
Sleeping poorly	Nausea	Sadness
Irritable	Abdominal or chest pain	

Causes

Anemia can be due to a problem in red blood cell production, increased red blood cell destruction and increased red blood cell loss. There may be a lower than normal number, altered size or function of red blood cells. The most common type of anemia in HIV disease is called "anemia of chronic illness." There are many different causes and types of anemia that can affect people with HIV and sometimes people with HIV have no specific cause of anemia found.

Possible underlying causes for anemia

HIV infection and other chronic illnesses	Iron, B6, Folate and B12 deficiency
Medications to treat HIV	Malnutrition
Opportunistic infection	Tumor or abnormal cell growth
Bone marrow disorders	Kidney disease

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HIV-related drugs that can cause anemia

Zidovudine (Retrovir, AZT)	Ribavirin (Rebetol)	Trimethoprim
Bactrim (Septra)	Interferon	Pyrimethamine
Cidofovir (Vistide)	Amphotericin B	Pentamidine
Foscarnet (Foscavir)	Flucytosine (Ancobon)	Antineoplastic (anti-cancer) agent
Ganciclovir (Cytovine)	Sulfonamides	Dapsone

Factors that make you more likely to develop anemia

- Clinical progression from HIV to an AIDS
- CD4 count less than 200 cells/mm³
- Viral load increase
- Being African American
- Being female
- Taking Retrovir (AZT)
- Taking Videx (ddI) or Zerit (d4T) but to a lesser degree than AZT.
- Hepatitis C infection and taking medication to treat it such as Pegylated interferon (Pegasys®; PEG-Intron®)

Management is important

Management of anemia has been shown to improve survival and quality of life. Getting treatment for anemia is very important and the type of treatment will depend on the cause or type of anemia. Your doctor needs to diagnose the underlying cause of your anemia. Ask your doctor to clearly explain to you what kind of anemia you have, its cause and its treatments. Your doctor may ask that you make changes in your diet and/or take iron supplements and/or prescribe a medication to increase red blood cell production. One particular medication is called PROCRT® (Epoetin alfa), and is given either via IV or under the skin injection.

Nutrition related anemia

If your anemia is due to low levels of a certain vitamin or mineral, treatment may include adding specific foods and/or vitamin and mineral supplements to your diet. After doing the appropriate lab tests, your doctor may diagnose a nutritional deficiency and prescribe single vitamin or mineral supplements if you need them. It is not a good idea to take single vitamin or mineral supplements without first speaking to your doctor. Taking too much of a vitamin or mineral can be as harmful as not having enough. Taking a daily low level general multiple vitamin and mineral supplement however has been recommended.

Iron-deficiency anemia is the most common nutritional related anemia in the United States and worldwide, affecting about 40% of the world's population. Anemia from an iron deficiency can be due to lack of iron in the diet, blood loss, or intestinal parasites.

Iron is found in red blood cells, and its main role is to carry oxygen from the lungs to the rest of the body. Infants, adolescent girls, pregnant women, and the elderly are those at highest risk. Symptoms can include oral lesions, angular stomatitis (lesion in corner of mouth), gastrointestinal problems, thinning and brittle nails and nails that are concave, resembling a spoon. Your doctor may prescribe an iron supplement depending on the severity of your anemia. It may take several months for your body's iron stores to increase, so it is very important that you take your medication as prescribed by your doctor.

Iron In general, meat, fish, and poultry are excellent sources. Other sources of iron include beans, dried fruits, whole grains, fortified cereals, and enriched breads. Iron supplements can cause constipation so include high fiber foods in your diet such as fruits, vegetables, and whole

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grains and drink plenty of fluids. Eat foods high in iron or fortified with iron. Iron from an animal source food is easier for the body to absorb and use than iron from a plant source.

Vitamin C foods included in meals or supplements will help your body absorb and use the iron from plant foods. Foods that have been cooked in a cast iron skillet are a source of iron, too.

Calcium may interfere with iron absorption, so to minimize this, do not drink milk or take a calcium supplement with your meals or at the same time you take your iron supplement (if your doctor has prescribed one).

Iron - food sources (* Foods that are also a good source of vitamin C)

<u>Protein Rich</u>	<u>Vegetables</u>	<u>Fruits</u>	<u>Grains</u>
Beef, lean	Dried peas	Dried Fruit	Fortified cereals
Calf liver	Green beans	Prunes	Bran Muffin
Chicken, dark	Spinach canned*	Watermelon*	Wheat Bread
Sardines	Turnip greens*	Strawberries*	Oatmeal
Turkey, dark	Mustard green*s	Tomato juice*	Cream of Wheat
Dried beans	Broccoli*	Oranges*	Corn tortillas
		Prunes*	

Megaloblastic Anemia

Megaloblastic anemia can be caused by a deficiency in folic acid or a deficiency in vitamin B12 and occurs often in HIV infection by AZT. With megaloblastic anemia your lab test would show Mean Cell Volume (MCV) *above* normal and your doctor must further determine the exact cause and type.

Folic acid is a B vitamin sometimes called folate or folacin. Folic acid is found in many vegetables, beans, fruits, whole grains, and fortified breakfast cereals. A deficiency in folic acid affects the synthesis of DNA and growth of red blood cells.

Pregnant women, alcoholics, and vegetarians are usually at highest risk for folic acid deficiency. Folic acid is especially needed during human growth, and with alcoholism, hepatitis, infection, inflammatory diseases, use of some birth control medications, cancers and poor eating habits. Your doctor may prescribe a folic acid supplement if you need one. Be cautious, as excessive folic acid supplementation will hide a B12 deficiency if there is one. Eat at least 3 fruits a day and 2 cups of vegetables a day. Do not overcook your fruits and vegetables -- heat can destroy folic acid in foods.

Folate – food sources (* Good source of folate, iron and vitamin C)

<u>Protein Rich</u>	<u>Vegetables</u>	<u>Fruits</u>	<u>Grains</u>	<u>Dairy</u>
Tenderloin Steak	Baked Potato	Apricots	Fortified cereals	Milk
Chicken, dark	Sweet Potato	Strawberries	Wheat Bread	Yogurt
Turkey, dark	Asparagus	Bananas	Barley	Cheese
Beans: Pinto,	Turnip &	Oranges*	Wheat germ	
Black, Navy,	mustard	Orange Juice*		
Lima, Kidney,	greens*, cooked	Strawberries*		
others	Beets			
Lentils	Romaine lettuce			
Sardines	Broccoli*			
	Spinach*			

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Megaloblastic and Pernicious Anemia

Vitamin B12 deficiency can cause megaloblastic, macrocytic, and pernicious anemia. B12 deficiency usually occurs due to poor absorption of the vitamin rather than inadequate intake, though strict vegetarians can become deficient. People at risk include the elderly, strict vegetarians or vegans, people with deficient intrinsic factor (component that aids vitamin B12 absorption) chronic small intestinal problems, partial or full stomach removal, long term use of certain medications such as Glucophage (metformin), acid-lowering agents, and cholestyramine. As with folate deficiency anemia, B12 deficiency anemia leads to large immature red blood cells. Your doctor may recommend an oral supplement or a subcutaneous injection of vitamin B12.

Vitamin B12 – food sources

Meat	Chicken	Cheese
Fish	Eggs Milk	Soymilk fortified with B12

Less common types of anemia

- Aplastic anemia: is a serious disease in which normal bone marrow is replaced with fat. Drug toxicity, toxic chemicals, radiation exposure, medications, and diseases can cause it.
- Hemolytic anemia: occurs when mature red blood cells are destroyed too early. It may be caused by vitamin E deficiency.
- Sickle cell anemia: is a hereditary disorder most common in the African American population and is usually diagnosed during infancy.
Anemia of chronic disease: occurs in inflammation, infection, and neoplastic disorders.

References and Resources

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