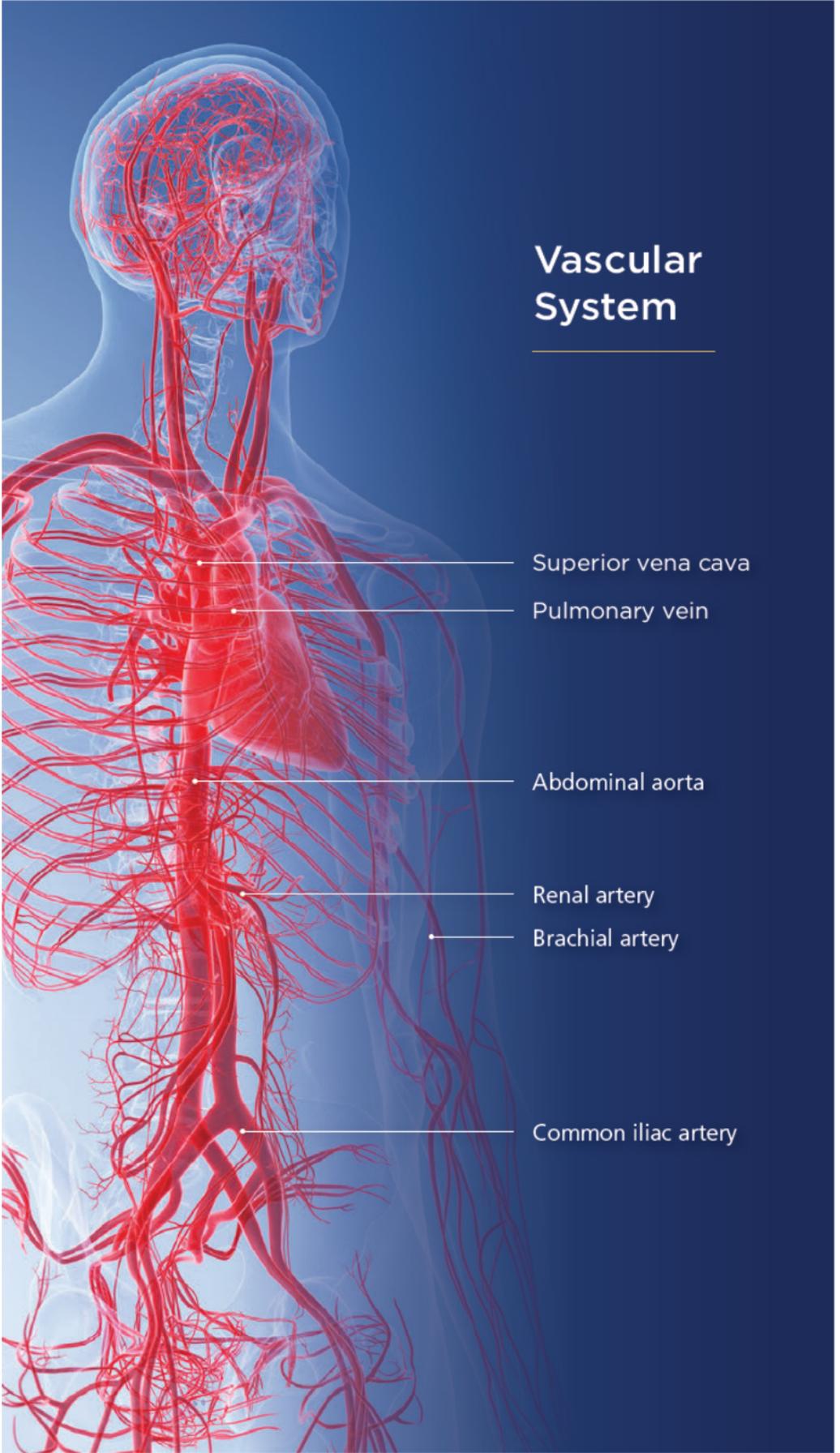


Anemia





Vascular System

Superior vena cava

Pulmonary vein

Abdominal aorta

Renal artery

Brachial artery

Common iliac artery

Anemia

Anemia is a medical term that stands for low red blood cell count. Red cells are produced inside the bone marrow. The red cell is what makes the blood red. Its only purpose is to carry oxygen to the body's tissues which need it for healthy function. Inside each red cell is a protein and iron combination that is called hemoglobin. A low hemoglobin level in the blood means anemia. A second way to measure anemia is called the hematocrit. The hematocrit simply checks how many red cells are packed into a unit of blood.

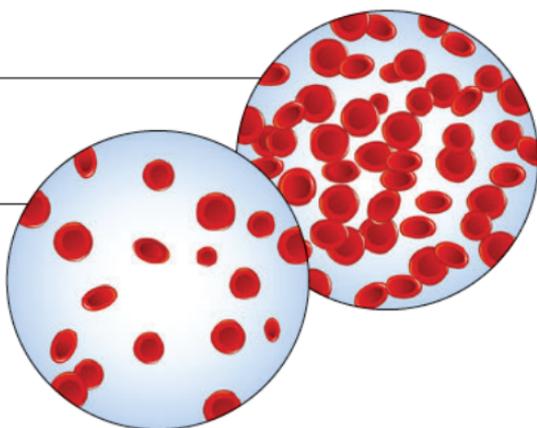
Hemoglobin and Hematocrit Normal Ranges

Hemoglobin	Hematocrit
Females: 12 - 16 gm %	Females: 36 - 48 volumes %
Males: 14 - 18 gm %	Males: 42 - 53 volumes %

When these values fall below normal, it is called anemia. There are not enough red cells in the body. If you are a little bit below the normal range, it is called a mild anemia. A bit more and it is moderate anemia. And with values very below normal, it is severe anemia.

Normal amount of
red blood cells

Anemic amount of
red blood cells



Symptoms

There are usually no symptoms with a mild anemia, unless the person is an athlete who finds his or her performance deteriorating. A moderate anemia may cause some fatigue, drowsiness or even shortness of breath on exertion. A severe anemia is the worst. Here, the fatigue is severe. In older patients or those with heart or vascular disease, there may be shortness of breath or angina heart pain with effort, or even stroke like symptoms.

However, if the anemia occurs very slowly, the individual often can tolerate a remarkably low red blood cell count, sometimes with very few symptoms.

Types of Anemia

Blood Loss Anemia (iron deficiency)

This most often occurs with a slow loss of blood and, with it, the body's iron. This usually occurs in the digestive tract and may be from **ulcers** in the stomach or duodenum, a **cancer** in the colon, or less commonly, from small broken **blood vessels** somewhere in the gut. Females may lose a great deal of blood with **excessive menstrual flow** leading to iron deficiency anemia. There are a number of conditions where iron in food is not absorbed through the intestinal tract. These are called **malabsorption** problems which means the iron is not absorbed from the intestine. One such condition is a hereditary disorder called **celiac sprue**, where the intestine is injured by the gluten protein in wheat. In children from poor families, the diet may be deficient in iron and cause anemia. This is called **nutritional** iron deficiency.

Bone Marrow Failure

There are a number of reasons why the bone marrow may fail to produce enough red cells. One is aplastic anemia, the cause of which is usually not known. Certain drugs may also cause this problem.



Fatigue, drowsiness or shortness of breath are symptoms of anemia.

Chronic Illness and Malignancies

Many types of malignancies, leukemia and chronic disorders such as tuberculosis or a combination of several chronic illnesses (lung, kidney, liver) may lead to anemia.

Chronic Kidney Disease

There is an important hormone called erythropoietin that is made by the kidney. It tells the bone marrow to make more red blood cells when there are not enough. People with chronic kidney disease especially when they require kidney dialysis, lack this hormone and therefore become anemic.

Large Red Blood Cell Anemia (macrocytic anemia)

There are a number of causes where there is anemia, but the remaining red cells are increased in size. This is called a macrocytic or large red cell anemia. A deficiency of vitamin B12, or pernicious anemia, is one example. A lack of folic acid in the diet and severe liver disease, such as cirrhosis, are other causes of this type of anemia. Folic acid deficiency is rare since folic acid is now added to so many foods by FDA requirements.

Red Cell Destruction (hemolytic anemia)

Certain immune disorders as well as some drugs and diseases may attack the red cells in the blood, destroying them and leading to anemia.



Blood studies



Endoscopy

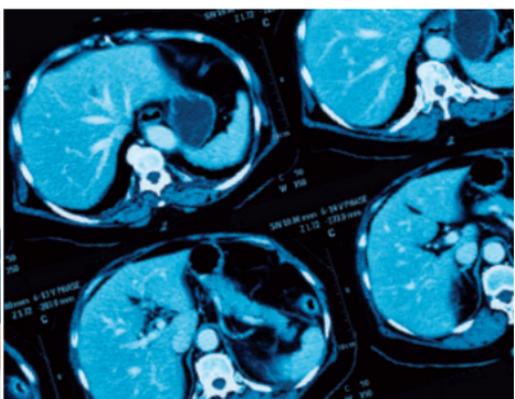
Testing

As noted, anemia is present when the red cell count is low. Simply measuring the size of the red blood cell and how much hemoglobin is in the cell will give a clue as to the cause. Your physician will usually need to do certain testing to determine the cause and prescribe the necessary treatment.

- **Blood studies**, measuring iron, vitamin B12, folic acid and certain other substances will often provide useful information.
- **Endoscopy**. These are visual exams of the intestinal tract under sedation using a flexible viewing endoscope. Ulcers of the stomach and cancers of the colon, both common causes of anemia, can be diagnosed that way. not provide an answer and additional tests such as a bone marrow biopsy may be recommended.
- **Imaging**, X rays of the stomach and intestinal tract may be done. An ultrasound and CAT (CT) exam may also be necessary.
- **Others**. There are times when all these test do not provide an answer and additional tests such as a bone marrow biopsy may be recommended.



Ultrasound



CT scan of abdomen

Treatment

Since there are so many causes for anemia, no single therapy is right for all. If there is bleeding from a stomach ulcer, then the ulcer must be healed. If there is blood loss from colon cancer, then, of course, the cancer needs to be surgically removed. Likewise, if there is excessive menstrual flow, this must be corrected by medications or surgery. In all of these cases of blood loss anemia, taking oral iron is appropriate while the underlying problem is being addressed. Vitamin B12 or folic acid deficiency are easily corrected once diagnosed. Chronic kidney disease or a failure of the bone marrow to make red cells may not be as easily treated. If the anemia is severe or causing disabling symptoms, then blood transfusions may be necessary. However, taking oral iron or receiving a transfusion by themselves are never enough. The underlying cause must always be sought.

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