Normocytic Nonhemolytic Anemia Causes

Normocytic nonhemolytic anemia refers to anemias in which the average RBC volume is maintained with an MCV between 80-100 fL and hemolysis does not occur. Some of the causes include anemia of chronic disease, aplastic anemia, chronic kidney disease and early iron deficiency.



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MCV 80-100

Red Blood Cells and (80) Ball and (100) Dollar-bill

Mean corpuscular volume is the average volume of a red blood cell. A MCV between 80 and 100 fL signifies no change in the average RBC volume, and indicates a normocytic anemia.

Nonhemolytic

Anemia of Chronic Disease/Inflammation

Crone Diseased

The body’s response to a chronic disease state is to store iron outside of the blood with molecules of ferritin. Although the body may have iron stored away, it is unavailable for hemoglobin synthesis, leading to a normocytic anemia. Of note, a minority of patients with anemia of chronic disease will actually have a microcytic anemia, typically seen late in the course of disease.

Aplastic Anemia

A-plastic-bottle Anemone

In aplastic anemia, the bone marrow fails to produce all types of cells including RBCs, WBCs, and platelets. Patients with aplastic anemia are prone to anemia, infection, and bleeding due to the deficiency of these cell lines. Aplastic anemia is most often idiopathic in nature, but can be caused by exposure to chemotherapeutic drugs, radiation, chloramphenicol, industrial chemicals, such as benzene, and viral infections, such as EBV, CMV, and parvovirus.

Chronic Kidney Disease

Crone Kidney

Erythropoietin (EPO) is a growth factor hormone produced in the proximal convoluted tubules of the kidneys, which accelerates RBC production. In chronic kidney disease, EPO production is decreased and RBC production is slowed, leading to a normocytic anemia.

Early Iron Deficiency

Early-sun Iron Broken

Initially, as serum iron and iron stored in ferritin decrease, patients with iron deficiency have normocytic anemia. However, as the quantity of iron further decreases and hemoglobin precursors become sparse, a microcytic anemia occurs.

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