Macrocytic Anemia Causes

Macrocytic anemia is defined by an anemic state in which mean corpuscular volume (MCV) is greater than 100 fL. Macrocytic anemias are classified as megaloblastic or non-megaloblastic. Megaloblastic etiologies for macrocytic anemia include folate and B12 deficiency, and orotic aciduria. Non-megaloblastic etiologies for macrocytic anemia include liver disease, alcoholism, and reticulocytosis.



PLAY PICMONIC

MCV > 100
Red Blood Cells Greater-than (100) Dollar-bill
Mean corpuscular volume is the average volume of a red blood cell. A mean corpuscular volume greater than 100 fL (femtoliters) indicates a macrocytic anemia.

Megaloblastic

B12 Deficiency
(12) Dozen Viking (B) Bees Broken
Vitamin B12 is found in meat and dairy. Since stores remain in the body for years, deficiency is rare, but can occur in patients with celiac sprue, pernicious anemia, gastric bypass surgery, or long-term vegans for example. B12 deficiency is associated with increased homocysteine and methylmalonic acid levels.

Folate Deficiency
Foliage Broken
Folate is found in a variety of foods such as grains, fruits, vegetables, and poultry, and folate stores remain in the body for about 4 months. Pregnant woman should be supplemented with folate as deficiency during pregnancy is associated with neural tube defects. Folate deficiency is associated with increased homocysteine levels but normal amounts of methylmalonic acid.

Orotic Aciduria
Erotic Acidic-lemons
Orotic aciduria is an autosomal recessive disease involving deficiency of an enzyme in the de novo pyrimidine synthesis pathway. These patients have increased orotic acid in the urine, and may have a megaloblastic anemia that is not corrected with folate or B12 supplementation. Treatment involves oral uridine supplements.

Non Megaloblastic

Alcoholism
Alcoholic-martini
Alcohol is a direct toxin to the bone marrow, damaging RBC precursor cells and causing a non-megaloblastic macrocytic anemia. Chronic alcoholism also damages the liver, further complicating the anemia.

Liver Disease
Liver Diseased
Liver disease involving cholesterol esterification deficiency affects RBC membranes by making them contain excess cholesterol, leading to production and appearance of macrocytic target cells.

Reticulocytosis
Rattle with Baby-cell
When RBCs are created, they are larger than the average RBC. In states of rapid cell production and proliferation, the average MCV is shifted, suggestive of a macrocytic anemia. However, as the newly created RBCs age, their cell size shrinks, and the MCV adjusts to a normocytic range.

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