Microcytic Anemia: Anemia of Chronic Diseases

See online here

Very common, and therefore important to know, is the so-called anemia of chronic disease. From this article, you will have all the relevant facts that you need in order to be well prepared for your exams.

Definition of Anemia of Chronic Diseases

Anemia of chronic disease is non-progressive anemia that occurs as part of chronic inflammatory, infectious, or neoplastic diseases. It is usually rather mild, but its severity does correlate with the severity of the underlying disease.

Note: Chronic inflammation causes sequestration of iron in bone marrow macrophages. This effect seems to be mediated by IL-1.

Epidemiology of Anemia of Chronic Diseases

After iron deficiency anemia, the anemia of chronic disease is the second most common type of anemia, having a 20% chance of occurrence.
Etiology and Pathogenesis of Anemia of Chronic Disease

Typically, an organism reacts to infections, inflammatory system diseases, and malignoma by increasing the release of inflammatory mediators. These not only have a local, but also a systemic effect. In this context, cytokines play a special role: when their systemic release is increased, it provokes an imbalance in the homeostasis of iron by influencing the physiological storage of iron in the macrophages of the bone marrow.

In addition, the mediators trigger the production of hepcidin in the hepatocytes. Hepcidin inhibits iron uptake in the intestines and lowers the availability of iron for erythropoiesis. This results in increased iron retention and insufficient iron output.

The consequence is a relative insufficiency in iron, which, from a pathophysiological perspective, leads to a defective composition in the heme molecule and clinically manifests as anemia.

In addition to the imbalanced iron homeostasis, the increased release of cytokines also provokes the suppression of erythropoietin production. So, not only is there a relative insufficiency in iron, but also in erythropoietin. Moreover, under the influence of the cytokines, the life-span of red blood cells is shortened by about 80 - 90 days.

Some of the underlying diseases that may cause anemia of chronic disease are:

- Infectious: Pneumonia, tuberculosis, osteomyelitis, bacterial endocarditis, pulmonary abscesses.
- Non-infectious: Systemic lupus erythematosus (SLE), Crohn’s disease, ulcerative colitis, vasculitides, rheumatoid arthritis, sarcoidosis.
- Malign diseases: Carcinoma, lymphoma, sarcoma, multiple myeloma.

Laboratory values:

- Mildly decreased Hbg (usually not < 9 mg/dL) and Hct.
- RBCs are usually normocytic to mildly microcytic.
- RDW is normal to slightly increased.
- Normal to increased serum ferritin (acute phase reactant, the main distinguishing feature between iron deficiency anemia and anemia of chronic disease).
Clinical Presentation and Symptoms of Anemia of Chronic Disease

Unspecific general symptoms like fever and weight loss in combination with other, typical signs of anemia like fatigue, weakness, tachycardia, or visual impairments, should be considered as possible indicators of anemia of chronic inflammation. Since anemia of inflammation is a consequence of an underlying disease, it is also important to look out for specific symptoms of the respective underlying disease.

Diagnosis and Differential Diagnosis of Anemia of Chronic Disease

If the underlying disease is known and is accompanied by signs of anemia, suspecting anemia of chronic diseases is reasonable but has to be further verified.

Laboratory tests will initially show hyporegenerative, normochromic, normocytic anemia. Only further in the course of the disease, can it be narrowed down as hypochromic, microcytic anemia.

Hematocrit, erythrocyte, and reticulocyte levels are reduced. Hemoglobin is also reduced, but the level usually does not fall below 9.0 g/dl. In contrast, ferritin will be increased since iron insufficiency is not absolute and is primarily a dysfunction of iron homeostasis. It is crucial to identify this circumstance because it is a way to exclude iron sufficiency anemia as a differential diagnosis.

Furthermore, measurement of the inflammatory markers is indicative. Patients with anemia of chronic inflammation have increased BSR and CRP. A bone marrow examination can detect normal or increased iron storage.

The causes of anemia can be diverse. Since different triggers, such as hemorrhages or hemolysis, could be present simultaneously during the course of a disease and since this could always change the clinical manifestation of an already diagnosed anemia, such a diagnosis will have to be reassessed regularly. It is a diagnosis of exclusion.

Treatment of Anemia of Chronic Diseases

The first priority is to treat the underlying disease. Additionally, an erythropoietin substitution might be considered. Oral iron therapy is ineffective, and, due to the relative iron insufficiency which cannot be remedied by oral intake of iron, it is contraindicated.

Prognosis of Anemia of Chronic Diseases

If the underlying disease can be treated successfully, the anemia will also subside.
References


Legal Note: Unless otherwise stated, all rights reserved by Lecturio GmbH. For further legal regulations see our legal information page.