Bone marrow attenuation

Marrow attenuation is a condition in which hematopoietic stem cells are damaged and stop to function sufficiently; thus (pan)cytopenia develops. It can be a **primary marrow attenuation**, the so-called **aplastic anemia**, when the stem cells die idiopathically (probably on the basis of immune mechanisms). The bone marrow can also be damaged **secondarily** by another process, pancytopenia is usually milder, only temporary and restore without treatment.

Clinical picture

Due to leukopenia, patients tend to have septic infections. Based on thrombocytopenia, platelet-type bleeding is present - *petechiae to purpura, ecchymoses, epistaxis, gynecological bleeding, hematuria*. However, major bleeding may occur, and **bleeding into the CNS may be fatal**.

Anemia can result in **anemic syndrome** - *paleness, fatigue, shortness of breath, tachycardia* - but it is less common.

Primary marrow attenuation

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Iron
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The primary marrow attenuation is **aplastic anemia**. There are mild, heavy and very heavy. Severe degrees are defined as meeting at least two cytopenia criteria:

- reticulocytes <0.1% (or 40 × 109 / l)
- neutrophil segments <0.5 × 109 / l
- platelets 20 × 109 / l

Aplastic anemia is thought to be due to immune mechanisms in which noxa (eg. viruses of hepatitis, EBV, parvovirus B19, HIV, radiation, drugs) act as antigen-activating T-lymphocytes that cause hematopoietic stem cell apoptosis. At 70%, the starter cannot be detected.

Diagnostics

The diagnosis is made on the basis of the peripheral blood count, in which cytopenia is present, and on the basis of bone marrow puncture and trepanobiopsy, where there is bone marrow attenuation (fat eyes), and the diagnosis is made per exclusionem: it is excluded myelodysplasia, myelofibrosis, chromosomal aberration, hematological or solid tumor.

Differencial diagnostics

The clinical picture may be similar to the following diseases: myelodysplastic syndrome, paroxysmal nocturnal hemoglobinuria, primary myelofibrosis, lymphoproliferative disorders, rarely infections (TB, legionellosis) or severe hypothyroidism.

Treatment

Treatment with curative intent

At the beginning of treatment at a milder stage **immunosuppression by antithymocyte globulin with corticosteroids** is used and subsequent long-term administration of **cyclosporine A.**

Allogeneic bone marrow transplantation is indicated in more severe forms and in younger patients who can handle such drastic treatment.

Supportive treatment

Substitution of blood derivatives in the form of erythrocytes and platelets is applied. Prophylactic treatment with **antifungals** and **broad-spectrum antibiotics** is also in place. Stimulation of hematopoiesis by **growth factors** is used.

Secondary marrow attenuation

In **secondary marrow attenuation**, the hematopoietic stem cell is not damaged by its own immune mechanisms, but by another etiological agent, such as **infection** or as **a side effect of drugs**. The attenuation is not so deep, usually lasts several days and adjusts on its own after removing the cause.

The most common infections are: CMV, EBV, parvovirus B19 in patients with hemolysis (hematopoietic cells become depleted by hemolysis) or very severe (anergic, hypothermic) sepsis.

Of the drugs, marrow attenuations are typically caused by **cytostatics**. Occasionally, unexpected attenuation occurs after **methotrexate** even at low rheumatological doses. Attenuation is classically described as a side effect of **chloramphenicol**. Attenuations after **thyrostatics** (thiamazole, carbimazole, but also propylthiouracil) are relatively common. They may also occur after the administration of **older antidepressants**.

Links

Related articles

- Aplastic anemia
- Myelodysplastic syndrom

References