

Neutropenia

What is neutropenia?

Neutropenia occurs when the number of circulating blood neutrophils decreases. Neutrophils are a form of white blood cells which help prevent and fight bacterial infection.

What causes neutropenia?

Neutrophils are produced inside the *bone marrow*, which is the spongy, fatty tissue inside bones, along with red blood cells and platelets. Millions of neutrophils every day enter the blood for a few hours and then enter body tissues (skin, mouth, intestines, lungs, etc.) where they fight bacteria and protect against infection. Neutropenia can rarely be present from birth or inherited from parents (*congenital*), but usually it is acquired, due to diseases that decrease production of neutrophils from the bone marrow or increase their destruction in the bloodstream.

- Decreased production can occur in leukemia (blood cancer), aplastic anemia and other conditions that affect the bone marrow. It can also be a side effect of drugs e.g. chemotherapy. Because the whole marrow is commonly affected, this is usually accompanied by decrease in other blood components, such as red blood cells and platelets.
- Increased destruction can occur due to antibodies in the blood stream in SLE and autoimmune neutropenia. It can also be a side-effect of antibiotics.
- Sometimes special blood tests or a bone marrow test are needed to find out the cause of the neutropenia..

How is neutropenia diagnosed?

Neutrophils are part of the complete blood count (CBC), a blood test obtained by a fingerstick or puncture of a vein. It is a simple test that can be done in almost any medical lab. The *differential white blood cell count* describes the percentage and number of neutrophils in the blood. The total white blood cell (WBC) count varies but in children is between 5,000 and 15,000 cells per cubic millimeter of blood. The *absolute neutrophil count (ANC)* is calculated by multiplying the percentage of neutrophils and bands in the blood by the total WBC count e.g. a child with neutropenia might have a WBC count of 4,000/mm³ with 5% neutrophils and 1% percent bands (ANC is 0.06 x 4,000 = 240/mm³). The ANC is normally above 1,500/mm³ (1,000/mm³ in children less than 2 years of age) and levels that drop lower than this suggest neutropenia. **It is important that the doctors know the cause neutropenia, since the treatment and outcome vary depending upon the cause.**

How is neutropenia cared for?

In general, the lower the neutrophil count (ANC) is, the more likely it is to lead to serious problems. If the bone marrow is healthy then **mild/moderate** neutropenia (ANC 500-1,000/mm³) commonly seen after viral infections is usually not a problem, and recovers in a few days or weeks.

In **severe** neutropenia the ANC is less than 500/mm³, and bacterial infections become more common and can include ear infections (otitis media), throat infections (pharyngitis), skin boils,

mouth sores, inflamed gums and urinary tract infections, as well as serious or life-threatening infections such as pneumonia, meningitis and septicemia (blood infection) and the patient needs to be hospitalized and treated with strong antibiotics given into a vein (IV). When the ANC is less than $200/\text{mm}^3$, the risk of life threatening bacterial infection is especially high.

What is the treatment for neutropenia?

The exact treatment for neutropenia depends on the underlying cause. It is important to know that the underlying bone marrow is healthy, whether your doctor does a bone marrow test will depend on whether the red cells and white cells also abnormal, or if this appears to be an isolated neutrophil problem. Subsequent treatment will depend on the underlying cause, so that in bone marrow diseases such as aplastic anemia or leukemia, treating the underlying disease is key.

If the marrow appears healthy, for example in mild post-viral neutropenia or chronic benign neutropenia, then a “watch and wait” approach might be appropriate. On the other hand patients who have very severe neutropenia following chemotherapy or in association with marrow diseases such as aplastic anemia might benefit from additional medications injected under the skin to stimulate neutrophil production (G-CSF), your doctor will clarify what treatment is best for you.

What special care is needed for neutropenia?

If you have severe neutropenia then the following precautions may be appropriate:

- Wash your hands with an antibacterial soap, especially after using the bathroom.
- Avoid vaginal douches, bubble bath, and bath salts.
- Avoid cuts, scrapes, and burns, use an electric razor instead of a blade.
- Don't squeeze or scratch pimples or sores on your skin.
- Avoid people with colds, flu, or any type of infection or open sores.
- Do not have vaccinations unless your health care provider approves.
- Never use rectal thermometers or suppositories.
- Make sure your food is completely cooked.
- Avoid constipation and consume plenty of fiber.
- Always use a soft toothbrush, and avoid dental floss.
- Tell your dentist as you may need antibiotics before and after dental work/cleaning.
- Tell your doctor if you develop fever as you may need immediate medical attention including blood cultures and antibiotics.