CONDITION

Neutropenia - infants

Neutropenia in infants is a lower-than-expected level of infection-fighting white blood cells called neutrophils.

WHAT IT IS
Low neutrophil count during infancy

BODY SYSTEM
Immune system and blood

MAIN SYMPTOMS
Often none, fever, mouth sores, repeated infections

WHAT CAUSES IT
Infection, immune conditions, medicines, or inherited changes

HOW IT IS DIAGNOSED
Blood count with differential and repeat testing

MAIN TREATMENT
Monitoring, infection treatment, or white-cell growth medicine

CAN IT BE CURED?
Sometimes - temporary causes resolve; inherited types may persist

IS IT AN EMERGENCY?
Sometimes - fever with severe neutropenia needs urgent assessment

LONG-TERM OUTLOOK
Most transient cases recover; inherited forms need long-term care

Overview

Neutropenia means that a baby has fewer neutrophils than expected. Neutrophils are white blood cells that help the body control bacterial and fungal infections.

The number is measured with a blood test and reported as the absolute neutrophil count, or ANC. An ANC is calculated from the total white blood cell count and the percentage of neutrophils in the blood.

Normal neutrophil levels change during the first weeks and months of life. Laboratories may also use different reference ranges. Some healthy people have naturally lower counts because of inherited ancestry-related differences without having a higher infection risk. For these reasons, one low result does not always mean that a baby has a lasting problem.

Neutropenia is a condition rather than a single disease. It may be temporary after an infection, caused by antibodies from the immune system, related to a medicine, or part of an inherited condition. How much it matters depends mainly on how low the ANC is, how long it stays low, and whether the baby develops infections.

Severe neutropenia generally means an ANC below 500 cells per microlitre. Infection risk is usually higher when severe neutropenia lasts for a long time. A baby's age, general health, symptoms, and other blood counts are also important.

Symptoms

Neutropenia itself usually causes no visible symptoms. Many babies are diagnosed after a blood count performed for another reason.

When symptoms occur, they usually come from an infection. Possible signs include:

Young infants may not show the usual signs of infection. They may instead become irritable, unusually sleepy, pale, or less interested in feeding.

Not every illness in a baby with neutropenia is caused by the low count. Viral infections are common in infancy and can both cause fever and temporarily lower neutrophil levels.

- Fever or an unusually low temperature
- Poor feeding, vomiting, or reduced alertness
- Mouth ulcers or inflamed gums
- Red, swollen, painful, or draining skin
- Repeated ear, chest, or skin infections
- Redness or discharge around the umbilical cord
- Fast or difficult breathing

Causes and risk factors

A recent viral infection is a common reason for temporary neutropenia. The count often returns to its usual range as the baby recovers, although this can take several weeks.

In autoimmune neutropenia, the immune system mistakenly makes antibodies against neutrophils. This often begins in infancy or early childhood. The ANC can be very low, but many affected children have only mild infections, and the condition often resolves over time.

Antibodies can also cross the placenta before birth. In neonatal alloimmune neutropenia, the

pregnant parent makes antibodies against proteins on the baby's neutrophils. A parent with an autoimmune condition may also pass neutrophil antibodies to the baby. These forms are usually temporary because the transferred antibodies gradually disappear.

Other possible causes include:

Inherited forms include severe congenital neutropenia and cyclic neutropenia. Cyclic neutropenia causes the ANC to fall in a repeating pattern, often about every three weeks. Some inherited syndromes also affect growth, the pancreas, bones, skin, heart, or nervous system.

Clues to an inherited or bone-marrow condition include severe infections beginning soon after birth, poor growth, unusual physical features, low red blood cells or platelets, and a family history of unexplained infant deaths or repeated serious infections.

- Prematurity or complications of pregnancy, including high blood pressure
- Certain medicines given to the baby or used during pregnancy
- Severe bacterial infection, which can use up neutrophils faster than they are replaced
- Vitamin or mineral deficiencies, usually with other blood-count changes
- Conditions affecting bone marrow, where blood cells are produced
- Inherited changes that reduce neutrophil production or survival

Diagnosis

Neutropenia is identified using a complete blood count with differential. This test measures different blood cells and allows the ANC to be calculated.

A repeat blood count is often needed. Neutrophil levels can change from day to day, especially during an infection. Repeated testing helps show whether the problem is resolving, persistent, or occurring in a cycle.

The assessment may include the baby's medical and family history, medicines, growth, recent illnesses, and pattern of infections. A physical examination looks for mouth inflammation, skin infection, enlarged organs, swollen lymph nodes, or features that may suggest an inherited condition.

Other tests are selected according to the pattern. They may include:

A bone marrow test is not needed for every infant. It is more likely to be considered when neutropenia is severe or persistent, other blood cells are also low, infections are serious, or an inherited marrow condition is possible.

- A blood smear to examine the shape and appearance of blood cells
- Blood, urine, or other cultures when infection is suspected
- Tests for immune, nutritional, or viral causes
- Antineutrophil antibody testing, although a negative result does not exclude autoimmune neutropenia
- Genetic testing when congenital neutropenia is suspected
- Bone marrow testing to examine blood-cell production

Treatment and management

Treatment is based on the cause, ANC pattern, infection history, and the baby's overall health. A low number alone does not always require medicine.

Temporary neutropenia after a viral illness may need only repeat blood counts and observation. Autoimmune neutropenia is also often managed with monitoring and prompt treatment of infections.

A suspected bacterial infection may require antibiotics like amoxicillin or doxycycline . The choice between treatment at home and treatment in hospital depends on the baby's age, appearance, ANC, infection site, and test results. Antibiotics should not be started, stopped, or saved for later without medical direction.

Granulocyte colony-stimulating factor, usually called G-CSF, is a medicine that helps bone marrow make and release neutrophils. It may be used for severe congenital neutropenia, serious infections, or selected cases of autoimmune or cyclic neutropenia. It is not needed for every low ANC.

Some infants with severe inherited bone-marrow conditions may be considered for a stem cell transplant. This replaces the blood-forming cells in the marrow. It is a specialised treatment with important benefits and risks, not a routine treatment for temporary or autoimmune neutropenia.

Routine care may include keeping vaccinations current, caring for the mouth and gums, and having a written plan for fever. Neutropenia alone does not usually require a baby to be isolated. If a broader immune disorder is suspected, the vaccination plan may need specialist review.

Complications

The main complication is infection. Risk is greatest when the ANC is very low for a prolonged period or when another part of the immune system is also affected.

Possible infections include skin abscesses, pneumonia, bloodstream infection, and inflammation around the mouth or anus. Sepsis is an extreme response to infection that can affect blood pressure and organ function. Prompt assessment of fever helps reduce this risk.

Repeated mouth ulcers or gum inflammation can make feeding uncomfortable. Frequent illness may also affect feeding, sleep, growth, and family routines.

Some forms of severe congenital neutropenia carry a long-term risk of bone marrow disorders, including myelodysplastic syndrome and acute myeloid leukaemia. This risk does not apply to most babies with temporary post-viral or autoimmune neutropenia. Children with an inherited form need specialist monitoring over time.

Prevention

Most cases of neutropenia in infants cannot be prevented. Viral, autoimmune, and inherited forms are not caused by ordinary parenting choices, foods, or routine contact with other children.

Good handwashing and avoiding close contact with people who are clearly unwell may reduce exposure to infection, but these steps do not correct the neutrophil count. Excessive cleaning or social isolation is not usually necessary.

If a medicine is suspected, it should be reviewed by the baby's medical team. Do not stop a prescribed medicine without advice. Once a medicine-related cause is established, future use may need to be avoided.

Inherited neutropenia cannot be prevented after conception. Genetic counselling can explain recurrence risks and testing options when a specific inherited change has been identified.

Living with it and what to expect

The course depends on the cause. Neutropenia following an infection often improves over weeks or months. Antibody-related neonatal neutropenia usually improves as transferred antibodies disappear.

Autoimmune neutropenia of infancy can last for months or a few years, but it often resolves during early childhood. Counts may remain very low while the child otherwise grows and develops normally. Follow-up usually focuses on infections and the overall pattern rather than

a single test result.

Cyclic neutropenia produces recurring low-count periods. Symptoms such as fever, mouth ulcers, or skin infections may follow the same pattern. Severe congenital neutropenia generally persists and requires long-term specialist care.

Many children with temporary or autoimmune neutropenia take part in usual family activities and childcare. Practical planning may include knowing how to measure temperature, keeping emergency contact details available, and telling childcare staff what to do if fever develops.

Follow-up blood tests may become less frequent as the count recovers and the child remains well. Persistent severe neutropenia, repeated infections, or an inherited diagnosis usually means longer-term care with a paediatric blood specialist.

When to get medical help

A fever in a young infant needs prompt assessment even when neutropenia has not been confirmed.

Seek emergency medical care if:

Contact the baby's medical team urgently the same day for a new fever in an older infant with neutropenia, worsening mouth sores, spreading skin redness, reduced feeding, repeated vomiting, or fewer wet nappies.

Routine follow-up is appropriate for repeat blood counts and discussion of growth, medicines, mild recurring infections, or a low ANC in a baby who otherwise appears well. Keep scheduled testing even when the baby has no symptoms, because the pattern over time helps identify the cause.

- A baby younger than 3 months has a temperature of 38°C or higher
- A baby with known severe neutropenia develops any fever under their care plan
- The baby is difficult to wake, floppy, or not responding normally
- Breathing is difficult, the lips look blue or grey, or there are pauses in breathing
- The skin looks mottled, very pale, or unusually cold
- There is a seizure or a rash that does not fade when pressed

Common questions

Does a low neutrophil count mean my baby has cancer?

Usually not. Temporary infection-related and autoimmune causes are much more common explanations. Bone marrow cancers can affect blood counts, but they often cause other abnormal results or symptoms. Further testing is based on the full blood count and clinical findings.

What ANC is dangerous for a baby?

An ANC below 500 cells per microlitre is generally called severe neutropenia. The number is only part of the assessment. A short-lived low count in a well baby may carry a different risk from persistent neutropenia with repeated infections. Fever and the baby's appearance matter more than the number alone in an urgent situation.

Will my baby grow out of neutropenia?

Many temporary and autoimmune forms resolve during infancy or early childhood. Inherited forms may persist, although their severity and treatment needs differ. Repeat blood counts and the pattern of infections help clarify what is likely.

Can my baby still have vaccinations?

Most babies with isolated neutropenia can continue routine vaccination. If neutropenia may be part of a broader immune condition, certain vaccines may need specialist review. Vaccination should not be delayed or cancelled without discussing the reason with the baby's medical team.

Can my baby attend childcare?

Many well babies with temporary or autoimmune neutropenia can attend childcare. They generally do not need isolation. The childcare setting should know how to contact you and what to do if the baby develops a fever or appears unwell.

Can teething cause neutropenia?

Teething is not an established cause of significant neutropenia. A viral infection can happen around the same time as teething and may temporarily lower the neutrophil count.

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