CONDITION

Leukemoid reaction

A leukemoid reaction is a temporary, noncancerous rise in white blood cells caused by another illness or physical stress.

WHAT IT IS
Extreme reactive rise in white blood cells

BODY SYSTEM
Blood and immune system

MAIN SYMPTOMS
Fever, fatigue, weakness, symptoms from the underlying illness

WHAT CAUSES IT
Severe infection, inflammation, cancer, medicines, or physical stress

HOW IT IS DIAGNOSED
CBC, blood smear, and tests excluding blood cancer

MAIN TREATMENT
Treatment of the underlying trigger

CAN IT BE CURED?
Sometimes - underlying trigger can be controlled

IS IT AN EMERGENCY?
Sometimes - breathing trouble, confusion, or severe underlying illness

LONG-TERM OUTLOOK
Usually resolves; outlook follows the underlying cause

Overview

A leukemoid reaction is a very high white blood cell count caused by the body reacting to another condition. It is not a type of leukemia or another blood cancer.

White blood cells help defend the body against infection and respond to inflammation. During a leukemoid reaction, the bone marrow releases large numbers of these cells into the bloodstream. Most are usually neutrophils, which are white blood cells that respond quickly to infection and tissue injury.

A leukemoid reaction is often defined as a white blood cell count above 50,000 cells per microlitre, although definitions differ. The count alone cannot confirm the condition. Doctors must examine the types and appearance of the cells, look for a trigger, and rule out blood cancer.

The reaction matters because it can be a sign of a serious infection, major inflammation, tissue damage, or an underlying cancer. Treatment is aimed at that cause rather than simply lowering the blood count.

Symptoms

A leukemoid reaction often causes no symptoms of its own. Most symptoms come from the illness or physical stress that triggered it.

Possible symptoms include:

Some symptoms can overlap with those of leukemia, including unexplained weight loss, night sweats, easy bruising, or a feeling of fullness below the left ribs. These symptoms do not establish the cause, but they may lead to further testing.

Very high white blood cell counts can occasionally interfere with blood flow. This is called leukostasis . It is much more strongly associated with leukemia than with a leukemoid reaction, but breathing difficulty, confusion, vision changes, weakness on one side, or a severe headache require emergency assessment.

- Fever, chills, or sweating
- Tiredness, weakness, or feeling generally unwell
- Pain, swelling, cough, diarrhoea, or other infection symptoms
- Symptoms related to inflammation, bleeding, tissue injury, or cancer

Causes and risk factors

A leukemoid reaction happens when signals from the immune system tell the bone marrow to produce and release many white blood cells. It is a response pattern rather than a disease in itself.

Common categories of triggers include:

Having one of these factors does not mean that a high count is necessarily a leukemoid reaction. More common forms of leukocytosis-an elevated white blood cell count-must also be considered.

A leukemoid reaction is not inherited. It also does not turn into leukemia.

- Severe infection: Bacterial infections are a well-known cause, but some viral, fungal, or parasitic infections can also produce a major rise.

- Major inflammation or tissue injury: Severe burns, pancreatitis, lack of blood flow to tissue, and other intense inflammatory conditions may trigger it.
- Bleeding or rapid red blood cell breakdown: Significant blood loss or haemolysis, meaning destruction of red blood cells, can stimulate bone marrow activity.
- Cancer outside the blood and bone marrow: Some solid tumours release immune-signalling proteins called cytokines. These can drive white blood cell production.
- Medicines: White blood cell growth factors can cause a pronounced rise. Corticosteroids and some other medicines can also increase the count, although not always to leukemoid levels.
- Severe physical stress: Major surgery, trauma, seizures, or other critical illness may contribute.

Diagnosis

A leukemoid reaction is usually found on a complete blood count , or CBC. This blood test measures white blood cells, red blood cells, and platelets. A differential count shows the number of each type of white blood cell.

The CBC is generally repeated to confirm the result and see whether the count is rising or falling. A laboratory specialist may examine a blood smear under a microscope. Reactive neutrophils can show signs such as toxic granulation or small blue areas called Döhle bodies. Immature neutrophils may also be present.

No single result confirms every leukemoid reaction. Diagnosis involves finding a likely trigger and checking that the blood-cell pattern is not due to leukemia or another bone marrow disorder.

Testing may include:

One important condition to exclude is chronic myeloid leukemia, or CML. CML usually carries a genetic change known as the BCR::ABL1 fusion . Testing for this change can help distinguish CML from a reactive process.

The pattern of red blood cells and platelets also matters. Abnormalities across several blood cell types, unusual cells on the smear, an enlarged spleen, or a persistent count may lead to assessment by a haematologist, a doctor specialising in blood conditions.

- Blood, urine, sputum, or stool tests for infection
- Imaging to look for infection, inflammation, tissue injury, or a tumour

- Blood tests for inflammation and organ function
- Flow cytometry, which identifies proteins on blood cells
- Molecular tests for genetic changes associated with blood cancers
- A bone marrow biopsy if the cause remains unclear or the count stays high

Treatment and management

Treatment focuses on the condition causing the reaction. There is no single treatment for the white blood cell count itself.

For example, a confirmed bacterial infection may need antibiotics like amoxicillin or doxycycline . Inflammation, significant bleeding, tissue injury, or another medical condition is treated according to its cause. If a medicine is contributing, the prescribing clinician may adjust or stop it when appropriate. Do not stop a prescribed medicine without medical advice.

A cancer-related leukemoid reaction may improve when the cancer responds to treatment. In this setting, the blood count can also help show how active the underlying process is, although it is not used alone to judge progress.

The care team will usually repeat the CBC. A falling count can support the conclusion that the trigger is improving. A count that continues to rise or remains very high may prompt more testing.

Treatments that rapidly remove or suppress white blood cells are not routinely used for a leukemoid reaction. They may be considered only in unusual circumstances after specialist assessment, particularly if there are signs that the high count is affecting blood flow.

Complications

Most complications come from the underlying illness rather than from the reaction itself. Severe infection, major tissue damage, or cancer may require hospital care regardless of the white blood cell count.

Possible concerns include:

A leukemoid reaction does not damage the bone marrow by "using up" white blood cells. It also does not become leukemia. However, follow-up is important until the count falls or its cause is clearly understood.

- Progression of the infection or inflammatory condition

- Organ problems related to the underlying illness
- Repeated or persistent high counts when the trigger remains active
- Delayed recognition of a blood cancer that initially resembles a reaction
- Rare blood-flow problems when the white count is exceptionally high

Prevention

A leukemoid reaction cannot always be prevented because it is the body's response to another medical problem. It is not caused by something inherited or by a single avoidable behaviour.

Prompt assessment and treatment of serious infections or inflammatory illnesses may reduce how long the reaction lasts. If you receive a medicine that stimulates white blood cell production, attend the blood tests arranged for you. The medicine may be necessary even if it temporarily raises the count.

If you have had a previous leukemoid reaction, tell healthcare professionals what caused it, if known. This information can help them interpret future blood results, but it does not guarantee that another reaction can be prevented.

Living with it and what to expect

A leukemoid reaction is often temporary. When an infection or other short-term trigger improves, the white blood cell count may begin falling over days or weeks. The exact timing reflects the cause, its severity, and how it responds to treatment.

Follow-up commonly includes repeat blood counts. You may need only short-term monitoring if the count returns toward normal and the trigger has resolved. Persistent or unexplained results need further review rather than indefinite observation without a diagnosis.

If the reaction is linked to a long-lasting inflammatory condition or cancer, the count may remain elevated or rise again. In that situation, day-to-day health and long-term outlook are shaped mainly by the underlying condition.

The leukemoid reaction itself usually does not require permanent activity limits, a special diet, or lifelong treatment. Follow any restrictions or care plan related to its cause. Keep copies of important blood results and specialist reports if ongoing monitoring is needed.

When to get medical help

A very high white blood cell result should be reviewed promptly, even if you feel well. Contact the clinician who ordered the test to confirm what follow-up has been arranged.

Seek urgent medical advice if you have a high count along with worsening fever, persistent vomiting or diarrhoea, increasing pain, dehydration, unusual bleeding, or rapidly worsening weakness.

Call emergency services for:

Routine follow-up is appropriate when you are otherwise stable and have been given a clear plan for repeat testing. Do not wait for a routine appointment if new severe symptoms develop.

- New or severe trouble breathing
- Chest pain, fainting, or blue-grey lips
- Confusion, difficulty waking, or a seizure
- Sudden weakness, numbness, speech difficulty, or vision loss
- A severe new headache with neurological symptoms
- Signs of severe infection, such as marked confusion or very rapid deterioration

Common questions

Is a leukemoid reaction the same as leukemia?

No. A leukemoid reaction is a noncancerous response to another condition. Leukemia is a cancer of blood-forming cells. Because both can produce very high white blood cell counts, additional testing may be needed to tell them apart.

How high is the white blood cell count in a leukemoid reaction?

The term is often used for counts above 50,000 cells per microlitre. This is not a universal cutoff, and the number alone cannot determine the cause. The cell types, blood smear, other test results, and change over time are also important.

How long does a leukemoid reaction last?

It may settle over days or weeks when a short-term trigger is controlled. It can last longer if infection, inflammation, tissue damage, or cancer remains active. A count that does not fall needs reassessment.

Can emotional stress cause a leukemoid reaction?

Ordinary emotional stress can affect white blood cell counts, but it is not a typical explanation for a leukemoid-level rise. Severe physical stress, such as trauma, major surgery, or critical

illness, is a more recognised trigger.

Can a leukemoid reaction come back?

Yes. It may return if the same trigger recurs or if a long-term underlying condition remains active. A new high count should still be evaluated rather than assumed to have the same cause.

Is a leukemoid reaction contagious?

No. The reaction itself cannot spread between people. An infection that caused it may be contagious, depending on the specific organism.

Sources

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