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Neutropenia

Neutropenia means you have a lower number of **neutrophils** (a type of white blood cell) than is usual for you. These cells help to fight infection. Many people who have lymphoma are affected by neutropenia. If you have neutropenia, your medical team might say that you are 'neutropenic' or describe you as having a 'low neutrophil count' or 'low white cell count'.

We have separate information about **risk of infection**, including **signs** and **prevention**.

On this page

We have separate information about the topics in **bold font**. Please get in touch if you'd like to request copies or if you would like further information about any aspect of lymphoma. Phone 0808 808 5555 or email **information@lymphoma-action.org.uk**.

Why does neutropenia affect people with lymphoma?

One of the main causes of neutropenia in people affected by lymphoma is **side effects of treatment** such as **chemotherapy** and **radiotherapy**. **CAR-T therapy**, which is used to treat some types of high-grade lymphoma, can also cause neutropenia.

Side effects can happen because treatment affects healthy cells (including blood cells) as well as lymphoma cells. Throughout your **treatment**, your medical team keep checks on your neutrophil count. For example, it can take a couple of weeks or more for your neutrophil count to return to a safe level after a cycle of chemotherapy. Your medical team only give you more treatment when your neutrophil levels have returned to a level that mean it is safe to do so.

You might also be affected by neutropenia if you have lymphoma in the **bone marrow**. Lymphoma in the bone marrow affects the production of neutrophils because the lymphoma cells take up space that's usually used to make healthy blood cells.

Treatment with a **stem cell transplant** puts you at a higher risk of developing neutropenia. After an **autologous stem cell transplant** (using your own stem cells), it takes a while for your bone marrow to recover and for your neutrophil counts to return to normal. With an **allogenic stem cell transplant** (using stem cells from a donor), you have medication to dampen your **immune system** (immunosuppressant drugs). This lowers the chances of your body recognising the donor cells as foreign and attacking them, but it also lowers your neutrophil count.

Symptoms and effects of neutropenia

Neutropenia itself doesn't usually cause symptoms. However, it can increase your chances of getting infections and of infections being more severe.

If you have a low number of neutrophils, you are likely to get more **infections** than you otherwise would. The risk of you developing an infection depends on how low your neutrophil count is. If it's only a little below your normal level, the risk isn't much higher than usual. Your chances of getting an infection go up as your neutrophil level goes down.

Infections

An infection can start anywhere in your body. Often, infections affect the airways, digestive system, bladder and reproductive system, causing symptoms such as a cough or urine infection. Less commonly, they can also affect your skin.

If your neutrophil count is low:

- You might not get the usual **signs of infection**. However, **fever** (a body temperature of 38°C or 100.4°F) is often present.
- It's harder than usual for you to fight an infection and you will need treatment to do so.

If you develop any signs of infection, seek medical attention immediately – you might need treatment, even if you are already taking antibiotics.

> **My consultant has emphasised the importance of reacting swiftly to any adverse condition. I am aware of how fast I can become very ill. When my neutrophil levels are very low, I take my temperature every 4 hours and am told to contact the Haematology Triage team immediately if it is high, which hasn't yet happened. At present I feel absolutely normal and am able to exercise, walk and cycle as I wish.**
>
> Roger, diagnosed with chronic lymphocytic leukaemia

Certain chemotherapy drugs can increase your risk of developing an infection. This is because the drugs can affect your **immune system** as a whole. If your treatment includes one of these drugs, your doctor will prescribe medicine to lower the risk of you developing an infection (**prophylactic treatment**). This will be a low dose of antibiotics, which you might need to continue taking after treatment until your immune system recovers.

While you cannot prevent all infections, you can take some simple steps to **reduce your risk of infection**. This includes keeping good personal hygiene, minimising your contact with germs, protecting your skin and following **food safety guidance**.

You might have heard of a 'neutropenic diet' (sometimes called a 'clean', 'low-bacterial' or 'low microbial' diet). The aim of this diet is to avoid foods that are more likely to contain bacteria and fungi that cause infection. However, there is limited scientific research supporting neutropenic diets, and advice varies between hospitals. Your medical team are best placed to advise you on any foods or drinks that you should avoid.

Diagnosis of neutropenia

Neutropenia means having a lower number of neutrophils than is usual for you.

There is no set number of neutrophils an individual should have. Instead, hospitals compare your count against a 'reference (or normal) range'. The reference range is a range of values typically found in healthy people.

As well as varying between individuals, ranges can differ between ethnic groups. For example, people of African, Caribbean, Middle Eastern and West Indian descent often have naturally lower numbers of neutrophils in their blood than white people. Having a naturally lower number of neutrophils due to ethnicity does not increase the risk of developing infections.

Neutropenia is diagnosed using the **blood tests** you have during your lymphoma treatment. The number of neutrophils in your blood is measured using a blood test called a **full blood count** (FBC). Your count is compared to the reference range.

The normal range for neutrophils is usually between 2 billion (written as 2x 10^9/L) and 7.5 billion (written as 7.5x 10^9/L) neutrophils per litre of blood. Doctors usually refer to neutrophil counts just by a number, such as a neutrophil count of 0.7 (which means 0.7 billion neutrophils per litre of blood) or 4.2 (which means 4.2 billion neutrophils per litre of blood).

In general, a neutrophil count of below 1x10^9/L is classified as neutropenia. This means that there are fewer than 1 billion neutrophils per litre of blood.

Neutropenic sepsis

Neutropenic sepsis means a whole-body reaction to an infection.

Having neutropenia can make it difficult to fight infection. This means neutropenic sepsis can develop quickly if you are neutropenic. Neutropenic sepsis can be life-threatening and it must be treated urgently.

If you notice any signs or symptoms of neutropenic sepsis, seek medical attention straightaway.

I had my bloods taken weekly to monitor the effect of the treatment. I had low neutrophil levels so my doctor gave me medication to stimulate the production of neutrophils. I also had a bone marrow analysis. While in for this, I developed a fever and had a rigor attack (which can cause uncontrollable shaking and shivering due to a very high fever). I was treated with a broad spectrum IV antibiotics and stayed in hospital for 6 days. I have great support from the NHS, and it also helps to have a GP and a pharmacologist in the family. I take their advice at all times.
Roger, diagnosed with chronic lymphocytic leukaemia

Signs, symptoms and diagnosis of neutropenic sepsis

Neutropenic sepsis is a potentially life-threatening complication of being neutropenic.

A common symptom of neutropenic sepsis is fever (a body temperature higher than 38°C or 100.4°F). This is known as 'febrile neutropenia'.

It is possible to have neutropenic sepsis without a fever. This is sometimes called 'cold sepsis'. **Steroids** can make this more likely because they can mask a fever. For this reason, doctors sometimes use other ways of checking for sepsis, including measuring your heart rate, blood pressure, breathing rate, kidney and liver function.

Other signs of sepsis include:

- chills and shivering
- fast heartbeat or breathing
- cold, pale, clammy or blotchy skin
- dizziness, confusion, disorientation
- slurred speech
- diarrhoea
- sickness (nausea or vomiting)
- weeing less than is usual for you
- loss of consciousness.

Risk factors

Certain risk factors can increase your risk of neutropenia sepsis, including:

- some treatments, for example steroids and high-intensity chemotherapy such as that used in **stem cell transplants**
- having had neutropenic sepsis in the past
- other illnesses or health conditions, such as liver or kidney disease.

In general, infants and people aged over 60 might have a higher risk of developing neutropenic sepsis after treatment with chemotherapy.

Prevention and treatment

Your medical team can give you information relevant to your situation and take any necessary precautions.

If you develop neutropenic sepsis, you are likely to need to be admitted to hospital for treatment with IV (intravenous) antibiotics.

> **I had a temperature after every cycle of chemotherapy and had to return to hospital for investigation and several days of IV antibiotics each time. This seemed like a pain, but it was only after I shared a ward with someone who had left it late and ended up in the intensive care unit that I fully realised the potential danger of not acting quickly.**
>
> Corrin, diagnosed with diffuse large B-cell lymphoma

Treatment for neutropenia

If chemotherapy has caused your neutropenia, you might not need any treatment for it. This is because neutrophils often return to a safe level on their own within a few days after a cycle of chemotherapy.

Treatment to prevent neutropenia (prophylactic treatment)

Sometimes, doctors recommend a regular, small dose of medicines to lower the risk of infection. You might have these for a short time while your neutrophil count is expected to be at its lowest.

Preventative (prophylactic) treatment can be:

- antibiotic medicines, which fight infections caused by bacteria (such as skin infections, tonsillitis or chest infections)
- anti-viral medicines, which fight infections caused by viruses (such as flu, chicken pox and shingles)
- anti-fungal medicines, which fight infections caused by fungi (such as thrush and some eye infections).

Prophylactic treatment can lower your risk of infection. However, it doesn't completely remove the risk of developing an infection. **If you have any signs of infection, contact your hospital straightaway.** If you develop an infection, you will need treatment with higher doses of other antibiotics, usually given into a vein (intravenously).

Treatment using growth factors

Our bodies naturally make hormones (chemical messengers) called **growth factors**. They can also be made in a laboratory. Some growth factors trigger your bone marrow to make new white blood cells.

The growth factor most commonly used is called granulocyte-colony stimulating factor (G-CSF). You have G-CSF by subcutaneous injections, given with a very small needle just underneath the skin.

You might have treatment with G-CSF for one of the following reasons:

- your neutrophil count is very low and your doctor thinks you have a high risk of developing an **infection**
- your neutrophil count is too low for you to have the chemotherapy dose you need
- you are over 60 years old and receiving certain types of chemotherapy.

G-CSF helps your neutrophil levels return to normal more quickly after chemotherapy, which lowers your risk of infection. We have more information about **growth factors**, including about **when they might be used**, **how they're given** and their possible **side effects**.

References

The full list of references is available on request. Please email publications@lymphoma-action.org.uk or call 01296 619409 if you would like a copy.

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✓	Evidence-based
✓	Approved by experts
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