Infection and myeloma

Symptoms and complications Infosheet

This Infosheet explains what an infection is, what increases the risk of infection in myeloma, what the signs and symptoms of infection are and how infection is managed and treated.

COVID-19: For the latest information about COVID-19 infection and myeloma, go to the COVID-19 information hub at myeloma.org.uk/coronavirus

What is an infection?

An infection occurs when disease-causing organisms, or 'germs', such as bacteria, fungi or viruses enter the body and begin to multiply. Usually, the immune system quickly kills and removes them, but sometimes the organism multiplies and survives long enough to cause infection and make you ill.

The immune system is the body's defence system. It is made up of specialised cells, tissues and proteins (including antibodies) which work together to protect the body against infection and disease.

The cells involved in the immune system are called white blood cells (leukocytes). Types of white blood cell include:

- Plasma cells
- T cells
- Neutrophils

Frequent or recurrent infection is a common complication of myeloma.

Types of infection

Examples of infections are listed below:

Bacterial infections

- Urinary tract (water) infections
- Most types of pneumonia (lung infection)
- Some types of meningitis (infections in the linings of the brain)

Viral infections

- Influenza (flu)
- COVID-19 (coronavirus)
- Shingles and chickenpox (caused by varicella-zoster virus)
- Cold sores (caused by herpes simplex-1 virus)

Fungal infections

- Thrush (also called a yeast infection, caused by a fungus called Candida)
- A lung condition called Aspergillosis
- Fungal infections on the skin or nails

What increases the risk of infection in myeloma?

Myeloma patients are more likely to develop an infection than healthy people. This is due to both the myeloma itself, and the effects of anti-myeloma treatments.

How myeloma affects the immune system

Myeloma affects how well the immune system responds to infection. Myeloma has several suppressive effects on the immune system.

Myeloma cells are abnormal (cancerous) plasma cells. As these myeloma cells multiply in the bone marrow, they suppress the production of normal blood cells and prevent the bone marrow from working properly.

Normal, healthy plasma cells produce different types of antibodies (also called immunoglobulins) to

help fight infection. In myeloma, the myeloma cells themselves produce large amounts of a single type of antibody (called paraprotein). The paraprotein has no useful function and cannot fight infection. At the same time, the myeloma is suppressing the production of normal, healthy antibodies.

The overall result of these, as well as other effects, is that the bone marrow produces fewer healthy white blood cells, and the immune system does not work as well as normal. This weakens the immune system's ability to fight infection. You may hear the term 'immunocompromised', which means having a weakened immune system.

You may have a particularly high infection risk if:

- You have active myeloma (with symptoms)
- You are on treatment for your myeloma (especially if you are having high-dose therapy and stem cell transplantation)
- You have had slow recovery from infection in the past

Side effects of anti-myeloma treatment

Some anti-myeloma treatments can lower the levels of white blood cells, particularly a type of white cells called neutrophils. Neutrophils are an important part of the body's defences against infections caused by bacteria and fungi. A reduced level of neutrophils is referred to as neutropenia (see below).

The normal range of neutrophils in healthy adults is between about 1.5 and 7.5 billion neutrophils in each litre of blood (1.5–7.5 x10^9/L), depending on the individual laboratory. The normal range is slightly lower in some minority ethnic groups. Neutropenia refers to a level of neutrophils lower than the normal range.

Neutropenia is a common but potentially serious side effect of myeloma drug treatment. It can increase the risk of infections.

Myeloma treatments that can cause neutropenia and therefore increase the risk of infection include:

- Thalidomide
- Bortezomib (Velcade®)
- Lenalidomide (Revlimid®)
- Daratumumab (Darzalex®)
- Cyclophosphamide
- Melphalan

Patients taking these drugs will have their white blood cell counts carefully monitored throughout treatment.

What are the signs and symptoms of infection?

The signs and symptoms of an infection depend on what is causing it, and may include:


Fever (temperature above 38°C)


A temperature below 35.5°C


Chills and sweating


Change in cough or a new cough


Sore mouth and throat


Blocked nose and/or ears


Burning sensation or pain when passing urine, or a frequent need to urinate


Diarrhoea or pain in the abdomen


Nausea or vomiting


Redness or swelling in any area


New onset of pain


Rash


Redness, heat or swelling around a Hickman®/PICC line or catheter

It is important to recognise the signs and symptoms of infection and to report any suspected infection to your doctor or nurse immediately, even if this is out of hours of your usual clinic times.

Even a minor infection in someone with a weakened immune system has the potential to develop into something more serious if not treated promptly.

A rare but serious complication of infection is called sepsis (blood poisoning). Go to next page for information about sepsis.

How is infection diagnosed?

Any number of the signs and symptoms in the list on this page can strongly indicate that an infection is developing. In addition, your doctor or nurse will carry out routine blood tests regularly to check for signs of a low white blood cell count.

If your blood tests indicate you have a low white blood cell or neutrophil count, your doctor or nurse will

perform tests to monitor you for further signs of infection. This will include a full assessment of your temperature, pulse, blood pressure and breathing rate (known as your vital signs).

Different infections can have similar symptoms, so your doctor may do more tests:

- A test called a 'swab' (e.g. in your throat or nose)
- More blood tests
- Tests on a sample of urine (pee)
- A stool (poo) sample

Following diagnosis of an infection, a course of treatment will be started.

What is sepsis (blood poisoning)?

Sepsis is a serious infection where bacteria enter the blood, and the body overreacts to the infection. It can lead to organ failure. It is also called blood poisoning or septicaemia. It is vital to get sepsis treated quickly in hospital, so it is important to know the warning signs. These vary but can include:

- A high temperature (fever) of 38°C (100.4°F) or above
- Extreme shivering or muscle pain
- Feeling extremely unwell
- Breathing very fast or feeling breathless
- Not having had a pee all day
- Skin pale or mottled
- Slurred speech or confusion

Sepsis is life-threatening and can be hard to spot. If you think you or your family member could be getting sepsis, you should get medical help urgently – trust your instincts.

If you do develop sepsis, you will need to go into hospital and be treated with intravenous antibiotics (into a vein).

How is infection treated?

The treatment for infection depends on what is causing it, where it is in the body, and how severe it is. Serious infection, if it is left untreated, can cause other complications, reduce quality of life or even be fatal. For these reasons, it is important to treat infection as it occurs. In some cases you may be given treatment to prevent infections (called preventive treatment). Preventive treatment is explained on page 8.

Vaccines can be given to reduce the risk of getting some types of infection.

A vaccine is a treatment that works by triggering an immune response to a particular infection without causing the infection itself. When you are vaccinated your body 'remembers' the response when it comes into contact with the same infection in future, making it easier to fight it off.

A vaccine may be an inactive part of a virus or bacterium, or it may contain a genetic instruction that triggers an immune response to the virus or bacterium.

Read the next sections for more information about vaccines and other treatments.

Treating bacterial infections

Infection caused by bacteria, for example urinary tract infections and most types of pneumonia, are treated using antibiotics. If the infection is more severe, you may need to be admitted to hospital.

If you are admitted to hospital for treatment, you may be given antibiotic tablets or antibiotics through an intravenous infusion (into a vein). Treatment at home usually consists of a course of antibiotic tablets (typically over a period of 7 days) and plenty of rest and fluids.

It is essential to finish taking your course of antibiotics, even if you feel better, unless a healthcare professional tells you to stop them. If you stop taking an antibiotic part way through a course, the infection may return or the bacteria can become resistant to the antibiotic.

Vaccines for bacterial infections

Vaccination is possible for some types of bacterial infection. An example is the pneumococcal vaccine, which offers protection against some types of pneumonia, meningitis and sepsis. It is recommended that all myeloma patients get the pneumococcal vaccine.

Treating viral infections

Antibiotics are not effective against viral infections. Some viral infections may be treated with antiviral drugs (e.g. aciclovir). People with weakened immune systems, such as myeloma patients, may be given preventive antiviral drugs alongside their anti-myeloma treatment.

Some virus infections are caused by viruses already in the body that are later reactivated. You have an increased risk of this happening if you have myeloma. For example, you can get shingles if you have had chickenpox in the past, and the virus is later reactivated. Shingles causes pain, tingling and a rash.

The risk of virus reactivation is increased by some myeloma drugs. You will be given an anti-viral drug at the start of many myeloma treatments to reduce this risk.

Vaccines for viral infections

Vaccines are offered to reduce the risk of some virus infections:

- **COVID-19** – vaccination is normally two doses plus boosters, and myeloma patients may be offered extra doses
- **Flu** – vaccination is available once a year in the autumn. A new vaccine is produced each year, to protect against new flu strains. Myeloma patients are recommended to have the flu vaccine every year
- **Shingles** – shingles vaccination is offered to everyone aged 70 to 79. The standard shingles vaccine is a weakened 'live' virus and you should not have it if you have myeloma. However, a new 'non-live' shingles vaccine is now available, which myeloma patients can have safely

For more information about vaccines see the **Vaccines and myeloma Infosheet** from Myeloma UK. For up-to-date information about COVID-19 vaccines, see the COVID-19 Information Hub at **myeloma.org.uk/coronavirus**

Treating fungal infections

Fungal infections are not as common as bacterial or viral infections.

Minor fungal infections, such as those infecting the skin, can be treated using antifungal creams. More serious fungal infections will need antifungal drugs as tablets (e.g. fluconazole) or as an intravenous infusion (into a vein).

Immunoglobulin treatment

Some myeloma patients may be given immunoglobulins (IGs). These are antibodies collected from donated blood, which give added protection against infections. IGs are given by intravenous infusion (into a vein). You might be given IGs if you have low levels of IGs of your own, and you are getting repeated infections despite antibiotic treatment.

Granulocyte-colony stimulating factor (G-CSF)

You might be given a drug called granulocyte-colony stimulating factor (G-CSF). This is used to help your bone marrow make more white blood cells.

Preventive treatment

Sometimes you might be given preventive treatment when you don't have any infection.

An example is the antiviral drug called aciclovir which can be given to help prevent viral infections, and to prevent dormant viruses being activated.

If you have had a treatment called high-dose therapy and stem cell transplantation (HDT-SCT), you will usually be given preventive drugs while you are recovering. This will include antifungal, antiviral and antibacterial drugs. They are needed because your immune system is extremely weakened for a time after the HDT-SCT.

Reducing the risk of infection

Once your myeloma has been controlled with anti-myeloma treatment, your risk of getting infections will be lower. The bone marrow is often able to recover and start producing more neutrophils and other white blood cells, which allows the immune system to function more effectively.

If your anti-myeloma treatment itself is lowering your white blood cell counts, it may be necessary to temporarily postpone treatment or reduce your treatment dose until your white blood cell levels begin to return to normal. Your doctor will advise you.

During the COVID-19 pandemic, your healthcare team may make some changes to your care to minimise your risk of infection. Changes might include:

- Holding some consultations by telephone or video call instead of in person. This means you don't have to visit the hospital so often
- Changing your drug treatment from one given into the vein, to one which you can take at home as tablets
- Delaying HDT-SCT for a limited period, and continuing with drug treatment until the HDT-SCT is done
- Having a break in your treatment for a time, or giving some of your drugs less often
- Some drugs can be given under the skin instead of into a vein. This means the drug is given more quickly, and may also mean a community nurse could give your injections at home

Any changes such as these will be decided based on your own situation and your treatment needs. Your healthcare team will discuss any changes with you. The aim will be to minimise your risk of COVID-19 infection but maintain the best possible myeloma treatment for you.

Self-help tips for avoiding infection

These are many things you can do to reduce your own risk of infection:

- Watch for signs and symptoms of infection (see page 4) and tell your healthcare team as soon as possible if you get any
- Follow current COVID-19 guidance (see link at end of section)
- Regularly wash your hands with warm water and soap, especially after using the bathroom, before handling food, and after being in public places
- Use sanitising hand gel (containing at least 60% alcohol) regularly if you are out and about, or if people are visiting your home
- Think about avoiding crowded public spaces and public transport when they are very busy
- Get all the vaccines you are entitled to
- Ask family and friends not to visit when they or others in their household have signs of infection
- Ask people who do visit to take precautions to reduce their risk of passing on infection
- Disinfect kitchen and bathroom surfaces regularly, and don't share towels with anyone
- Cook food thoroughly, keep raw and cooked meats separate, and don't eat food past its use-by date
- Try to avoid getting cuts and scratches (e.g. wear gloves when gardening), and keep any you do get clean and covered
- Don't handle pet litter
- Take your temperature if you think you might have an infection

Find the latest guidance about COVID-19 at the COVID-19 Information Hub at **myeloma.org.uk/coronavirus**

Avoiding infection after HDT-SCT

During the period after you have had high-dose therapy and stem cell transplantation (HDT-SCT), you will be especially at risk from infection. Until the transplanted stem cells have had time to get established and start producing new white blood cells, your white blood cell count will be very low. During this time you will be monitored closely, and will be given strict guidelines to help reduce your risk of infection. This will

include measures such as daily showers and bedding changes, and restrictions on visitors.

For more information see the **High-dose therapy and autologous stem cell transplantation Infoguide** from Myeloma UK

Future directions

Research into new treatments for myeloma aims to develop drugs that target myeloma more effectively as well as minimising side effects such as lowered white blood cell counts.

Research into infections in myeloma is aiming to answer questions such as:

- How many myeloma patients suffer serious infections?
- At what stages is infection most likely?
- What make some patients more likely than others to have serious infections? Could these patients be considered for preventive antibiotics?
- Should preventive antibiotics be given to all newly diagnosed myeloma patients?

Since the start of the COVID-19 pandemic, there has been collaboration between healthcare professionals across the UK and internationally, to share knowledge and experience on the best ways to look after myeloma patients.

Key points

- Infections happen when bacteria, viruses or fungi enter the body and cause illness
- The body's defence against infection is the immune system
- Infection is a common complication of myeloma
- Infection risk is due to both the myeloma and its treatment
- It is important that any infection is treated promptly
- Get to know the signs of infection and report them straight away to your healthcare team
- Treatment will depend on the type of infection
- There are vaccines against some infections
- During the COVID-19 pandemic, you may have changes to your care to reduce your COVID-19 risk
- Following self-help tips will help reduce your risk of infections

About this Infosheet

The information in this Infosheet is not meant to replace the advice of your healthcare team. They are the people to ask if you have questions about your individual situation.

For a list of references used to develop our resources, visit myeloma.org.uk/references

We value your feedback about our patient information. For a short online survey go to myeloma.org.uk/pifeedback or email comments to patientinfo@myeloma.org.uk

Other information available from Myeloma UK

Myeloma UK has a range of information booklets available covering all areas of myeloma, its treatment and management. Download or order them from myeloma.org.uk/publications

To talk to one of our Myeloma Information Specialists about any aspect of myeloma, call our Myeloma Infoline on 0800 980 3332 or 1800 937 773 from Ireland.

The Infoline is open from Monday to Friday, 9am to 5pm and is free to phone from anywhere in the UK and Ireland.

Information and support about myeloma is also available around the clock at myeloma.org.uk

Notes

Notes

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MyelomaUK

We're here for everything a diagnosis of myeloma brings

Get in touch to find out more about how we can support you

Call the Myeloma Infoline on
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Email Ask the Nurse at
AskTheNurse@myeloma.org.uk

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