Infection and myeloma

Symptoms and complications Infosheet

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

What is an infection?

An infection is caused by 'germs', which are organisms such as bacteria, fungi, or viruses. When these organisms enter the body they begin to multiply. Usually, the immune system quickly kills and removes these organisms. Sometimes though the organism will multiply and live long enough to cause an infection and make you ill.

Frequent or recurrent infection is a common complication of myeloma.

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

The specialised cells involved in the immune system are called white blood cells, or leukocytes. Types of white blood cell include:

- Plasma cells
- T cells
- Neutrophils

Types of infection

Examples of infections are listed below:

Bacterial infections

- Urinary tract infections, also called a water infection
- Most types of pneumonia, which is a lung infection
- Some types of meningitis, which is an infection in the lining of the brain

Viral infections

- Influenza, also called flu
- COVID-19, or coronavirus
- Shingles and chickenpox
- Cold sores

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 people who do not have myeloma. This is due to both the myeloma itself, and the effects of myeloma treatments.

How myeloma affects the immune system

Myeloma can weaken the immune system, making it more difficult for the body to fight infections.

Myeloma cells are abnormal (cancerous) plasma cells. These myeloma cells multiply in the bone marrow, which is inside of the bone. The myeloma cells reduce the production of normal blood cells. This prevents 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 reduces the production of normal, healthy antibodies.

Overall, this means that the bone marrow produces fewer healthy white blood cells. Then the immune system does not work as well as it should. 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, which means you are experiencing myeloma symptoms
- You are on treatment for your myeloma, especially if you are having high-dose therapy and stem cell transplant
- You recovered slowly from infection in the past

Side effects of myeloma treatment

Some myeloma treatments can lower the levels of white blood cells, particularly a type called neutrophils. Neutrophils are an important part of the body's defences against infections caused by bacteria and fungi.

The normal range of neutrophils in healthy adults is usually between 2.0 and 7.5 billion neutrophils in each litre of blood (2.0–7.5 x10^9/L). However, normal ranges can vary between hospital laboratories. The normal range is often slightly lower in people of black or Middle Eastern ethnicities. Neutropenia refers to a level of neutrophils lower than the normal range.

Neutropenia is a common but potentially serious side effect of myeloma 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 on these treatments 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 37.5°C)

A temperature below 36°C

Chills and sweating

Change in cough or a new cough

Sore mouth and throat

Blocked nose or ears

Burning sensation or pain when passing urine (pee), or a need to urinate often

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 healthcare team immediately, even if this is outside usual clinic hours.

Even a minor infection in someone with a weakened immune system may develop into something more serious if not treated quickly.

A rare but serious complication of infection is called sepsis. See more about sepsis on page 5.

Common non-opioid pain relief treatments, such as paracetamol, are often used to treat pain due to infections. This may mask the onset of more serious infections. You should always be aware of symptoms of infections and report them to your healthcare team

How is infection diagnosed?

Any number of the signs and symptoms on the previous page can strongly indicate that an infection is developing. In addition, your healthcare team 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 healthcare team 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. These are called your vital signs.

Different infections can have similar symptoms, so your healthcare team 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?

Sepsis is a serious infection where bacteria enters 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 37.5°C or above
- Extreme shivering or muscle pain
- Feeling extremely unwell
- Difficulty breathing, breathing very fast, or feeling breathless
- Not peeing all day
- Blue, grey, pale, or blotchy look to skin, lips, tongue, palm of hands or bottom of feet
- A rash that does not fade when a glass is rolled over it
- Slurred speech or confusion

Call 999 if you think you or someone you know has one or more of the warning signs of sepsis.

Sepsis is life threatening and you should get medical help immediately.

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 order to treat infection you may have to take a break from your myeloma treatment for a time, or have certain treatments less often. Your healthcare team will discuss any changes to your care with you.

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 help protect you against specific infections.

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 next time it comes into contact with the same infection, making it easier to fight it off.

A vaccine is made from a weakened or harmless version of the virus or bacteria it has been designed to protect you from.

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. Only stop if a healthcare professional tells you to. 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 medicines, such as aciclovir. Myeloma patients may be given preventive antiviral medicines alongside their 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 treatments. You will be given an antiviral medicine at the start of many myeloma treatments to reduce this risk.

Shingles does not spread as easily as chickenpox. However, if someone is not immune to chickenpox they can catch the infection from a shingles rash. If you have a shingles rash you should cover the rash with loose clothing to reduce the risk of spreading the virus.

Vaccines for viral infections

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

- COVID-19 – vaccines are normally given as a dose in winter and one in spring, plus boosters. Myeloma patients may be offered extra doses
- Flu – vaccines are 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 – the shingles (Shingrix®) vaccine is offered to everyone aged 50 years or older with a weakened immune system. Anyone 18 or older who has had high-dose therapy and autologous stem cell transplant, or CAR-T cell treatment, can receive the same vaccine. The Shingrix® vaccine is a non-live vaccine. This means it does not contain any live viruses. This makes Shingrix® safe for people with myeloma

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 **NHS guidance**.

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 treatments as tablets, such as fluconazole, or as an infusion into a vein (intravenous).

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 even with antibiotic treatment.

Granulocyte-colony stimulating factor (G-CSF)

You might be given a treatment 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 do not have any infection.

An example is the antiviral medicine 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 transplant (HDT-SCT), you will usually be given preventive treatment while you are recovering. This will include antifungal, antiviral,

and antibacterial medicines. 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 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. This allows the immune system to function more effectively.

If your myeloma treatment itself is lowering your white blood cell counts, it may be necessary to temporarily postpone treatment or reduce your treatment dose. Treatment will start again when your white blood cell levels begin to return to normal. Your healthcare team will advise you.

Your healthcare team may hold some consultations by telephone or video instead of in person. This means you do not have to visit the hospital so often. This will be done to minimise your risk of infection.

Any changes to treatment will be decided based on your own situation and your treatment needs. Your healthcare team will discuss any changes with you.

Self-help tips for avoiding infection

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

- Tell your healthcare team immediately if you get any signs and symptoms of infection (see page 4)
- 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, or if people are visiting your home
- Avoid crowded public spaces and public transport when they are very busy
- Get all the vaccines you are suitable for
- 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 do not share towels with anyone

- Cook food thoroughly, keep raw and cooked meats separate, and do not eat food past its use-by date
- Try to avoid getting cuts and scratches, such as by wearing gloves when gardening. If you get a cut or scratch keep it clean and covered
- Do not handle pet litter
- Take your temperature if you think you have an infection
- Keep indoor spaces well ventilated by opening windows or doors
- Wear a well-fitted face mask in crowded spaces or areas with a higher risk of infection, such as in the hospital, if it makes you feel more comfortable
- Follow current COVID-19 guidance

Find the latest guidance about COVID-19 on the **NHS website**

Avoiding infection after HDT-SCT

After you have had high-dose therapy and stem cell transplant (HDT-SCT), you will be especially at risk from infection. Until the transplanted stem cells 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 daily showers and bedding changes, and restrictions on visitors.

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

Current research

Research into new treatments for myeloma aims to develop treatments 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 makes 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?

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 quickly
- 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
- Following self-help tips will help reduce your risk of infections
- Know the signs of sepsis and call 999 immediately if you show any symptoms

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 aspects of myeloma and related conditions. 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

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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
0800 980 3332

Email Ask the Nurse at
AskTheNurse@myeloma.org.uk

Visit our website at
myeloma.org.uk

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