

Infection

Myeloma Nurse Guide

The Myeloma Nurse Guide Series has been developed to enhance nurse knowledge, inform practice and support nurses in the delivery of high quality treatment and care to myeloma patients and families. The information has been reviewed by myeloma nurse and medical experts and should be used in conjunction with local and national policies, protocols and guidelines.

What is the significance of infection in myeloma?

Infection is a leading cause of death in myeloma patients. Prevention, detection and management of infection are key nursing priorities in myeloma.

Myeloma affects plasma cells, which are part of the immune system. In myeloma, normal functioning of the immune system is disrupted, resulting in low levels of normal immunoglobulins (antibodies) and an increased risk of infection. Myeloma can also affect other cells of the immune system, including T-cells, dendritic cells, and natural killer cells.

Predictors of infection in newly diagnosed myeloma patients include level of disease burden, high levels of lactic dehydrogenase (LDH), poor performance status and renal dysfunction. Other risk factors include older age, frailty, previous infection history and exposure to viruses. Patients are most at risk from infection when their myeloma is active, such as in the first three months after diagnosis, at relapse, or if they have refractory disease. As most treatments for myeloma increase infection risk, vulnerability to infection can accumulate during the disease course. Current myeloma treatment is typically combination therapy with few treatment breaks, so patients can be immunocompromised by concurrent medications for prolonged periods. Bacterial and viral infections occur most commonly. See the Appendix for information about periods of immunosuppression and associated pathogens.

Clinical features

Signs and symptoms of infection can include any of the following:

- Change in temperature (>37.5°C or <36°C)
- Sweating, chills or rigors
- Tachycardia, tachypnoea
- Feeling unwell, general malaise, agitation, or behavioural change
- Productive cough
- Nasal congestion
- Sore mouth or throat
- Dysuria, reduced urine output
- Diarrhoea
- Vaginal discharge or irritation
- Skin changes (heat, redness, pain)
- Inflammation, pain, redness, heat or discharge at a wound/IV site (although some of these signs may be absent in patients who are immunocompromised)

Nurses should always be alert to the signs of sepsis in myeloma patients. **Neutropenic sepsis is a complication of neutropenia and a medical emergency.** It is defined as a temperature of >38°C or any symptoms and/or signs consistent with sepsis, in a patient with an absolute neutrophil count of $0.5 \times 10^9/L$ or lower. It requires immediate treatment with broad spectrum antibiotics. The hospital protocol for management of neutropenic sepsis in patients on systemic anti-cancer treatments (SACT) should be followed.

Assessment and monitoring

Diagnostic and assessment features	Rationale
Myeloma type, disease burden, frailty score, comorbidities and infection history	To assess a patient's individual risk factors for infection
Vital signs if symptomatic, or as required.* Use national early warning tools such as NEWS2 as indicated.	To pick up signs of infection promptly To identify acutely ill patients, sepsis
Blood tests: full blood count (FBC), renal and liver profile, C-reactive protein (CRP), lactate, blood cultures, urine dipstick	To check for infection, and the effects of infection
Check for respiratory symptoms. COVID-19 test, sputum, nasopharyngeal swab. Imaging may be indicated.	To check for infection, identify the associated pathogen and direct treatment
Check for mouth, abdominal, bowel or urinary symptoms. Mouth swab, stool sample, urine sample. Imaging may be indicated if focal signs present.	To check for infection, identify the associated pathogen and direct treatment
Screening for cytomegalovirus (CMV), hepatitis B, Epstein-Barr virus (EBV) hepatitis C, human immunodeficiency virus HIV, varicella zoster (VZV)	To check for active viral infection prior to immunosuppressive treatment. To plan preventative treatment.

Prevention and treatment

Effective treatment of myeloma generally improves overall immunity and reduces infection risk.

When on active myeloma treatment, patients will have prophylactic antibiotics, anti-viral and antifungal drugs according to hospital or department guidelines. Some of these can continue for a period of time after treatment finishes. For example, antivirals following a course of bortezomib, or antimicrobials after stem cell transplantation (SCT). If neutropenia develops during a course of myeloma treatment, dose reduction or a treatment break may be needed. Some patients may have granulocyte colony stimulating factor (G-CSF) injections to boost neutrophil counts.

Patients with a fever or symptoms of infection need prompt treatment with broad-spectrum antibiotics and investigations to elicit the underlying cause. Close liaison with microbiology for guidance on anti-microbial treatment is required.

Patients who have frequently recurring infections may, if eligible, receive monthly intravenous immunoglobulins (IVIG) treatment to strengthen the immune system. This is particularly relevant for patients undergoing the newer treatments such as CAR-T and bispecific antibodies.

Vaccination is a key feature of infection prevention. Ideally, patients have vaccinations when their immune system is less suppressed (after treatment or when in remission), although single agent lenalidomide has been shown to improve response to vaccination. See the Appendix for the vaccines recommended in current myeloma guidance.

* Follow local and national guidelines for patients undergoing stem cell transplantation or other highly immunosuppressive treatments

Nursing management points

Assessment and monitoring

- Be vigilant in observation and reporting of signs and symptoms of infection
- Obtain swabs and samples either routinely or if infection is suspected
- Be aware that patients on steroids, or those who have recently taken antipyretic drugs, may not always present with an abnormal temperature
- Educate patients, family and carers on signs and symptoms of infection and the importance of prompt reporting

Prevention and treatment

- Provide information to patients on infection risk, treatment and prevention
- Ensure patients understand the importance of taking prophylactic antimicrobials as prescribed
- Be aware of the times when patients are more vulnerable to infection
- Follow recommended guidelines for nursing patients undergoing SCT
- Advise patients to seek medical advice if considering overseas travel
- Be aware of immunisation recommendations for staff as part of workplace risk assessment

Self-care strategies for patients

- Wash hands regularly and thoroughly
- Carry sanitising hand gel for times when you can't easily wash your hands
- Avoid people with obvious signs of infection
- Consider avoiding crowded, enclosed spaces such as busy buses or trains. Wear a face mask when necessary or preferred
- Have a working thermometer and report a raised temperature
- Carry an alert card for risk of infection, if you have been given one
- Maintain good personal hygiene, skin and mouth care
- Take care when gardening, wear protective gloves
- Wash hands after animal contact, avoid handling pet litter
- Store food correctly, wash fruit and vegetables, cook food thoroughly, keep raw and cooked meat separate, adhere to use-by dates
- Follow special diet guidance if advised by your doctor or nurse

Useful links

- UKONS Oncology Haematology 24-Hour Triage Rapid Assessment and Access Toolkit www.ukons.org/site/assets/files/1134/oncology_haematology_24_hour_triage.pdf
- Sepsis Trust www.sepsistrust.org/about/about-sepsis
- The Green Book: Immunisation against infectious disease <https://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book>
- Myeloma: diagnosis and management NICE guideline www.nice.org.uk/guidance/ng35
- BSH Guidelines for screening and management of late and long-term consequences of myeloma and its treatment <https://onlinelibrary.wiley.com/doi/10.1111/bjh.14514>

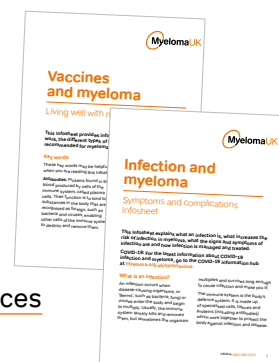
Patient information

- myeloma.org.uk/library/infection-and-myeloma-infosheet
- myeloma.org.uk/library/vaccines-and-myeloma-infosheet

References



A list of key references is available on Myeloma Academy:
academy.myeloma.org.uk/myeloma-nurse-guide-references



Appendix

Immunosuppression in myeloma and common pathogens

Period	Immunological effects	Common pathogens
At diagnosis and at times of aggressive relapse	Disease active; profound immunosuppression	Bacterial infections, especially <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> and <i>Escherichia coli</i>
Immediate post-autologous stem cell transplant period (c. 1 month)	Neutropenia	Bacteria associated with neutropenic sepsis
Recovery post autograft (up to c. 6 months)	Gradual reconstitution of T cell-mediated immunity	<i>Pneumocystis jirovecii</i> HSV, VZV, CMV; rarely invasive fungal infection
Remission	Immunity improved	Appropriate time for elective vaccinations Re-vaccination schedule >6 months after autograft
Multiple relapses, increasingly refractory disease	Progressive immunosuppression from underlying disease and multiple therapies	Bacteria as above, but in addition: progressive diminution in resistance to viral infections especially HSV, VZV, influenza, occasional atypical infections, eg <i>aspergillus</i> , CMV, <i>cryptococcus</i>

HSV – herpes simplex virus; VZV – varicella zoster virus; CMV – cytomegalovirus

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Vaccinations in myeloma

Vaccination	Recommendation
Annual seasonal influenza vaccination	All myeloma patients and those living in the same household as the patient
Pneumococcal vaccination	One dose of PCV13, followed by one dose of PPV23 two months later. Patients with chronic kidney conditions are recommended for repeat PPV23 every five years
Shingles (herpes zoster) vaccination (the inactivated vaccine Shingrix®)	Myeloma patients aged 50 and over, with a two-dose schedule, 8 weeks to 6 months apart
COVID-19 vaccination	In line with the relevant national guidance
Revaccination after autologous or allogeneic SCT according to local policy	Influenza, polio, diphtheria-tetanus-pertussis, haemophilus influenza (Hib), pneumococcal, meningococcal group C, herpes zoster
Myeloma patients should not have live attenuated vaccines at any stage of myeloma and should, if possible, avoid close contact with recipients of live vaccines	



Myeloma★Academy

For further nurse guides and other educational resources on myeloma and related conditions:

academy.myeloma.org.uk

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Myeloma UK 22 Logie Mill, Beaverbank Business Park, Edinburgh EH7 4HG

☎ 0131 557 3332 ✉ myelomauk@myeloma.org.uk

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