University Hospitals of Derby and Burton NHS Foundation Trust

Neutropenic Sepsis in Adults - Microbiology Summary Clinical Guideline

Reference number: CG-T/2024/059

Haematology/Oncology disease or other history of **immunocompromise**

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Suspected/confirmed infection

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≥ 1 of the sepsis flags that include:

- "Looks unwell" to clinicians/carers
- **Recent chemotherapy*/immunotherapy**
- NEWS2 trigger (e.g. ≥ 5)
- Lactate > 2 mmol/L

* **With regard to recent chemotherapy, NICE outlines within the last 30 days**

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Screen for sepsis:

- Doctor (FY2 or more senior) or equivalent healthcare professional review stat
- NEWS2 repeat
- Lactate

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High risk of severe illness or death from sepsis

- **Neutropenia* and symptoms/signs of sepsis**; **or**
- **Neutropenia* and temperature > 38°C**; **or**
- Suspected/confirmed infection and NEWS2 ≥ 7; **or**
- Suspected/confirmed infection, NEWS2 5 or 6, **and** 1 of:
  - Mottled or ashen skin
  - Non-blanching purpuric rash
  - Cyanosis of skin, lips, or tongue
  - Single NEWS2 parameter score of 3
  - Lactate > 2 mmol/L
  - Acute kidney injury
  - Clinical deterioration from last NEWS2
  - Clinical deterioration from last intervention
- * **Or high pre-test probability of neutropenia**

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If high risk of severe illness or death from sepsis

Investigate

- Past: if possible, review the past microbiology for cultures - especially blood cultures - of bacteria with resistance to initial, empiric intravenous antibiotic options
- Present:
  - Blood sciences: FBC, CRP, U&Es, clotting, LFTs; blood gas (glucose, lactate)
  - Microbiology: if possible, before starting antibiotics, blood cultures (8-10 ml of blood into an aerobic bottle and 8-10 ml of blood into an anaerobic bottle) ≥ × 1 (if central venous catheter in situ, centrally and peripherally); urine culture; if there are localising symptoms and/or signs, extra microbiology investigations as per hospital guidelines
  - Radiology: CXR; if there are localising symptoms and/or signs, in collaboration with the senior, consider further imaging

Treat (**after blood cultures [if possible] - asap - ≤ 1 hour - awaiting other investigative findings**)

- Empiric antibiotics intravenously (pages 3-4)
- ± Administer oxygen; Sepsis Management in Non-Pregnant Adult Patients page 7
- ± Administer fluids intravenously; Sepsis Management in Non-Pregnant Adult Patients page 9
- ± Monitor fluid input and output; Sepsis Management in Non-Pregnant Adult Patients page 10

Monitor/Escalate

- NEWS2 repeats every 30 minutes
- Inform the haematology/oncology registrar (or equivalent healthcare professional) stat (page 5)
  - Haematology/oncology registrar (or equivalent healthcare professional) review within 1 hour if no improvement
- If no improvement within 1 hour:
  - Inform the haematology/oncology/medical consultant on clinical duty/on call
  - ± ICU referral ± transfer of care (page 5)

Initial, empiric intravenous antibiotic options

- This antibiotic section includes fluoroquinolone usage.
- The Medicines and Healthcare products Regulatory Agency (MHRA) - with input from the Commission on Human Medicines (CHM) - have reviewed and published drug safety updates regarding systemic fluoroquinolones.
- Ciprofloxacin is hyperlinked to the British National Formulary.
- For NHS medicines and MHRA information for healthcare professionals on ciprofloxacin, click here and here, respectively.
- For MHRA printable information for patients on fluoroquinolones, click here.

Option 1	
Piperacillin tazobactam	4.5 g 6 hourly
± Tobramycin	Stat dose as per hospital guidelines for haematology patients, with the exception/exclusion of myeloma patients. NB Tobramycin doses thereafter require collaboration with the haematology senior, within the next week day or weekend review
± Teicoplanin	If clinical concerns regarding the risk of central venous catheter infection or methicillin resistant *Staphylococcus aureus* (MRSA), add teicoplanin, dose as per hospital guidelines

Option 2, if non-severe penicillin allergy (i.e. non-immediate without systemic involvement penicillin allergy)	
Ceftazidime **AND**	2 g 8 hourly
Teicoplanin	Dose as per hospital guidelines
± Tobramycin	Stat dose as per hospital guidelines for haematology patients, with the exception/exclusion of myeloma patients. NB Tobramycin doses thereafter require collaboration with the haematology senior, within the next week day or weekend review
± Metronidazole	If the differential diagnosis includes an abdomen pelvis focus of infection, add metronidazole 500 mg 8 hourly

Option 3, if severe penicillin allergy (i.e. immediate rapidly evolving or non-immediate with systemic involvement penicillin allergy)	
Ciprofloxacin **AND**	400 mg 8 hourly
Teicoplanin	Dose as per hospital guidelines
± Tobramycin	Stat dose as per hospital guidelines for haematology patients, with the exception/exclusion of myeloma patients. NB Tobramycin doses thereafter require collaboration with the haematology senior, within the next week day or weekend review
± Metronidazole	If the differential diagnosis includes an abdomen pelvis focus of infection, add metronidazole 500 mg 8 hourly

NB1 If clinical concerns emerge regarding a suboptimal response (e.g. neutropenia and sepsis are persisting after 48-72 hours) to initial, empiric intravenous antibiotic options 1 or 2 or 3, please note Management: ongoing neutropenic sepsis within the microbiology full clinical guideline, with regard to escalation options.
NB2 If the differential diagnosis includes (i) candidiasis, aspergillosis, or mucormycosis, or (ii) pneumocystosis, please note invasive fungal disease and *Pneumocystis jirovecii* hospital guidelines, respectively.