

Neutropenic Sepsis Protocol

Version 2 2019

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Directorate / Department responsible (author/owner):	Surgical Directorate / Oncology (T Wells / AOS)
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Brief summary of contents	Neutropenic Sepsis Protocol
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Executive Director responsible for Policy:	Medical Director
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This document replaces (exact title of previous version):	Neutropenic sepsis proforma / Neutropenic patients – Guidelines for the treatment of
Title and date of committee/forum/group consulted during development :	
Signature of Executive Director giving approval	
Intranet location:	
Links to key external standards	
Related Documents:	NICE guidelines
Training Need Identified?	In-house training of doctors and nurses

Version Control Table

Date	V	Summary of changes	Author
Aug 2019	2	Transfer onto new template	Tom Wells

Document Amendment Form – minor amendments

No.	Date	Page no	Amendment	Authorised by
1				
2				
3				
4				
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10				

Ten or less minor amendments can be made before the document is revised.

Major changes must result in immediate review of the document

If printed, copied or otherwise transferred from the Trust intranet, procedural documents will be considered uncontrolled copies. Staff must always consult the most up to date version – located on the intranet.

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1. Introduction and purpose

Neutropenia can occur in patients undergoing systemic anti-cancer therapy. It can also occur in patients undergoing myelosuppressive treatments for other conditions, such as rheumatological conditions. Also it can occur due to disease, such as in haematological conditions and conditions such as congenital neutropenia. Neutropenic sepsis can occur in these patients and it is an oncology emergency.

Patients presenting with suspected neutropenic sepsis should be urgently assessed (observations and blood tests), as well as being given intravenous antibiotics within one hour of presenting to a healthcare setting (one hour intravenous door-to-needle time). Other measures include intravenous fluids and escalating care to ITU when appropriate.

There is often a delay in identifying these patients and instigating treatment, which resulted in the introduction of Acute Oncology Service (AOS) at Weston General Hospital in 2013. Data collection and audit on this group of patients showed a significant improvement in the percentage of patients receiving intravenous antibiotics and this resulted in a decrease in neutropenic sepsis mortality. It is an ongoing challenge to ensure patients presenting with neutropenic sepsis are treated optimally. The AOS team continues to strive to maintain excellent practice in this area through education and support of the different hospital teams, as well as producing this protocol for the teams to follow.

2. Scope

The aim of the pathway is to enable the appropriate management of patients who present with suspected neutropenic sepsis.

3. Explanation of terms

Neutropenic sepsis is defined as:

- a neutrophil count of **either** $\leq 0.5 \times 10^9 /L$ **or** $\leq 1.0 \times 10^9 /L$ and falling
- with a temperature of $\geq 38^{\circ}C$ on one occasion **or** temperature > 37.5 for over 1 hour **or** temperature < 36 **and/or** other signs and symptoms consistent with clinically significant sepsis.

NOTE: patients with neutropenic sepsis may not necessarily be pyrexial; they may have rigors or feel generally unwell.

IV: intravenous

OD: once daily

bd: twice daily

tds: three times daily

QDS: 4 times daily

PCP: Pneumocystis carinii pneumonia

NEWS: New Early Warning Score

4. Roles and Responsibilities

The Acute Oncology Service (AOS) Lead Clinician is Dr Thomas Wells, Consultant Medical Oncologist.

The AOS Clinical Nurse Specialist / Sister is Ceri Tucker.

Neutropenic sepsis is one of the common oncology emergencies that is covered by the AOS

The Acute Oncology Service supports patients with neutropenic sepsis and help to facilitate the patient's pathway by:

- Providing expert medical and nursing advice and support for health professionals looking after Oncology & Haematology patients in a general setting.
- Communicating and supporting patients and carers during treatment of neutropenic sepsis.

5. Policy details

Treat Neutropenic sepsis as an acute medical emergency and offer empiric antibiotic therapy immediately. Failure to treat promptly can be fatal.

Intravenous antibiotics must be given within one hour of arrival to hospital or within one hour of the signs and symptoms developing if the patient is already an inpatient.

If Neutropenic sepsis is suspected, **do not wait for the full blood count or Medical assessment** before **giving first dose of antibiotics**, but do ensure the blood cultures have been obtained prior to giving the first dose of antibiotics.

History

- Has the patient had chemotherapy in the last 6 weeks?
- Is there another reason for neutropenia (for example, Methotrexate as treatment for a rheumatological condition)?
- Has the patient been treated with prophylactic antibiotics?
- Systemically unwell
- Fever of 38.°C on one occasion, or 37.5°C on two occasions 1 hour apart or hypothermia <36
- Any of the following:
 - Specific symptoms of an infection including sore throat, cough, dysuria, cellulitis, etc
 - Meningitis or encephalitis symptoms
 - Hypotension and /or tachycardia

Examination & Investigations

Observations: blood pressure, pulse, temperature, respiratory rate, oxygen sats. Record on **New Early Warning Score (NEWS) Chart**.

IV Access: Urgent bloods to include:

FBC, U&E, Creatinine, LFT (including albumin), calcium, CRP, glucose, coagulation, lactate
Blood culture – peripheral and central line if present
Arterial blood gases if hypoxic

Do not wait for full blood count result before giving intravenous antibiotics.

Follow sepsis 6 Guidelines

Full clinical examination including mouth, chest, perineum, line sites, skin and fundi. Assess clinically for any Meningitis or Encephalitis symptoms. Swabs from appropriate inflamed sites.

Other investigations to include:

MSU
Stool M,C&S if diarrhoea, check C. difficile toxin
Serology, vesicle fluid for virology if indicated
Aspergillus precipitins and PCR (yellow top bottle) if indicated
Only perform a chest X-ray if clinically indicated
Sinus or dental x-rays if symptomatic
ECG if indicated

Check for previous microbiology results. If known previously to have been either colonised or infected with MRSA and/ or ESBL please discuss with on call Medical Microbiologist for antibiotic advice.

Assume Neutropenic Sepsis and treat accordingly until proven otherwise. Do not delay administration to wait for blood results before giving the initial dose of antibiotics.

Treatment of Neutropenic Sepsis of Unknown Source

Please follow 'NEUTROPENIC SEPSIS ADMISSION PROFORMA' and 'TREATMENT ALGORITHM' in this protocol document.

1st line antibiotics in Neutropenic sepsis as per NICE guidelines:

- Offer beta lactam monotherapy **with infusion Tazocin 4.5gm** [Piperacillin [4g] with Tazobactam [500mg]] **for suspected Neutropenic Sepsis** as initial empiric antibiotic therapy to patients with suspected Neutropenic sepsis who need intravenous treatment unless there are patient-specific or local microbiological contraindications.
- If neutropenia confirmed, continue with **6-hourly Tazocin.**
- If not neutropenic but requiring intravenous antibiotics for sepsis, **give 8-hourly Tazocin** [Piperacillin [4g] with Tazobactam [500mg]

NEUTROPENIC SEPSIS ADMISSION PROFORMA

Patient name:
Hospital ID number:
NHS number :.....
Date of birth:

KEY POINTS FOR SUSPECTED NEUTROPENIC SEPSIS

Urgent assessment, intravenous antibiotics and fluid resuscitation (start within one hour of attending hospital) – please complete proforma below.

INITIAL ASSESSMENT AND TREATMENT

(please tick boxes where applicable)

Has the patient been receiving either a course of chemotherapy or immunosuppressant medication?

- yes no ----- no need to complete this proforma

Pyrexial, history of pyrexia or clinically unwell?

- yes no ----- no need to complete this proforma
 Do blood tests (FBC, CRP, U&E, Cr, LFT, blood cultures– peripheral & line), urine culture.

Need to give IV antibiotics immediately - do not wait for blood test results (NB Door-to-needle time of less than one hour) - see below for choice of antibiotic.

Is the patient allergic to penicillin?

- no = **give: Tazocin 4.5g iv qds.**
 yes (previous penicillin allergy not life threatening) = **give: Meropenem 1g IV tds.**
 yes (previous penicillin allergy life threatening) = **give: Ciprofloxacin 400mg IV bd.**
 If Haemodynamically unstable, add **Gentamicin 4mg/kg IV OD (2mg/kg if known renal impairment or age >65 years).**

Start IV fluids

Any diarrhoea, mucositis, perineal or abdominal symptoms

- Yes no

If yes:

- Stool culture
 Start metronidazole 500mgs tds IV (in addition to antibiotics already started)

Consider suitability for ITU – discuss with seniors and the oncology team

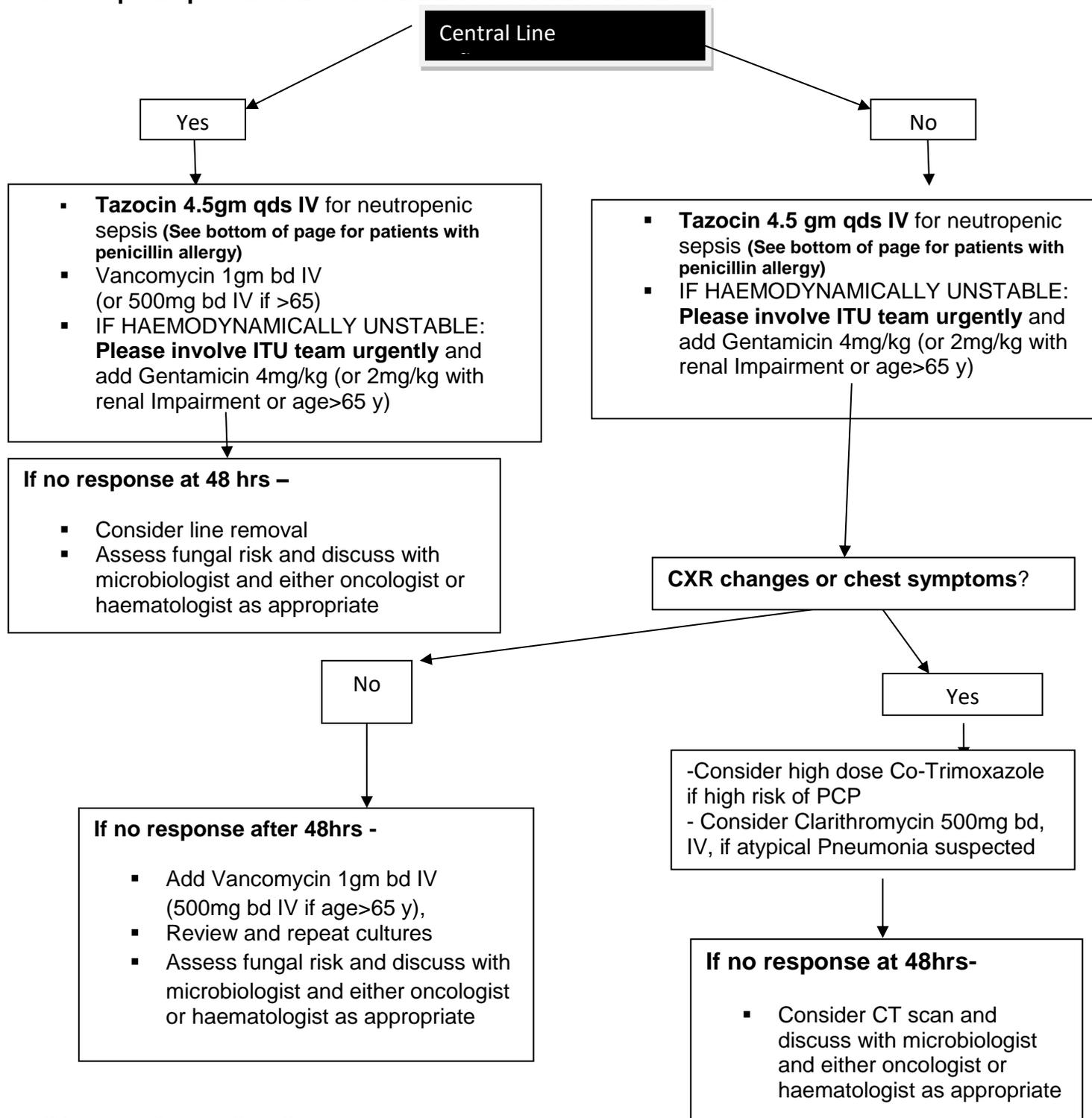
Perform chest x-ray

FURTHER ASSESSMENT AND TREATMENT

- Chase blood results and chest x-ray
 If patient neutropenic ----- admit for further management
 If patient not neutropenic ----- need to assess (1) severity of illness and whether admission is necessary or whether discharge on oral antibiotics is appropriate instead; (2) likelihood of becoming neutropenic in the oncoming days – discuss with the oncology team.

TREATMENT ALGORITHM

Target time: **LESS THAN 1 HOUR** for administration of intravenous antibiotics to septic or neutropenic patients. **DO NOT DELAY FOR BLOOD RESULTS.**



If history of penicillin allergy:

History of non-life-threatening penicillin allergy - use Meropenem 1 gm iv tds instead of Tazocin.

History of life-threatening penicillin allergy - use Ciprofloxacin 400mg bd iv instead of Tazocin.

If pneumonia is suspected, add Teicoplanin 400 mg iv bd for 3 doses, then reduce to 400mg iv OD. Discuss treatment with microbiology if the patient has received Ciprofloxacin as prophylaxis.

Patients with confirmed neutropenic sepsis should be nursed in a side room **with toilet facilities.**

If signs or symptoms of diarrhoea, mucositis, perineal or abdominal infections → add Metronidazole 500mg tds IV after cultures taken.

If signs of herpetic infections add Aciclovir iv or orally.

Monitor and record temperature, pulse rate, BP, O₂ sats and respiratory rate on the NEWS chart. Monitor observations every 15 minutes initially then regular monitoring according to the patient's condition.

A fluid balance chart should monitor urine output, regularly and IV fluid replacement in dehydration.

Consider suitability for ITU and follow Sepsis 6 guidelines if haemodynamically unstable or increasingly unwell (discuss with seniors and oncology team).

Monitor bloods daily including: FBC, U&E, Creatinine, LFT (including albumin), calcium, CRP.

If cultures are negative, antibiotics will be stopped once patient has been afebrile for 48 hours and a minimum of 5 days treatment has been given.

With positive cultures, antibiotics will be adjusted according to their identity and sensitivity.

For patients whose clinical condition is deteriorating or for whom there are resistant organisms on bacterial culture results, appropriate alterations to antibiotic regimens should be made promptly. Early microbiological advice should be sought for these patients.

Consider stopping Gentamicin after 48 hours, especially if Vancomycin is commenced, unless there is good clinical reason to continue.

Risk factors for systemic fungal infection include prolonged neutropenia, corticosteroid therapy, altered bacterial flora, breakdown of mucosal barriers and building work (exposure to fungal spores). Patients at high risk of fungal infection are those who have experienced neutropenia for longer than 14 days and also following induction chemotherapy for leukaemia or intermediate dose Melphalan.

In Rheumatology patients taking Methotrexate and who present with Neutropenic Sepsis

Manage according to the above protocol and also:

- Stop Methotrexate
- Give Folinic Acid rescue
- Inform the Rheumatology Team

The initial dose of Folinic Acid should be at least 20 mg, given intravenously. Subsequent doses of 15mg [which may be taken orally] should be given at 6-hourly intervals until the haematological abnormalities [WCC, platelets +/- haemoglobin] have all returned to normal [usually not more than 2-8 doses].

Gentamicin

If first dose is between **4am and 6pm**, give 4mg/kg as a single daily dose and do levels at **10am** the next day

If first dose is between **6pm and 4am**, give 4mg/kg and do levels at **2pm**

With renal impairment, give 2mg/kg stat, then according to Gentamicin levels, and discuss with attending consultant.

Check first level before 2nd dose (expected result <1mg/L)

Admitting doctor should ensure that they have indicated when levels are needed on the drug chart and communicated with nursing staff

Monitor serum trough level of Gentamicin at least twice weekly.

Vancomycin

Monitor only trough levels (expected result 10-15mg/L) prior to 3rd dose or 4th dose (whichever is in the morning) and then at least twice weekly on Mon and Thurs am.

Reduce dose according to blood urea / Creatinine and age.

Teicoplanin should be considered in patients with marked renal impairment (please discuss with attending consultant).

Teicoplanin

400mg 12 hrly IV for 3 doses then 400mg OD IV bolus (3mls).

When treating a line infection, inject 1.5ml down each lumen, leave for 1 hour and then flush.

6 Dissemination

The protocol will be available on the trust intranet site in the policy library and on the AOS homepage.

The protocol will be referred to in relevant teaching sessions.

7. Implementation

This protocol will be used when patients are either referred or admitted with suspected neutropenic sepsis.

8. Monitoring Compliance and Effectiveness

Table 1. Mandatory Elements of Monitoring Compliance.

Element to be monitored	Compliance with the Neutropenic Sepsis protocol and NICE guidelines
Lead	AOS Lead Consultant, AOS team and QI HUB
Tool	Neutropenic Sepsis protocol and NICE guidelines.
Frequency	Annual report for peer review
Reporting arrangements	Acute Oncology Group meetings
Acting on recommendations and Lead(s)	Acute Oncology Group meetings
Change in practice and lessons to be shared	Through Acute Oncology Group meetings

9. Reference and bibliography

National Institute for Health and Care Excellence (NICE): Neutropenic Sepsis: prevention and management of neutropenic sepsis in cancer patients, September 2012, NICE clinical guidance 151.

10. WAHT associated records

No associated records.

11. Staff compliance statement

All staff must comply with the Trust-wide procedural document and failure to do so may be considered a disciplinary matter leading to action being taken under the Trust's Disciplinary Procedure. Actions which constitute breach of confidence, fraud, misuse of NHS resources or illegal activity will be treated as serious misconduct and may result in dismissal from employment and may in addition lead to other legal action against the individual concerned.

12 Equality and Diversity statement

The Trust aims to design and implement services, policies and measures that meet the diverse needs of users of our services, population and workforce, ensuring that none are placed at a disadvantage over others.

Equality Impact Assessment Screening Tool

To be completed for any procedural document when submitted to the appropriate committee for approval.

		Yes/No	Rationale
1	Does the policy/guidance affect one group less or more favourably than another on the basis of:		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2	Is there any evidence that some groups are affected differently?	No	
3	If you have identified potential discrimination, are there any exceptions valid, legal and/or justifiable?	No	
4	Is the impact of the policy/guidance likely to be negative?	No	
5	If so can the impact be avoided?	No	
6	What alternatives are there to achieving the policy/guidance without the impact?	No	
7	Can we reduce the impact by taking different action?	No	
8	Actions identified following screening process	None	
9	Screening identified a full impact assessment.	No	

If you have identified a potential discriminatory impact of this policy/procedure, please refer it the appropriate Director in the first instance, together with suggested actions required to avoid/reduce this impact. For advice in respect of answering the above questions, please contact the H.R Department. For advice on completion of this form please contact the Governance Team.

Appendix I

Title

Appendix II

Title

Appendix III

Title