Balancing what we know and what we do: A collaborative approach to improve the management of neutropenic sepsis in the emergency department.

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Nelson Emergency Department
Neutropenic Sepsis

• Life threatening complication of bone marrow dysfunction and cancer therapies

• Medical emergency

• Associated mortality 2 - 21 %

• Evidence suggests inadequacies in emergency department management
Neutropenic Sepsis

Neutrophil count of $0.5 \times 10^9$ per litre or lower and EITHER
temperature higher than 38 C

OR

signs and symptoms consistent with sepsis

(Nice Guidelines, 2014).
### Background
- 65 year old female, 1st cycle chemotherapy, malignancy.

<table>
<thead>
<tr>
<th>Presentation 1</th>
<th>Day 4 post chemo</th>
<th>2/7 diarrhoea “exhausted”</th>
<th>Discharged with loperimide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATS 3</strong></td>
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<tr>
<th>Presentation 2</th>
<th>Day 7 -1955 post chemo</th>
<th>Sore throat, D &amp; V, “not coping” T- 37.9, BP: 105 HR: 110 Neutrophils 0.1</th>
<th>Discharged with advice to monitor temperature</th>
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<tr>
<th>Presentation 3</th>
<th>Day 8 -0700 post chemo</th>
<th>Cardiac arrest Neutropenic sepsis ICCU 6 days</th>
<th>Deceased</th>
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Next steps

Collaborative Practice
Literature review
Retrospective research
Identifying clinical risk
Pathways and checklists
Changing practice
Audit / KPI’s
The Evidence - understanding what we know.

<table>
<thead>
<tr>
<th>Neutropenic sepsis</th>
<th>Tools and resources</th>
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<tbody>
<tr>
<td>This guideline covers preventing, identifying and managing neutropenic sepsis in children, young people and adults receiving treatment for cancer in the ...</td>
<td>Neutropenic sepsis: prevention and management in people ...</td>
</tr>
<tr>
<td>Evidence</td>
<td>Key-priorities-for-implementation...</td>
</tr>
<tr>
<td>Neutropenic sepsis: prevention and management in people with ...</td>
<td>Key priorities for implementation. Information, support and ...</td>
</tr>
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</table>

More results from nice.org.uk »
Retrospective Audit

- understanding what we do.
Door-to-Needle time

Antibiotic Target < 60 minutes (n=20)

pre pathway

AB < 60 mins
28%

AB > 60 mins
72%
Retrospective Audit
- understanding what we do.

• Triage process inconsistent

• Triage not meeting ATS guidelines - Triage 2

• Inconsistencies in identifying patients at risk

• Assumptions that symptoms were complications of chemotherapy

• Immunosuppressed oncology cards not followed
• Barriers for primary care to access ED

• Clinical guidelines

• Temperature as an indicator of sepsis

• Clinician dependant practice

• Reluctance to administer antibiotics without blood results

• Lack of urgency in antibiotic administration

• Senior medical oversight
Checklists and Pathways ....

“We train longer, specialise more, use ever advancing technologies and still we fail “  
THE CHECKLIST MANIFESTO
HOW TO GET THINGS RIGHT

ATUL GAWANDE
BESTSELLING AUTHOR OF BETTER AND COMPLICATIONS
Safety nets
Consistent practice
Decision making tool

“ensure the stupid but critical stuff is not overlooked.”
ED NEUTROPENIC PATHWAY

Date:  
Time:  

- ALL patients who have had chemotherapy in last 6 weeks
- Receiving immunosuppressive drugs or has a disease process affecting the bone marrow (myelodysplasia, leukaemia, lymphoma)
- Neutrophils < 0.5 x 10^9/L or < 1.0 x 10^9/L and likely to fall
- Carries an immunosuppressed card

Triage 2
Place in ED bed
EWS / Monitoring / IV access
FBC, Us&Es, LFTs, CRP, serum lactate, blood cultures, U/A, MSU

DO NOT WAIT FOR LAB RESULTS
TREAT ANY SUSPECTED NEUTROPENIC SEPSIS AS A MEDICAL EMERGENCY.

Sepsis Criteria – (any 3) of following - suspected infection, temp >38 or < 35, heart rate > 100, RR > 20, Sys BP < 90, SaO2 < 90, altered mental state.

MEETS SEPSIS CRITERIA
Initiate 1st line antibiotics
IV Fluids
Severe Sepsis Pathway
SENIOR ED MEDICAL REVIEW

DOES NOT MEET SEPSIS CRITERIA BUT HAS ANY CLINICAL SIGN OF INFECTION, DIARRHEA OR GENERALLY UNWELL.
Initiate 1st line antibiotics
Consider IV fluids
SENIOR ED MEDICAL REVIEW

NO FEATURES OF INFECTION
EWS-0
Urgent WBC RESULT < 60 MINS
Phone lab 7632, request urgent neutropenic bloods, stamp form.

IF NEUTROPHILS < 0.5
SENIOR ED MEDICAL REVIEW

1st Line Antibiotics

PIPERACILLIN and TAZOBACTAM 4 + 0.5G
IV every 8 hours

Mild penicillin allergy
CEFEPIME 2g 8- hourly
Severe penicillin allergy
CIPROFLOXACIN 500mg orally 12-hourly (or IV 400mg in 200mL IV over 1 hour 8-hourly if unable to take oral meds)
VANCOMYCIN 1.5 g IV 12-hourly (1 gm 12-hourly if GFR <90)

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Immunosuppressed Haematology/Oncology Patient Card

Name: ___________________________ NHI: __________________

This patient is immunosuppressed either from:
- receiving chemotherapy in the last 6 weeks
- blood or bone marrow disease
- recent bone marrow transplant

If the patient presents to ED unwell with this card
→ Triage 2 and initiate NMDHB Neutropenic Pathway
Post Pathway Audit (n=30)
- 3 months

- 30 patients placed on pathway at triage - Triage 2
- 8 patients identified as meeting sepsis criteria on admission
- 11 other patients identified as having markers of infection
- 20 received antibiotics
- 13 received Tazocin / 7 received other antibiotics
- 7 patients had neutrophils < $0.5 \times 10^9$ / L
- Laboratory response time positive
- 1 patient’s management did not follow pathway
Temperature

Of the 19 patients identified as having clinical signs of infection or sepsis, 4 were afebrile and 1 was hypothermic.
Door-to-Needle time

Antibiotic Target < 60 minutes

post pathway

- AB < 60 mins: 80%
- AB > 60 mins: 20%
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References


