Febrile neutropenia

The nursing perspective

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• Risk assessment
• Practice guidelines
• Prevention of infection
• Patient education
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**What:**
Patients marked by
- *fever of 38°C of higher*
- *have a cold chill*
- *absolute neutrophil count (ANC) lower than 500/mm³.*

**Who is at risk:**
*All patients receiving myelosuppressive chemotherapy*
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Is a **life-threatening emergency**.
- About 70%-75% of deaths from acute leukemia
- About 50% of deaths in patients with solid tumors are related to infection secondary to neutropenia (*Nirenberg, Mulhearn, Lin, and Larsen 2004*).

Complications of febrile neutropenia often result:
- in chemotherapy dose reductions
- in therapy delays

➤ **can compromise treatment outcomes** (*Crawford et al., 2008; Lyman, Dale, & Crawford, 2003; Lyman, Dale, Friedberg, Crawford, & Fisher, 2004*).
Risk Assessment

Risk models:
• To predict outcomes who develop FN.
• Enable to identify the severity of FN.

Risk factors:
→ Factors associated with increased risk for FN.
• Treatment related.
• Patient related.
• Cancer related.
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Multinational Association of Supportive Care in Cancer Risk Score Tool for Febrile Neutropenia

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definition</th>
<th>Points Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burden of illness</td>
<td>Range from moribund to absence of signs and symptoms</td>
<td>0 = moribund to 5 = no signs or symptoms</td>
</tr>
<tr>
<td>Hypotension</td>
<td>Score if absent</td>
<td>5</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>Score if absent</td>
<td>4</td>
</tr>
<tr>
<td>Tumor type</td>
<td>Either solid tumor or hematologic malignancy without prior fungal infection</td>
<td>4</td>
</tr>
<tr>
<td>Dehydration</td>
<td>Score if absent</td>
<td>3</td>
</tr>
<tr>
<td>Patient location</td>
<td>Score if an outpatient</td>
<td>3</td>
</tr>
<tr>
<td>Age</td>
<td>Score if patient is younger than age 60</td>
<td>2</td>
</tr>
</tbody>
</table>

Note. Higher scores convey a lower risk of complications from febrile neutropenia. In the validation study (Uys et al., 2004), scores of 21 or more reflected lower risk of complications.

Treatment related
- Previous history of severe neutropenia with similar chemotherapy
- Type of chemotherapy (anthracyclines and platinum-based regimens)
- Planned relative dose intensity greater than 80%
- Preexisting neutropenia or lymphocytopenia
- Extensive prior chemotherapy
- Concurrent or prior radiation therapy to marrow-containing bone

Patient related
- Older age
- Female gender
- Poor performance status
- Poor nutritional status (e.g., low albumin)
- Decreased immune function
- Open wounds or active tissue infection
- Comorbidities
  - Chronic obstructive pulmonary disease
  - Cardiovascular disease
  - Liver disease (elevated bilirubin, alkaline phosphatase)
  - Diabetes mellitus
  - Low baseline hemoglobin

Cancer related
- Bone marrow involvement with tumor
- Advanced cancer
- Elevated lactate dehydrogenase (lymphoma)

Risk Factors for Febrile Neutropenia

Note. Based on information from Dale, 2006; Djulbicovic, 2006; Rolston, 2006; Schwartzberg, 2006.
Several practice guidelines have been developed for FN.

(Infecious Diseases Society of America, The American Society of Clinical Oncology, NCCN, MASCC and The American Cancer Society)

The common language:

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Prevention of infection

Is identified as a nursing-sensitive patient outcome measure by the Oncology Nursing Society (ONS).

Interventions at the highest level of recommendation:

• Hand hygiene with soap and water of alcohol-based rubs.
• Gown by caring for pt with respiratory secretions.
• Closed windows in healthcare facilities.
• Restrictions for visitors with respiratory symptoms

http://www.cdc.gov/
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**Prevention of infection**

Effectiveness **has not yet been established** for several nursing interventions frequently delivered such as:

- When entering the room of a neutropenic pt, routine use
  - gowns
  - gloves
  - masks

- **Diet modification**

- **Laminar airflow** for preventing infection in patients with cancer
  
  *(Hayes-Lattin et al., 2005)*
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Prevention of infection

The findings can help focus attention on interventions with maximum benefit to patients!

eg.

instead of strict enforcement of isolation procedures for inpatients

nurses can ensure that patients and families properly demonstrate **good hand hygiene**
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**Patient education**

Oncology nurses play a vital role in providing chemotherapy side-effect education to:

- patients
- their caregivers

Patient education includes teaching about:

- the potential of neutropenia
- the consequences of neutropenia
- preventive measures to decrease the risk of infection
- signs and symptoms of infection
- what to do when signs and symptoms occur

*(Nirenberg, A., et al., 2006)*
Patient education

However!
Wide variations exist in what patients are taught, and few evidence-based protocols are available to guide nursing practice and patient education in this area.

Although!
National patient guidelines and educational materials have been produced by the American Cancer Society and NCCN (2006), the American Society of Clinical Oncology (2006), and the Wellness Community, not all are evidence based.

→ suggestions for preventing infection.

(Nirenberg, A., et al., 2006)
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*Patient education*

Eg. What should nurses teach patients about temperature?

report a temperature of 100.5°F or greater (American Cancer Society & NCCN, 2006; American Society of Clinical Oncology, 2006; Wellness Community, n.d.)?

single oral temperature reading higher than 100.9°F or an oral temperature higher than 100.4°F that lasts for more than an hour) (Hughes et al., 2002) defined by NCCN(2005) and the Infectious Diseases Society of America

➔ *Need for uniform information!*
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**Assessment:**

- General condition
- Complaints / symptoms (patient behavior)
- Timing of last chemotherapy treatment
- Current medications
- Comorbid diseases

Patients treated in the early stages have a good chance of survival. Once in the late stages there is an 80% chance of death!

http://www.sussexcancer.nhs.uk/home/
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Clinical examination:

- Vital signs: Blood pressure, heart rate, breathing, t °, saturation, diuresis
- Check skin and possibly skin defects (dressings always open it!)
- Oral inspection
- Control catheter insertion point! Often only minimal redness, sensitivity, swelling, ...
  Cave! with blocked catheter: infected clot
- Control of anal region. DO NOT measure rectal examination or rectal temperature ➔ introduction wounds, risk surinfections, bleeding, ...
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Early and late signs of Neutropenic Sepsis

http://www.sussexcancer.nhs.uk/home/
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### Nursing care of patients with FN

#### Early and late signs of neutropenic Sepsis

<table>
<thead>
<tr>
<th></th>
<th>Early</th>
<th>Late</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp</td>
<td>?low grade pyrexia ? Shakes/chills</td>
<td>Febrile</td>
</tr>
<tr>
<td>Skin</td>
<td>Flushed/warm</td>
<td>Cold/clammy, mottled skin</td>
</tr>
<tr>
<td>Cardio</td>
<td>Tachycardia, normal or low BP</td>
<td>Hypotension, peripheral oedema, DIC</td>
</tr>
<tr>
<td>Renal</td>
<td>Low output</td>
<td>No output</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>Hyperventilation</td>
<td>Pulmonary oedema</td>
</tr>
<tr>
<td>CNS</td>
<td>Alert/mild confusion, apprehension</td>
<td>Restless/anxious/confusion/lethargy/coma</td>
</tr>
<tr>
<td>GI</td>
<td>Nausea/vomiting/diarrhoea</td>
<td>Haematemesis/melena/pr bleed</td>
</tr>
</tbody>
</table>

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http://www.sussexcancer.nhs.uk/home/
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**Cultures:**

- Blood cultures for fever > 38°C
  Repeat with remaining fever 1x/24 hours
  At each temperature peak
  Always at shivering
  Peripheral and through each lumen of the catheter

- Urine culture
- Throat culture
- Stool culture
- Wound culture

*Before the start of AB but may not involve loss of time!*

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H.E.A.T

H  istory:  has patient been on chemo/how long ago?
E  xamine
A  ction:  30 mins for FBC, get Antibiotics prescribed
T  reat:  Antibiotics + Fluids within 60 minutes of arrival

A Preventable Death - An Educational Film
http://www.sussexcancer.nhs.uk/home/
Collaboration between care providers is an essential factor in the treatment of febrile neutropenia. ➔ MULTIDISCIPLINARY COLLABORATION

Patients with febrile neutropenia in emergency service should be immediately seen to be closely monitored!

Hospitalized haematological patients with fever, should always be evaluated immediately!

The development of an infection in the presence of neutropenia can be fatal in a matter of hours. ➔ TIME

If not properly managed, neutropenia in the hematology setting can have a devastating effect on quality of life. ➔ MANAGEMENT
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Take home message

Fibrile neutropenia is:
History – Examine – Action – Treat

Rapid diagnosis, treatment and good nursing care may stop a PREVENTABLE DEATH
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Thank you!

Questions?
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Sources

Nirenberg, Mulhearn, Lin, and Larsen, 2004

Crawford et al., 2008; Lyman, Dale, & Crawford, 2003; Lyman, Dale, Friedberg, Crawford, & Fisher, 2004)


http://www.cdc.gov/

http://www.sussexcancer.nhs.uk/home/

American Cancer Society & NCCN, 2006; American Society of Clinical Oncology, 2006

Hughes et al., 2002 defined by NCCN(2005) and the Infectious Diseases Society of America

The Oncology Nursing Society (ONS)