Neutropenia and Fever: Inpatient Care

Site Applicability: PHC Acute Care

Skill Level: **RN Basic**

Related Standards and Resources:

1. B-00-12-10111 - Extravasation Vesicant: Management Procedure
2. B-00-13-10137 – Inpatient Vesicant Chemotherapy (Administered on MSSU)
3. B-00-13-10138 – Extravasation of Vesicant Suspected Protocol
4. B-00-13-10148 – Administration of Parenteral Chemotherapy
5. B-00-13-10152 - DT Procedure Rooms MSJ: Procedural Sedation: Administration and Monitoring
6. B-00-13-10153 – Hypersensitivity (Allergic) Reaction, Chemotherapy
7. B-00-13-10155 – Oral Mucositis, Chemotherapy
8. PHC Occupational Health and Safety

Clinical Indication:

Patients receiving myelosuppressive treatments with expected neutropenia

Definitions:

Neutrophils: the most abundant type of leukocyte. They are the chief phagocytic leukocyte. Neutrophils are normally found in the blood stream, but migrate to sites of acute inflammation. The lower the neutrophil count, the greater the risk of infection. The life span of a neutrophil is estimated at less than 1 day to a maximum of 5.4 days.

Cytopenias: a reduction of any of the cellular components in the circulating blood, such as anemia, leucopenia, neutropenia, and thrombocytopenia.

Neutropenia: an abnormally low number of neutrophils in the blood. Chemotherapy induced neutropenia (CIN) is the primary dose-limiting toxicity associated with systemic chemotherapy.

> Neutrophil count 0.5×10^9 or less **OR** neutrophil count 1×10^9 or less with a predicted decline to 0.5×10^9 or less over the next 48 hours.

Myelosuppression: a decrease in the production of cells produced by the bone marrow related to the administration of certain medications or chemotherapeutic agents. Myelosuppression results in cytopenias and is a dose-limiting toxicity of systemic chemotherapy.

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Nadir: A term used to describe a low point. In the context of chemotherapy it refers to the lowest point of blood cell counts (white blood cells, red blood cells and platelets). The nadir varies depending on the agent but usually occurs 7 to 10 days after treatment.

Fever or Febrile: a single temperature of 38.3 ^{0} C or above orally **OR** an oral temperature of 38° C that lasts for more than one hour. Fever in the setting of chemotherapy induced neutropenia is often the *only* indication of an underlying infection. This is thought to be because the lower number of circulating white blood cells results in signs and symptoms of inflammation being blunted. For example redness or purulent drainage may not be present to indicate a skin infection.

Febrile Neutropenia (FN): a potentially life-threatening complication of cancer chemotherapy. Fever in the setting of neutropenia is often the cardinal sign of infection and can be a life threatening complication that often necessitates immediate treatment with intravenous antibiotics and other supportive measures.

Need to Know:

Febrile neutropenia is a medical emergency. Rapid assessment and administration of antibiotics within 1 hour are critical.

Reducing the Risk

Physical hygiene

- Review hygiene recommendations with the patient and their family (if appropriate):
  - Bathe daily
  - Wash hands with soap and water or with hand sanitizer:
    i. Before and after eating
    ii. After using the washroom
    iii. After coughing or sneezing into hands
- Gentle but thorough perineal cleaning after bowel movement and thorough drying of the perineum after urination. Females should wipe the perineum from front to back after using the toilet to prevent contamination
- Menstruating patients should not use tampons, which can be abrasive
- Avoid touching face and mucous membranes
- Use an electric razor

Oral hygiene

- See oral mucositis nursing practice standard

Nutrition

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- Nursing staff should review with patients and their families that:
  - Uneaten food is discarded if it has been sitting out for more than 2 hours
  - Refrigerated food is discarded after 48 hours
- Diet should include:
  - Well-cooked foods
  - Well-cleaned, uncooked raw fruits and vegetables are acceptable, as are cooked foods brought from home or restaurants, provided that the freshness of ingredients and the means of preparation can be confirmed
- Prepared luncheon meats should be avoided

Environment

- No pets are allowed to visit
- No flowers or dried flowers, mosses, or pine cones should be kept in the patient's room
- Ensure that the patient's room is set on positive pressure
- Place a "Protective Measures" sign on the patient's door

Visitors

- Hand washing before and after visiting the patient must be strictly enforced
- Health care providers or visitors who are currently symptomatic with infections transmissible by air, droplet, and direct contact (e.g.: infectious gastroenteritis, HSV lesions on lips or fingers, upper respiratory tract infections) OR who have recently been immunized with live or attenuated virus vaccines, should not engage in patient care or visit patients unless appropriate barrier (e.g.: mask and glove) protection is established.

Other

- The patient should avoid constipation and straining as this can lead to rectal tissue trauma
- The patient should wear an N95 mask when they are not in their rooms
- Do not give medications per rectum or IM

Identifying High Risk Patients

Generally speaking, people who are being treated for hematological cancers are at a higher risk of developing serious complications from febrile neutropenia. If ANY of the following factors is present, that person has a higher risk of serious complications, including mortality,

- Anticipated prolonged neutropenia (more than 7 days)
- Inpatient status at the time of development of fever
- Pneumonia or other complex infection at clinical presentation
- Significant co-morbidity OR clinically unstable, including:
  - GI symptoms, including abdominal pain, nausea and vomiting, or diarrhea
  - Neurological or mental status changes or new onset
  - Hepatic or renal insufficiency
  - Open wounds
  - Mucositis grade 3 or 4
- Other abnormal vital signs: hypotension; respiratory rate greater than 20 breaths/minute; tachycardia; mental changes

Other Factors that Influence Risk:

- Profound neutropenia (absolute neutrophil count {ANC} less than 0.5 x 10^9/L)
- Poor nutritional status
- Poor performance status
- Female gender
- More than 70 years old

PRACTICE GUIDELINE

Assessment:

Assessment of the neutropenic patient should be completed at least once a shift and should include the following:

- **Vital signs** – hypotension is a hallmark sign of septic shock and must be reported to the hematologist and/or most responsible physician stat. Please refer to the Early Identification and Treatment of Sepsis nursing practice standard [insert link] and the Early Sepsis Investigation and Treatment Inpatient Orders [insert link to appendix] and Febrile Neutropenia Empiric Antibiotic Therapy [insert link to appendix]
- **Neurological** changes
  - Inattention, disorientation, agitation
- **Alimentary tract** (mouth, pharynx, large and small bowel, and rectum):
  - Examine for areas of ulceration, thrush, blisters
  - Does the patient report having difficulties swallowing, heart burn, or chronic nausea
  - Diarrhea – clostridium difficile can also present in the setting of neutropenia,

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occurring in about 7% of patients
    - Pain
- **Sinuses and lungs**
    - Does the patient report having congested, tender or painful sinuses
    - Do you observe any unilateral eye tearing or face swelling
    - Does the patient report tooth or jaw pain
    - Does the patient have a new cough? Do they report feeling dyspneic?
- **Skin** – areas of ulceration, breakdown. Check nails as well.
- **Perivaginal and perianal areas**
    - Vaginal discharge +/- itching
- **Vascular access devices**
    - Entry or exit site inflammation (swelling, redness, discharge)
    - Tenderness over site
- **Urinary tract** symptoms – urgency, burning, pain, cloudy urine
- **General**
    - Chills or rigors +/- sweating
    - The patient reports feeling like they have the "flu"

Management of Febrile Neutropenia

If the patient is neutropenic and presents with a fever above 38^{o} C x 1 hour or a one time temperature reading of over 38.3 ^{o} C, consider **sepsis** and refer to the **Adult Inpatient Sepsis Screening Tool** [link] AND:

1. Complete a thorough assessment of the patient:
    - Vital signs, oxygen saturation, breath sounds
    - Mentation – is the patient disoriented, slow to respond?
    - Assess for any signs of infections (as described above)
    - Review recent lab reports
2. Notify the hematologist immediately
3. Anticipate some or all of the following diagnostic orders:
    - Blood cultures. At least 2 sets of blood cultures are recommended, with a set collected simultaneously from each lumen of an existing central venous catheter (CVC), if present, and from a peripheral vein site
    - Other cultures as clinically indicated (urine, sputum, wound)
    - X-rays

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4. Empiric antibiotics must be ordered and initiated STAT (within 1 hour of triage or assessment). Physicians may print off preprinted prescriber's order set PH323 – Febrile Neutropenia Empiric Antibiotic Therapy (Appendix A).
   - If the patient is already on empiric antibiotics, the physicians may change the prescription to an alternate antibiotic
   - Granulocyte colony stimulating factor (GCS-F, filgastrim) may be ordered if it has not already been requested
   - If the patient is symptomatic with pain or dyspnea, ensure that an appropriate analgesic order (if not already ordered) is in place
5. Increase monitoring of patient

Patient & Family Education

1. Assess potential problems associated with patient's ability to report symptoms.
2. Instruct patient of general, but critical, signs of infection to report immediately: feeling like they have a fever, sore mouth or throat, chills, cough, back pain, sores forming anywhere, redness or swelling in any area of body, etc.
3. Provide the patient and/or family with appropriate health education materials, including: "Neutropenia – Inpatient/Outpatient Information"
4. If the patient is being discharged and is expected to become neutropenic provide the patient with a Fever Card [insert link]. The purpose of the fever card is to instruct the patient and family in plain language what to do in the event of a fever, as well as providing a flag and directions for emergency department triage healthcare providers. [See Appendix B].

Documentation:

1. 24 Hour Nursing Assessment Flow sheet: record assessment, nursing interventions, patient's response and vital signs
2. Medication Administration Record—any medications given

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Persons/Groups Consulted:

Hematologist

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Nurse Educator Medicine

Revised by:

Clinical Nurse Specialist, Chemotherapy

Approved By: Professional Practice Standards Committee

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Appendix A Febrile Neutropenia Empiric Antibiotic Therapy

IF YOU RECEIVED THIS FACSIMILE IN ERROR, PLEASE CALL 604-806-8886 IMMEDIATELY

PRESCRIBER'S ORDERS

NO DRUG WILL BE DISPENSED OR ADMINISTERED WITHOUT A COMPLETED
CAUTION SHEET
ALLERGY/INTOLERANCE STATUS FORM (PHC-PH047)

DATE AND TIME	FEBRILE NEUTROPENIA EMPIRIC ANTIBIOTIC THERAPY (Items with check boxes must be selected to be ordered)

Patient Weight: _____kg ☐ Actual ☐ Estimate

LABORATORY: Blood C and S
Urine for C and S

MEDICATIONS: ☐ vancomycin 25 mg/kg (to nearest 250 mg) = _____ mg IV STAT *AND*
vancomycin 15 mg/kg (to nearest 250 mg) = _____ mg IV Q12H *AND*
cefTAZidime 2 g IV Q8H *AND*
tobramycin 6 mg/kg (to nearest 20 mg) = _____ mg IV STAT and Q24H

☐ If estimated Glomerular Filtration Rate (GFR) less than 30 mL/min,
vancomycin 25 mg/kg (to nearest 250 mg) = _____ mg IV STAT *AND*
vancomycin 15 mg/kg (to nearest 250 mg) = _____ mg IV Q24H *AND*
meropenem 1 g IV Q12H

☐ If known colonization or infected by VRE (vancomycin-resistant enterococci)
Discontinue above vancomycin
linezolid 600 mg IV Q12H (Approved Indication)

Printed Name | Signature | College ID | Pager

Form No. PHC-PH323 (R. Sep-11) **ALL NEW ORDERS MUST BE FLAGGED**
FAX COMPLETED ORDERS TO PHARMACY **PLACE ORIGINAL IN PATIENT'S CHART**

Appendix B Fever Card (available from the Patient Health Education Materials catalogue)

Medical Alert

I am receiving chemotherapy.
FEVER may be a
life-threatening EMERGENCY.

Providence HEALTH CARE
How you want to be treated

Health care providers: please read both sides of this fold-out card.

Name	
Diagnosis	
Chemotherapy Protocol	
Allergies	

Are you taking any steroids, such as prednisone or dexamethasone? ☐ Yes ☐ No

Chemotherapy was received on:

Date:	Date:
Date:	Date:

Patient and Family

If the patient has a fever of 38°C (104.4°F) or higher, they need emergency care.

- Go immediately to St. Paul's Hospital Emergency or to the nearest emergency department.
- Bring this card and a list of the patient's medications.
- DO NOT take acetaminophen (Tylenol). It can hide your fever.

Show this card to the nurse and doctor when registering at the emergency department.

If you have any concerns about how you are feeling, contact your hematologist's office:

Physician:

Phone number:

After business hours, call 604-682-2344 and talk to the hematologist on call, OR call 911 or visit your nearest emergency department.

If this patient presents with a fever, please triage as emergent.

Febrile Neutropenia (FN) is an oncologic emergency associated with significant morbidity and mortality. It is a serious consequence of some chemotherapy regimens. It requires immediate management.

Patients with FN should have antibiotics started within 1 hour of triage.

Febrile Neutropenia (FN) is defined as:

Absolute neutrophil count (ANC) $<0.5 \times 10^9/L$

OR

ANC $<1 \times 10^9/L$, with ANC expected to drop further

AND

temperature greater than 38°C for more than 1 hour

OR

a one time reading of > 38.3°C

Instructions for Healthcare Providers

1. Conduct a medical workup of this patient for possible sources of infection. Take blood cultures, urine and/or sputum.
2. Prescribe antimicrobial treatment:
   - St. Paul's Hospital Emergency see 'Febrile Neutropenia Empiric Antibiotic Therapy' preprinted orders (Form PHC-PH323)
   - Other Emergency Departments please contact the St. Paul's on-call hematologist for appropriate antimicrobial therapy

Contact St. Paul's Hospital:

- For questions about antimicrobial agents
- To relay patient status
- To talk with the hematologist on-call

604-682-2344

FA.113.F4361.PHC (Oct-16)

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