

NATIONAL INSTITUTES OF HEALTH
CLINICAL CENTER
CLINICAL CENTER NURSING DEPARTMENT

Standard of Practice: Care of the Neutropenic-Patient

SUMMARY OF SIGNIFICANT CHANGES SINCE LAST REVIEW

❖ **Reinstated document retired in 2016**

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Deletes or Replaces -

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Essential Information

1. Neutropenia is defined as an ANC of <1500 cells/mm³ and severe neutropenia is defined as an ANC < 500 cells/mm.³
2. Neutrophils account for approximately 60% of the body's circulating white blood cells. They are the body's first responders to infection by bacteria, viruses and other pathogens.
3. An absolute neutrophil count (ANC) < 1500 places a patient at increased susceptibility to infection. An ANC < 500 places a patient at considerable risk.²
4. Usually white blood cells nadir (reach their lowest point) 7-14 days after chemotherapy administration. If a patient has received numerous cycles of chemotherapy or has other co-morbid conditions, they may reach their nadir earlier.
5. The reduced quantity of neutrophils may limit the classic signs and symptoms of infection such as redness, pus, swelling and pain. Fever may be the only sign of infection!^{2,3}
6. Severely neutropenic patients who exhibit signs of infection and/or fever must have prompt (within < 60 minutes) intervention from a medical team.
7. Colony-stimulating factors (G-CSF or GM-CSF) may be used to help stimulate WBC production and decrease period of neutropenia; however, the patient's research protocol or clinical condition may prohibit use of colony-stimulating factors.
8. Not all neutropenia is caused by malignant disease or immune-suppressive therapy. Patients may experience neutropenia due to an underlying disease or treatment (Examples: Aplastic Anemia or medication related neutropenia).
9. Potential sites of serious bacteremia include the GI tract, skin, blood, upper and lower respiratory tract, and urinary tract.
10. Not all infections in the neutropenic patient are preventable, but interventions can be effective in decreasing the risk of infection.
11. Good hand hygiene is the number one way to prevent infection.
12. Refer to Elsevier Clinical Skills: "Infection Prevention for Patients with Neutropenia: Nursing Management" and "Febrile Neutropenia: Nursing Management".

I. Assessment

- A. Venous Access Devices: Assess catheter entrance, exit, and tunnel sites for skin breakdown, erythema, pain/ tenderness, discharge, swelling, or warmth every four hours for inpatients and on every outpatient encounter. Encourage neutropenic outpatients to assess line site frequently.
- B. The inpatient nurse will assess the following potential sites of infection every 12 hours, change of shift, or more frequently if clinically indicated; the outpatient nurse will assess the following potential sites of infection with each patient encounter:

1. Skin: skin for any breakdown, lesions, rashes or pain. Be especially alert to complaints of pain/ discomfort in areas of skin folds, including buttocks, axilla, perineum, genital area, and breasts.^{2,4} Examine these areas as clinically indicated.
 2. GU: changes in urinary function including frequency, dysuria, hematuria; change in color/appearance/odor of urine.²
 3. GI: mouth and throat for redness, ulcers, white patches, soreness/tenderness, pain with eating/drinking, dryness or bleeding; bowel function for stool consistency, pain, frequency, color and amount of stool.^{2,5}
 4. Lungs: breath sounds and respiratory status for any changes in pattern, effort, dyspnea, cough, or sputum production (amount and color).^{2,4,5}
 5. HEENT/Neurological: headaches, neck stiffness, mental status changes, focal neurological deficits, sinus pressure/congestion/drainage/pain, or orthostatic dizziness.²
- C. Vital Signs:
1. Inpatients:
 - a. Monitor blood pressure, temperature, pulse, and respiratory rate at least every four (4) hours or more frequently as clinically indicated.
 - b. Review nursing orders in CRIS for vital sign parameters requiring Licensed Independent Practitioner (LIP) notification.
 - c. Report changes in condition such as tachycardia, tachypnea, hypotension, or temperature ≥ 38.0 Celsius.
 2. Outpatients:
 - a. Monitor vital signs with each patient encounter.
 - b. (Neutropenic outpatients will be instructed to monitor their temperature at home according to the patient education document [Fever Guidelines](#), also available in [Spanish](#)).
 3. End-of-Life:
 - a. Monitoring standards may be suspended with a medical order when the comfort of the patient overrides vital sign monitoring.

II. Interventions

- A. Monitor CBC/differential as ordered or as indicated by the specific research protocol, generally at least twice a week or every 3 days while on antibiotic therapy.²
- B. Use strict aseptic technique when performing all invasive procedures and when manipulating any invasive tubing.⁴ Refer to CCND SOP: Central Venous Access Device or SOP: Peripheral Venous Access Device, for aseptic venous access care. Avoid IM injections that could lead to skin abscesses.
- C. Prevent rectal trauma by avoiding rectal temperatures, enemas, suppositories or digital exams. Discuss with LIP strategies to prevent constipation. Keep the perirectal area clean and dry. Reduce the risk of perianal trauma/infection by cleansing with sitz baths and applying skin barrier creams as needed. Minimize vaginal trauma by avoiding use of tampons or vaginal suppositories.^{4,5}

III. Management of Febrile Neutropenia

- A. Fever in a neutropenic patient is a **clinical emergency** and can quickly lead to sepsis and death. Immediate nursing recognition and intervention is important in preventing death. Rapid Response or Code Blue may be indicated if the patient has an acute change in condition or deteriorating status. If you think the patient is septic, act fast and get help.
- B. Assess the patient's history to determine risk of neutropenia: comorbid conditions, age, history of infections, HIV status, treatment with antineoplastic agents (e.g., heavily pre-treated with history of prolonged neutropenia), exposure to pets and their excrement, travel outside the US, and/or antibiotic prophylaxis.
- C. Monitor temperature closely.
 - 1. For any new onset of fever $>$ or equal to 38, LIP should be notified immediately, unless LIP orders state otherwise. Also notify the LIP if the patient has rigors, chills, dysuria, confusion/disorientation, changes in heartrate or BP, pain or discomfort, shortness of breath, or other symptoms of possible infection.
 - 2. Hypothermia may also be a sign of sepsis. Notify the LIP for a temperature \leq 35°C.
- D. A complete physical examination should be performed to assess possible cause of fever. Common sites include lungs, skin, gut, urinary tract, and indwelling devices, including CVADs.
- E. Orders to anticipate in the setting of febrile neutropenia include:
 - 1. Blood cultures
 - a. from all lumens of a central line
 - b. peripheral blood cultures in the adult patient
 - c. Obtain blood cultures as per CCND Pro: Obtaining Blood Cultures from Peripheral and Central Venous Access Devices
 - 2. Other orders may include: urine culture, chest x-ray, stool sample if patient has diarrhea, sputum culture if patient has a cough, congestion or other symptoms of upper respiratory infection, skin samples if the patient has open lesions. Clarify orders with LIP.
 - 3. In the case of a patient who has a subcutaneous access port that is not accessed, remind LIP that port is present and clarify need for cultures.
- F. Broad spectrum antibiotics should be initiated **within one hour** of first fever.
 - 1. An Infectious Disease consult is not needed for the LIP to order the first dose of broad spectrum antibiotics.
 - 2. It is preferable to obtain blood cultures prior to starting antibiotics.
 - 3. Do not delay antibiotics if unable to obtain cultures. Contact LIP, administer antibiotics, and continue attempts to obtain cultures.
- G. Neutropenic patients who have persistent fevers will generally have an infectious disease consult.
- H. Reduce the fever slowly using cooling blanket (LIP order required), ice packs, tepid sponge baths, and reduction of room temperature. Quick decrease in temperature can cause rigors which will cause temperature to rise again.

IV. Patient Education

- A. Reinforce neutropenic guidelines using the patient education document, “Understanding Your Complete Blood Count”, from the NIH Research Participant Education Committee, NIH/CC Healthcare Fact Sheets, in Transplant Resources: Blood & Marrow.
- B. Patients, staff and visitors must adhere strictly to guidelines regarding hand hygiene.^{4,5} Encourage patient and family to use alcohol-based gel for hand hygiene.
- C. Instruct patient regarding meticulous and frequent oral hygiene, including the use of a soft/ultra-soft toothbrush, mouth rinses with alcohol-free mouthwash at minimum in morning, after each meal and bedtime.⁵ Flossing is not recommended for a platelet count equal or less than 50,000 and/or an ANC equal or less than 500. Refer to CCND Oral Care Standard of Practice as needed.
- D. Preserve skin integrity by instructing the patient to maintain good personal hygiene to include daily bathing, using a mild, fragrance-free soap and apply fragrance-free lotion to prevent dry/cracking skin.⁵ Electric razors should be used to prevent breaks in the skin.
- E. Patients should avoid contact with individuals of all ages with signs/symptoms of a suspected transmissible illness.^{4,5} Patients should avoid aerosolized bursts of organisms, construction sites, and crowds of people where transmissible respiratory pathogens (Aspergillus, RSV, Influenza, and Para-Influenza) are potentially present. Patient should wear a mask when outside their room. Outpatients should wear a mask during their Clinical Center visits.
- F. Contact with persons who have recently received any live vaccines (including Sabin oral polio, Chicken pox/Varicella and nasal flu mist) should be avoided.⁵ Patients should check with their NIH health provider before receiving any vaccines or immunizations.
- G. Instruct patient to avoid handling potted plants, sniffing fresh flowers and contact with stagnant water (humidifiers, water pitchers, water in a vase).^{4,5} Fresh flowers and potted plants are not permitted in patient rooms of neutropenic patients, but may be displayed at the nurses’ station. Flowers should be discarded when they show any signs of wilting.^{4,5} Outpatients should be reminded to avoid gardening or handling cat litter/pet excrement.^{4,5}
- H. Provide nutritional counseling with patient and family in collaboration with the Clinical Center (CC) Nutrition Department and the “[*Don't Let Your Food Make You Sick*](#)” patient education document.⁴
- I. Discuss sexual activity guidelines with LIP and counsel patients as to safe sexual practices as it relates to the neutropenic state.
- J. Provide opportunity for patient and family to ask questions and sufficient discussion to meet learning needs.

V. Documentation

- A. Document assessments in CRIS per nursing documentation policy:
 - 1. Physical assessment at least every 12 hours, change of shift, or more frequently if clinically indicated for: skin, GU, GI, lungs, HEENT and neurological status.
 - 2. Vital sign parameters every 4 hours or more frequently if clinically indicated.

3. CVAD site assessment every 4 hours or more frequently if clinically indicated.
- B. Document interventions and response in CRIS per nursing documentation policy:
 1. Interactions with LIPs.
 2. Interventions and the patient/families response.
 3. Patient/family education and validation of learning as well as any follow up needed.
 4. Telephone contacts with patient/family related to neutropenic status.

VI. References

1. Freifield, A., Bow, E., Sepkowitz, K. et al (2010). Clinical Practice Guideline for the Use of Antimicrobial Agents in Neutropenic Patients with Cancer: 2010 Update by the Infectious Diseases Society of America. *Clinical Infectious Diseases*, 52(4):e56–e93.2.
2. Hughes, W., Armstrong, D., Bodey, G. et al (2002). 2002 Guidelines for the use of antimicrobial agents in neutropenic patients with cancer. *Clinical Infectious Diseases*, 34:730-751.
3. Nirenberg, A., Parry Bush, A., Davis, A., Friese, C., Wicklin Gillespie, T. & Rice, R. (2006). Neutropenia: State of knowledge part I. *Oncology Nursing Forum*, 33(6):1193-1201.
4. Nirenberg, A., Parry Bush, A., Davis, A., Friese, C., Wicklin Gillespie, T. & Rice, R. (2006). Neutropenia: State of knowledge part II. *Oncology Nursing Forum*, 33(6):1202-1208.
5. Steele-Moses, S. K. (2017). Febrile neutropenia: nursing management (oncology). *Elsevier Clinical Skills*.
6. Zitella, L., Friese, C., Hauser, J., Homes, B., Woolery, M., O'Leary, C., & Andrews, F. (2006). Putting evidence into practice: Prevention of infection. *Clinical Journal of Oncology Nursing*, 10(6):717-832.

VII. Contributing References

- A. CCND Standard of Practice: Oral Care for Research Patients with Actual or Potential Immunocompromise
- B. CCND Standard of Practice: Care of the Patient with a Peripheral Venous Access Device (PIV)
- C. CCNS Standard of Practice: Care of the Patient with a Central Venous Access Device (CVAD)
- D. CCND Procedure: Obtaining Blood Cultures from Peripheral and Central Venous Access Devices

Approved:

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