Neutropenia is a reduction in the white blood cell (WBC) count (Camp-Sorrell, 2005; Cappozzo, 2004; Hawkins, 1997; Lynch, 2000).

- WBC function is to fight off infection.
- Five types comprise the count: neutrophils, lymphocytes, monocytes, eosinophils, and basophils (see Table 1).
- The five types are reported in percentages that add up to 100%.
- Neutrophils are the first line of defense in infection.
- Neutrophils digest bacterial organisms and debris.
- Neutrophils increase during infection or acute trauma.
- Neutrophils have a half-life of seven to eight hours in circulation.
- Bands, also called “stabs,” are the immature form of neutrophils.
- An increase in band level is called a left shift, which occurs with acute infection.

Neutropenia is caused by problems with neutrophil production, problems with neutrophil distribution, infection, treatment, or drugs (Lynch, 2000). Treatment-related causes include chemotherapy, radiation therapy, immunotherapy, and bone marrow transplant (National Comprehensive Cancer Network [NCCN] & American Cancer Society [ACS], 2002).

Despite the cause or treatment modality, patients with neutropenia are at increased risk for infection. The absolute neutrophil count (ANC) is an essential tool used in oncology to determine potential risk (Hawkins, 1997). ANC represents the number of mature WBCs in circulation using a simple, mathematical calculation. See Figure 1 to learn how to calculate the ANC. The ANC is categorized into grades, which reflect the risk for infection. See Table 2 for grading and levels of risk.

The occurrence of neutropenia can lead to life-threatening infections. To decrease the rate of chemotherapy-induced neutropenia, the chemotherapy dose may be reduced or delayed. Reductions or delays diminish the effectiveness of potentially curative treatment (Cappozzo, 2004; Nirenberg, 2003). Prevention of chemotherapy-induced neutropenia is one way to decrease the potential for dose reductions or delays and is achieved through the use of (Camp-Sorrell, 2005)

- Granulocyte-colony-stimulating factor
- Granulocyte macrophage-colony-stimulating factor.

The use of a colony-stimulating factor is recommended when (Camp-Sorrell, 2005)

- Patients have had a previous episode of febrile neutropenia.
- Chemotherapy is being administered in a dose-dense manner.
- A high risk of febrile neutropenia exists. Despite dose delays, reductions, or use of colony-stimulating factors, fever still may develop in the presence of neutropenia.
Perform the following tests.

- Temperature of 100.4°F or higher for more than one hour
- Timings of last chemotherapy treatment
- Comorbid diseases
- Current medications, including recent antibiotic use
- Prior infections.
- Review history for recent travel, pet exposure, infectious disease exposure, and kidney and liver functions.

Once cultures have been obtained, patients are treated with antibiotics. Initial antibiotic monotherapy includes the use of one of the following drugs (NCCN, 2005).
- Cefepime
- Ceftazidime
- Imipenem/cilastatin
- Meropenem
- Pipercillin/tazobactam

Oncology nurses play a vital role in the education of patients and caregivers concerning neutropenia precautions. Patients will need to know how to avoid infection, what the signs of infection are, and when to seek medical care. They should be instructed to (Loerzel, 2005; NCCN & ACS, 2002)
- Wash hands frequently, especially before eating and after using the bathroom.
- Avoid crowds or anyone who is sick with a cold or flu.
- Avoid cleaning up pet excrement.
- Bathe daily.
- Brush teeth twice a day using a soft toothbrush.
- Floss teeth once a day, as long as platelet count is not low.
- Avoid constipation by regularly taking a stool softener.
- Avoid use of suppositories or enemas.
- Eat only fruits and vegetables that can be washed or cooked.
- Eat only meat that is fully cooked.
- Avoid drinking unpasteurized milk or other unpasteurized beverages.
- Avoid use of suppositories or enemas.
- Change in mental status.
- Pain in abdomen or rectum.
- Change in physical status.

If not properly managed, neutropenia in the oncology setting can have a devastating effect on quality of life. The development of an infection in the presence of neutropenia can be fatal in a matter of hours. Nursing makes an important impact on the outcome of care through interventions that help to prevent, monitor, and educate. These interventions may save the life of patients with neutropenia.

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