

Care of Patients With Neutropenia

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Neutropenia can be a significant problem in the oncology setting. Awareness of potential risks, management of neutropenia, and preventive measures guide nurses in providing comprehensive care that can make the difference between life and death.

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 poten-

Table 1. Function of the White Blood Cell Components

WHITE BLOOD CELL TYPE	FUNCTION
Neutrophils: also called polymorphonuclear cells (polys) or segmented neutrophils (segs)	Phagocytosis: digestion of bacterial organisms and debris
Lymphocytes: Measurement reflects a combination of the T and B cells.	Combat acute viral infections and chronic bacterial infections
Monocytes: also called monos	Phagocytosis of bacteria; monocytes last longer in circulation than neutrophils.
Eosinophils: also called eos	Allergic reaction and parasitic infections
Basophils: also called mast cells or basos	Involved in inflammatory process and allergic reactions

Note. Based on information from Hawkins, 1997; Pagana & Pagana, 2002.

tial 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.

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