Chemotherapy Induced Neutropenia and Increased Risk for Sepsis

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Neutrophils play an important role in the inflammatory response by releasing crucial regulatory cytokines, chemokines, and leukotrimones (Kovach & Standiford, 2012).

Bone marrow suppression and subsequent neutropenia significantly increases a patient’s risk of infection, due to a lack of appropriate immune response (Kovach & Standiford, 2012; O’Leary, 2014). Neutrophils are the first phagocytic cell to arrive at the site of an infection, function to fight against bacterial, fungal, and viral pathogens, produce common signs and symptoms of infection including, redness, swelling, and temperature (Kovach & Standiford, 2011; Vioral & Wentley, 2015).

Patients with neutropenia do not produce a sufficient number of mature neutrophils to fight against an appropriate immune response against microorganism invasion (Vioral & Wentley, 2015). Therefore, neutrophils do not always present with classic signs and symptoms of infection. Neutropenic fever is a term that only response to an infection in the neutropenic patient is a fever (Bow, 2013). A reported overall average temperature greater than 101 degrees Fahrenheit or persistent fever (longer than one hour) oral temperature of 102 degrees Fahrenheit represents a fever in a patient with neutropenia (Kovach & Standiford, 2015). In patients with severe neutropenia, a fever or pyrexia can cause such substantial difficulty producing an immune response. Fever may not be exhibited in the patient with a present temperature that is below normal, namely temperatures below 96.8 degrees Fahrenheit (Bow, 2013; O’Leary, 2014).

The patient may also display alterations in vital signs. An elevated or decreasing progression towards sepsis and the progression of the systemic inflammatory response. Criteria concerning for the presence of systemic inflammatory response include increased heart rate, increased respiratory rate, and temperature, hypotension, or hypovolemic shock (Vioral & Wentley, 2015). Additionally, patients may rapidly develop symptoms of severe sepsis including altered mental status, and rigors (Demokratis, et al, 2011).

The function of neutrophils in sepsis. Current Opinion in Infectious Diseases, 28(1), 31-37. doi:10.1097/QCO.0b013e3283528c9b


Conclusion

Neutropenia in patients receiving chemotherapy medications for the treatment of cancer can place patients at risk for potentially life threatening immune dysfunctions, infection, and symptoms of infection, and prompt intervention when concerns for infection area are vital for positive patient outcomes. Vioral and Wentley (2015) noted that “nurses are integral in the prevention, identification, treatment, and management of these high mortality complications of immunosuppressive therapies” (p. 173). Ensuring that nurses have a thorough understanding of the pathophysiology of neutropenic patients and implications for nursing care further contributes to improvements in the quality of care received by the neutropenic patient.