

Nursing Considerations of Bevacizumab Use in Multiple Tumor Types

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Purpose/Objectives: To update information concerning the antiangiogenic agent bevacizumab, discuss side effects, and provide information on nursing management of the side effects.

Data Sources: Published articles, abstracts, and research data.

Data Synthesis: In clinical trials, the addition of bevacizumab to standard chemotherapy increased survival in patients with metastatic colorectal cancer and advanced non-small cell lung cancer and increased progression-free survival in patients with metastatic breast cancer. Bevacizumab also is being evaluated in combination with other targeted agents in various tumor types. Commonly reported side effects associated with bevacizumab include hypertension, proteinuria, and minor bleeding.

Conclusions: The value of bevacizumab in treating metastatic colorectal cancer has long been established. Clinical trial data have demonstrated the benefit of using bevacizumab in combination with standard chemotherapy in the treatment of non-small cell lung cancer and metastatic breast cancer. Because of bevacizumab's expanding role in cancer treatment, nurses need to know how to use it, be aware of possible side effects, and anticipate interventions.

Implications for Nursing: Nurses play an important role in the identification and management of adverse events associated with bevacizumab.

Key Points . . .

- Cytotoxic treatments for cancer are limited by their inability to selectively target tumor cells, producing well-characterized side effects, such as fatigue, hair loss, and bone marrow suppression. This limits the dosage given and thereby the overall effectiveness of treatment.
- Bevacizumab is the first approved targeted agent that specifically inhibits the vascular endothelial growth factor that plays a key role in angiogenesis, tumor growth, and metastases.
- Bevacizumab is the first antiangiogenic agent to consistently increase overall or progression-free survival in different tumor types, including metastatic colorectal cancer, advanced non-small cell lung cancer, and metastatic breast cancer.
- Oncology nurses play a vital role in the assessment and monitoring of common and rare side effects associated with bevacizumab therapy.

Patients with advanced stages of cancer have poor prognoses, and the goal of treatment is to prolong survival and improve quality of life. Chemotherapy has been the mainstay of treatment for advanced cancer for many years, but cytotoxic agents are limited by their inability to selectively target tumor cells. The nonspecificity often results in damage to healthy cells and produces well-characterized side effects, such as fatigue, hair loss, and bone marrow suppression. The nonspecificity of chemotherapy also can limit the dosages that can be given and, therefore, the effectiveness of treatment. More effective and better-tolerated cancer therapies are needed. New therapeutic agents that act directly on tumor cells or the cells supporting tumor growth are referred to as targeted therapies. The improved specificity of targeted agents means they are less likely to affect healthy cells, which should result in fewer side effects.

An improved understanding of the multistep process in cancer development has led to the identification of various potential therapeutic targets. Angiogenesis, the formation of new blood vessels, is a key target in tumor growth and metastatic spread. Proliferating tumor cells, similar to normal cells, must be supplied by blood vessels to provide vital nutrients and oxygen required for growth. Small tumors can grow to 1–2 mm by absorbing nutrients and oxygen through simple diffusion, but a vascular blood supply is required for further growth (Ferrara, 2004). A new blood supply normally

is recruited from neighboring mature vasculature, which forms new blood vessels that grow toward and eventually into the tumor. The transition of a small avascular tumor to a large vascularized tumor with increased growth potential is known as an “angiogenic switch.” The angiogenic switch is triggered by an increase in proangiogenic factors, such as vascular endothelial growth factor (VEGF), basic fibroblast growth factor, and transforming growth factor- α , and a decrease in antiangiogenic factors, including angiostatin, endostatin, and thrombospondin (Ferrara & Kerbel, 2005), as seen in Figure 1.

VEGF, also known as VEGF-A, has emerged as a key angiogenic factor involved in regulating the angiogenic switch. VEGF is a ligand that has numerous roles in angiogenesis. For example, it directly increases the permeability of blood vessels that may contribute to angiogenesis and tumor growth. In addition, VEGF promotes angiogenesis by binding to two receptors, VEGFR-1 (Flt-1) and VEGFR-2 (Flk-1/KDR). The receptors are found predominantly on the surface of endothelial

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