A significant need exists for effective and well-tolerated treatments for patients with hematologic malignancies. Bendamustine hydrochloride is a novel cytotoxic agent that possesses alkylator and purine-like structural groups, which may confer a unique mechanism of action. Bendamustine recently was approved by the U.S. Food and Drug Administration for the treatment of chronic lymphocytic leukemia (CLL) and currently is being used in clinical trials for a number of hematologic and solid tumors. Bendamustine has demonstrated promising clinical activity in patients with hematologic malignancies and has manageable toxicities when administered as monotherapy or in combination with other agents. In clinical trials, nausea, fatigue, vomiting, fever, diarrhea, constipation, and headache were the most commonly reported nonhematologic side effects. Reversible myelosuppression also was reported. Nurses need to understand the efficacy and safety profiles of bendamustine to educate patients and their families about its use and expected side effects. Knowledge of specific measures for preventing and managing associated side effects and dose modifications is integral to the provision of optimal care.

**Pharmacology**

Bendamustine has a unique chemical structure. Similar to other alkylators, bendamustine contains a mechloretamine (nitrogen mustard) alkylating group (see Figure 1); however, it also contains a benzimidazole ring. The effect of the benzimidazole ring on the clinical activity of bendamustine currently is unknown.

Bendamustine’s antitumor effects include DNA damage through double- and single-strand DNA cross-links and down-regulation of mitotic checkpoint genes that regulate DNA synthesis and cell division (Leoni et al., 2008). The concomitant activity of these mechanistic pathways may further increase the cytotoxicity of bendamustine through a process...