Management of Patients With Primary Central Nervous System Lymphoma Treated With High-Dose Methotrexate

Elizabeth Warnick, RN, MSN, CRNP, and Danielle Auger, MPA, PA-C

Primary central nervous system lymphoma (PCNSL) is a rare, extranodal form of non-Hodgkin lymphoma that most commonly presents with neurologic changes. Comprehensive workup to diagnose PCNSL and rule out nodal non-Hodgkin lymphoma is critical to the development of an appropriate plan for therapy. Past PCNSL treatments have included whole-brain radiation or steroids, but high-dose methotrexate (MTX) has emerged as initial therapy. Although high-dose MTX is well tolerated, special considerations must be taken to administer the drug safely. Specific interventions include aggressive IV hydration with sodium bicarbonate fluids, monitoring blood chemistries, and the administration of leucovorin rescue. Nurses should evaluate and monitor patients closely during treatment to ensure safety and decrease drug toxicity.

At a Glance

- Primary central nervous system lymphoma (PCNSL) is a rare, fast-growing form of non-Hodgkin lymphoma that presents with acute neurologic status changes.
- High-dose methotrexate has emerged as the primary therapy for immunocompetent patients with PCNSL.
- Understanding the principles of methotrexate metabolism and specific treatment considerations will ensure patient safety.

Primary central nervous system lymphoma (PCNSL) is a rare, extranodal form of non-Hodgkin lymphoma that presents with neurologic changes. Comprehensive workup to diagnose PCNSL and rule out nodal non-Hodgkin lymphoma is critical to the development of an appropriate plan for therapy. Past PCNSL treatments have included whole-brain radiation or steroids, but high-dose methotrexate (MTX) has emerged as initial therapy. Although high-dose MTX is well tolerated, special considerations must be taken to administer the drug safely. Specific interventions include aggressive IV hydration with sodium bicarbonate fluids, monitoring blood chemistries, and the administration of leucovorin rescue. Nurses should evaluate and monitor patients closely during treatment to ensure safety and decrease drug toxicity.

In immunocompetent patients with PCNSL, age of presentation generally is 60 years, with a higher incidence in men (Raval et al., 2004). PCNSL usually presents as a solitary lesion and can affect any part of the central nervous system, including the eyes, brain, spine, or cerebral spinal fluid. Patients usually present with changes in neurologic status that are consistent with the tumor location. The tumors often are found in the frontal lobes, corpus callosum, basal ganglia, cerebellum (Raval et al.), and ventricles (Plotkin, 2005). PCNSL also can develop in the vitreous, retina, choroids, and optic nerve. The disease usually is unilateral but can spread to the contralateral eye (Shenkier & Connors, 2007). Complaints of floaters and blurred vision are consistent with ocular involvement. Reported neuropsychiatric symptoms include personality changes, depression, or altered thought processes with cognitive deficits. If the spinal cord is affected, presentation may be similar to compression and include muscle weakness, loss of mobility, or incontinence. Patients infrequently develop symptoms of increased intracranial pressure, presenting with headaches or seizures. PCNSL tumors are not associated with edema like other brain tumors because they are fast growing. In addition, the tumors typically are located deep in the white matter of the brain (Eichler & Batchelor, 2006; Raval et al.).

Evaluation of patients suspected to have PCNSL includes magnetic resonance imaging of the brain, followed by biopsy. On imaging, the tumors tend to have no surrounding edema with less distinct borders than other types of brain lesions (Shenkier & Connors, 2007). Steroids should not be given before biopsy has