

## FEATURE ARTICLE

# Chemotherapy-Induced Peripheral Neuropathy: A Review and Implications for Oncology Nursing Practice

Rita Wickham, PhD, RN, AOCN®, CHPN

Advances in supportive care have increased the likelihood that previously less common adverse effects of chemotherapy will be more evident. The incidence of chemotherapy-induced peripheral neuropathy (CIPN) is increasing because more neurotoxic drugs have been developed and because patients are living longer and receiving multiple chemotherapy regimens. This article reviews the anatomy of the peripheral nervous system, the proposed mechanisms of CIPN, and manifestations of CIPN from vinca alkaloids, taxanes, and platinum analogs. Major topics of this article are evidence-based data regarding symptom management, a review of medical management, and a synthesis of nursing care for patients at risk for or experiencing CIPN.

**A**dvances in cancer chemotherapy include several new, highly active agents that are potentially neurotoxic. Aggressive treatment with one or more of the agents has increased the likelihood of cure or long-term survival along with possible development of dose-limiting neurologic effects, particularly in the peripheral nervous system (PNS), which is more sensitive than the central nervous system (CNS) to neurotoxic effects of chemotherapy. This article will discuss chemotherapy-induced peripheral neuropathy (CIPN) in terms of incidence, PNS anatomy and physiology, pathogenesis of CIPN, and current and potential management strategies.

Several challenges regarding CIPN include incomplete understanding of pathogenesis, a lack of evidence-based therapies to alleviate it, and inconsistent assessment for CIPN by nurses and physicians who may view it as less important than other side effects of chemotherapy (Smith, Whedon, & Bookbinder, 2002). As a result, patients do not receive correct information about what to anticipate, how CIPN might progress, and to what degree it will resolve (Nail, 2001). This is particularly problematic because research is beginning to document that CIPN is among the most distressing symptoms experienced by patients undergoing chemotherapy with neurotoxic drugs and that it affects important activities and quality of life (QOL) (Boehmke & Dickerson, 2005). Furthermore, little data exist regarding the duration of post-therapy CIPN and which manifestations lessen or resolve.

## The Peripheral Nervous System

A brief review of PNS structures and functions is useful to understand the pathophysiological mechanisms of CIPN. The PNS

### At a Glance

- ◆ Understanding the peripheral nervous system is important because it is sensitive to the effects of neurotoxic agents.
- ◆ Vincristine, taxanes, and platinum analogs most commonly cause bilateral sensory neuropathy in a stocking-glove distribution.
- ◆ Nurses need some understanding regarding medical management, such as altering chemotherapy doses, administering drugs that may decrease neuropathy, and planning and implementing skilled care of patients at risk for or experiencing chemotherapy-induced peripheral neuropathy.

and CNS transmit, integrate, interpret, and respond to information from the external and internal environments. The CNS (brain and spinal cord) is protected by the blood-brain vascular barrier that inhibits diffusion of large molecules, highly charged ions, and many drugs from the bloodstream into CNS tissues (Willis, 2000). A similar vascular barrier *does not* protect the

Rita Wickham, PhD, RN, AOCN®, CHPN, is an oncology and palliative nurse consultant and an associate professor of nursing at Rush University Medical Center in Chicago, IL. The author received an honorarium from sanofi aventis. Mention of specific products and opinions related to those products do not indicate or imply endorsement by the *Clinical Journal of Oncology Nursing* or the Oncology Nursing Society. (Submitted May 2005. Accepted for publication June 25, 2006.)

Digital Object Identifier:10.1188/07.CJON.361-376