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The Validity of Neuropathy and Neuropathic Pain Measures in Patients With Cancer Receiving Taxanes and Platinums

Ellen M. Lavoie Smith, PhD, APRN-BC, AOCN®, Jeffrey A. Cohen, MD, Marjorie A. Pett, MStat, DSW, and Susan L. Beck, PhD, APRN, FAAN

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Purpose/Objectives: To assess the validity of neuropathy and neuropathic pain-measurement approaches.

Design: Cross-sectional measurement study.

Setting: Two comprehensive cancer centers in the northeastern United States.

Sample: 117 patients with cancer in an outpatient setting.

Methods: Participants were assessed using the five-component Total Neuropathy Score-reduced (TNSr), the TNSr short form (TNSr-SF), individual TNSr items, the Neuropathic Pain Scale for chemotherapy-induced neuropathy (NPS-CIN), and the National Cancer Institute's Common Toxicity Criteria™, version 3.0 (NCI-CTC).

Main Research Variables: Neuropathy and pain measure scores, cumulative and per M^2 chemotherapy dosage, comorbid risk factors, drug class, and the number of neurotoxic drugs received.

Findings: TNSr, TNSr-SF, and tendon reflex scores were greater in patients receiving higher cumulative (z range = –2.2 to –3.6; p range = 0.01 to < 0.001) and per M^2 (z range = –1.8 to –2.4; p range = 0.04 to < 0.001) chemotherapy doses. Scores from most neuropathy and pain measures were higher in patients with comorbid illnesses (z range = –1.79 to –3.51; p range = 0.03 to < 0.001). Sensory NCI-CTC scores were higher in patients receiving higher cumulative chemotherapy dosage (z = –2.1; p = 0.02). Only the sensory NCI-CTC correlated with other measures (r range = 0.22–0.63; p range = 0.05 to < 0.001).

Conclusions: Findings support the validity of the TNSr, TNSr-SF, tendon reflex item, NPS-CIN, and NCI-CTC sensory grading scale when measuring taxane and platinum-induced neuropathy. However, additional validity testing is warranted.

Implications for Nursing: Comprehensive neuropathy and pain measures mainly used by researchers and neurologists were simplified to more clinically useful tools for use by nurses when monitoring chemotherapy-induced peripheral neuropathy.

Chemotherapy-induced peripheral neuropathy (CIPN) is a common and distressing side effect experienced by patients receiving neurotoxic chemotherapeutic agents (Armstrong, Almadrones, & Gilbert, 2005; Bakitas, 2007; Sweeney, 2002; Visovsky, 2003; Wickham, 2007). Cumulative chemotherapy dosage, as well as preexisting neuropathy, are well-established CIPN risk factors (Hausheer, Schilsky, Bain, Berghorn, & Lieberman, 2006; Ocean & Vahdat, 2004; Verstappen, Heimans, Hoekman, & Postma, 2003). For example, neuropathy can occur in patients with diabetes, HIV infection, degenerative or familial neurologic disorders known to cause peripheral neuropathy, paraneoplastic neuropathy, alcohol abuse, vitamin B deficiency, and peripheral vascular disease (Hausheer et al., 2006). To minimize CIPN risk, administration of neurotoxic agents to patients with these conditions is avoided when possible. Severe CIPN symptoms can necessitate chemotherapy dose reductions, negatively affecting cancer treatment efficacy. In addition, CIPN-related neuropathic pain and adverse effects on functional status and quality of life (QOL) can extend well beyond the completion of chemotherapy treatment, leading to chronic suffering for many cancer survivors (Elderly Lung Cancer Vinorelbine Italian Study Group, 1999; Ostchega, Donohue, & Fox, 1988; Wampler et al., 2006). Despite these negative outcomes, research investigating new ways to prevent, minimize, or reverse established CIPN has been impeded because reliable and valid ways to measure CIPN have not been fully developed. Therefore, the purpose of this article is to report the findings of a research study designed to evaluate the validity of several CIPN measurement approaches.

Background

Comprehensive assessment of subjective and objective neurologic components, inclusive of tendon reflexes, strength, pin and vibration sensibility, and nerve conduction studies, is the gold standard approach to neuropathy evaluation (England et al., 2005). Quantification of neuropathy severity can be accomplished via use of composite instruments where individual neurologic