Asian Nursing Research 8 (2014) 36–41

Contents lists available at ScienceDirect

Asian Nursing Research

journal homepage: www.asian-nursingresearch.com

Research Article

Relationship between Quality of Life and Nurse-led Bedside Symptom Evaluations in Patients with Chemotherapy-induced Peripheral Neuropathy

Yang-Sook Yoo, RN, PhD,[1] Ok-Hee Cho, RN, PhD[2,*]

[1] College of Nursing, The Catholic University, Seoul, South Korea
[2] College of Nursing, Jeju National University, Jeju, South Korea

ARTICLE INFO

Article history:
Received 17 May 2013
Received in revised form
23 September 2013
Accepted 28 October 2013

Keywords:
neurotoxicity syndromes
quality of life
symptom assessment

SUMMARY

Purpose: This cross-sectional study aimed at determining the relationship between patient-reported quality of life (QOL) and nurse-led bedside evaluations of chemotherapy-induced peripheral neuropathy symptoms.
Methods: One hundred ninety-five patients treated at the oncology clinic at our institution were assessed using Functional Assessment of Cancer Therapy/Gynecologic Oncology Group–Neurotoxicity and nurse-led bedside examinations. The relationship between self-reported QOL and bedside examinations was evaluated using Spearman rank correlations.
Results: Scores of upper and lower extremity muscle strength based on the bedside examinations showed a weak negative correlation with the emotional well-being subscale of Functional Assessment of Cancer Therapy-General. Further, weak negative relationships were present between QOL and the following nurse-reported parameters: vibration perception in the hand, upper extremity muscle strength, touch and vibration perception in the feet, and tendon reflexes.
Conclusion: Collectively, our results indicate that nurse-led bedside evaluation is a noninvasive and useful method for detecting neurotoxicity and evaluating the patient's QOL both during and after treatment.

Introduction

Peripheral neuropathies are among the most frequently occurring and distressing adverse consequences of chemotherapy (Nurgalieva et al., 2010), and can be caused by chemotherapeutic agents such as taxanes, platinum compounds, and vinca alkaloids (Ocean & Vahdat, 2004; Visovsky, 2003). Previous reports have suggested that the incidence of chemotherapy-induced peripheral neuropathy (CIPN) ranges from 10% to 100%, depending on certain patient-specific factors and the specific drugs, doses, schedules, and measurement tools (Hershman et al., 2011; Tofthagen, McMillan, & Kip, 2011).

Although neuropathy affects the patient physically, functionally, and psychosocially (Nielsen & Brant, 2002), CIPN has been relatively neglected by physicians and nurses compared with other chemotherapy side effects. Moreover, physicians and nurses tend to underestimate and underreport the severity and frequency of CIPN symptoms compared to the patient reports, and underestimate the impact of the physical symptoms on the patient's quality of life (QOL) (Shimozuma et al., 2009). Importantly, patients may not acknowledge or report neuropathic symptoms for fear of missing out on an effective cancer treatment (Kaley & Deangelis, 2009).

Since the occurrence of CIPN can result in chemotherapy dose reductions, treatment delays, and treatment discontinuation (Visovsky, Collins, Abbott, Aschenbrenner, & Hart, 2007), CIPN monitoring should be routinely considered in everyday practice. However, useful tools for diagnosing and assessing toxic symptoms and clinical practice guidelines are lacking. Currently, patient-subjective symptoms, neurologic physical examination, nerve conduction velocity, vibration perception threshold, and electromyography are the major methods of measuring CIPN abnormalities in the clinical setting (Hershman et al., 2011). Unfortunately, the symptoms of neuropathies are diverse and patient-specific, making the condition difficult to diagnose accurately (Visovsky & Daly, 2004). Quantitative neurosensory testing results are less subject to recall bias and may play a role in further assessing and evaluating CIPN. However, these methods can be invasive and uncomfortable for patients and generally lack diagnostic value (Shimozuma et al., 2009).

* Correspondence to: Ok-Hee Cho, RN, PhD, College of Nursing, Jeju National University, 102 Jejudaehak-no, Jeju 690-756, South Korea.
E-mail address: ohcho@jejunu.ac.kr

1976-1317/$ – see front matter
http://dx.doi.org/10.1016/j.anr.2013.11.002

The total neuropathy score and the reduced versions are comprehensive composite tools used to assess both subjective and objective aspects of peripheral nerve function and have been tested in patients receiving neurotoxic chemotherapy. However, because the inclusion assessment must be performed and interpreted by a neurologist, these instruments are too complex for use by oncology nurses (Lavoie Smith, Cohen, Pett, & Beck, 2011). Nursing staff should be successfully employed in collecting toxicity data after adequate and specific training, as they are often better able to elicit such information from patients than the medical staff and are more accurate in describing any adverse effect of toxicity by grade (Cirillo et al., 2009). Nurses play an important role in the early detection and intervention of neurotoxicity, the success of treatment, and the patient's QOL both during and after treatment. To date, few studies have focused on the validity of bedside assessments by nursing staff for identifying CIPN symptoms.

This study aimed at determining the relationship between nurse-led bedside evaluation of CIPN symptoms and patient-reported QOL.

Methods

Setting and sample

All patients treated with at least one cycle of taxanes and/or platinum compound agents at the inpatient ward of the oncology clinic at Seoul St. Mary's Hospital in South Korea between October 2010 and February 2011 were considered eligible for the current study. Criteria for participants enrolled in the study were more than 18 years old, a histologically confirmed cancer, and a treatment plan that included neurotoxic chemotherapeutic agents or biotherapy. Patients with other comorbid conditions that could potentially cause CIPN, such as diabetes mellitus, cancers of the central nervous system, brain metastasis, uremia, spinal injuries, and alcoholism were excluded.

Potential participants were screened using a simple questionnaire to determine whether they had neuropathic symptoms (numbness, tingling, pain, or impaired sensory function in hands and/or feet, clumsiness in fingers, peripheral muscular weakness, or difficulties in walking). Of the 347 consecutive patients who met the eligibility criteria, 263 patients (76%) reported at least one of the neuropathic symptoms, while 84 patients (24%) did not report any. Of the 263 symptomatic patients, 16 patients refused to participate due to their poor condition. Thus, a total of 247 patients were assessed using the National Cancer Institute Common Toxicity Criteria (NCI CTC version 2) (Postma & Heimans, 2000). Of these 247 patients, 52 patients (21%) had a grade 0 neuropathy, and 195 patients (79%) had grade 1 or higher neuropathy (27% grade 1, 33% grade 2, and 19% grade 3). Patients with grade 1 or higher peripheral neuropathy were enrolled in the study. More detailed information with regard to disease, treatments, QOL, and symptoms was obtained from the 195 patients using questionnaires, medical chart review and a nurse-led bedside examination. Using G*Power 3.1.2 (Faul, Erdfelder, Buchner, & Lang, 2009) for power analysis, the power was .95 for the correlation analysis at a medium effect size of 0.30 and a significance level of .05. The sample size of 195 was satisfactory for identifying relationships between patient-reported QOL and symptoms assessed by nurse-led bedside examination.

The protocol was approved by the Ethics Committee of the Catholic University of Korea, and written informed consent was obtained from all participants before entering the study.

Ethical consideration

The content and the method of this study were approved by the institutional review board of the university.

Measurements

Demographic and clinical characteristics were collected using self-report measures and via medical chart review. QOL was assessed using the Functional Assessment of Cancer Therapy (FACT)/Gynecologic Oncology Group–Neurotoxicity questionnaire (Calhoun et al., 2003; Cella, 1997). The FACT-General (FACT-G), a 27-item self-report questionnaire, comprises subscales assessing physical well-being, social/family well-being, emotional well-being, and functional well-being. The neurotoxicity subscale (11 items) was designed to measure chemotherapy-induced neuropathy (Huang, Brady, Cella, & Fleming, 2007). Scores were calculated according to the Functional Assessment of Chronic Illness Therapy (FACIT) manual, with higher scores reflecting a better QOL. The Cronbach's alpha of internal consistency for FACT/Gynecologic Oncology Group–Neurotoxicity, FACT-G, and the neurotoxicity subscale was .85, .88, and .83, respectively.

Nurse-led bedside examinations were constructed with reference to the total neuropathy score, and included touch and vibration perception in the hands/feet, muscle strength of the upper/lower extremities, and tendon reflexes. All measures were feasible, noninvasive, and widely used in the clinical setting. The nurse-led bedside examinations were conducted by two oncology nurses (clinical experience of $>$ 5 years) trained in peripheral nerve function, CIPN symptoms, and assessment methods. Intra-rater reliability for all measures ranged between .90 and .95. All 7 assessments comprising the nurse-led bedside examinations were evaluated from 0 to 4, with a higher score indicating a worse neuropathy. A score of 0 indicated that the patient had no neuropathy-related impairment and a score of 4 indicated excruciating impairment.

Touch perception was determined based on pinprick perception in the hands and feet using a wooden cotton swab that had been broken to create a sharp tip. The scale was as follows: 0 = *normal*, 1 = *reduced in the fingers or toes*, 2 = *reduced up to the wrist or ankle*, 3 = *reduced up to the elbow or knee*, and 4 = *reduced to above the elbow or knee*.

Vibratory perception was assessed using a 128-Hz tuning fork and established techniques. Specifically, patients were asked to close their eyes while the vibrating tuning fork was systematically and sequentially applied to the dorsum of the interphalangeal joint of the great toe, medial malleolus, the mid-anterior lower leg, the patella, and the mid-anterior upper thigh. Vibratory perception in the fingertips, dorsum of the hand, wrist, forearm, and upper arm was assessed in the same sequential fashion. Patients were asked to describe whether they felt the vibration and/or to report when the vibration ceased. Diminished vibratory sensation was noted if the patient could not feel vibration at all, or if the examiner could feel vibration from the tuning fork for a longer period than the patient did. The vibratory perception scale was the same as that of the touch perception scale.

Muscle strength was assessed using the manual muscle test (Hough, Lieu, & Caldwell, 2011). The examiners screened and assessed muscle strength of the upper extremities (bilateral shoulder abduction, elbow flexion, & wrist extension) and the lower extremities (hip flexion, knee extension, & foot dorsiflexion). Muscle strength for upper/lower extremities was scored using the following scale with the medical research council equivalent enclosed in parentheses: 0 = *normal* (5), 1 = *mild weakness* (4), 2 = *moderate weakness* (3), 3 = *severe weakness* (2), and 4 = *paralysis* (0–1). If the patient would not or could not perform the test for an individual muscle group, no score was recorded, and data were indicated as missing. The muscle with the worse score was used as the strength score (Hough et al.).

Tendon reflexes were assessed using a Babinski reflex hammer. The examiners tested the Achilles tendon reflex. If this tendon