Impact of Cold Therapy on Paclitaxel-Induced Peripheral Neuropathy and Quality of Life in Patients With Breast Cancer

Mei-Ying Jue, BSN, RN, OCN®, Dipti Shah, MSN, RN, OCN®, Anne Scott Stiles, PhD, RN, and Tariq Nisar, MPH

BACKGROUND: Taxane drugs frequently produce peripheral neuropathy (PN). Cold therapy to hands and feet during chemotherapy has been effective in reducing PN.

OBJECTIVES: The purpose was to compare the frequency and severity of PN and quality of life in patients with breast cancer receiving cold therapy to their hands and feet versus standard of care during 12 weekly paclitaxel infusions with a follow-up at 16 weeks.

METHODS: Forty-eight female participants were consecutively recruited and randomized to treatment versus control groups. This randomized control trial used the Common Terminology Criteria for Adverse Events and the Functional Assessment of Cancer Therapy–Taxane questionnaires to collect data weekly for 12 weeks and at 16 weeks.

FINDINGS: A repeated-measures ordinal logistic model and binomial logistic model showed that patients on standard therapy were three times more likely to develop PN, with a progression toward severe PN, when compared to patients who were on cold therapy. There was no effect of treatment on quality of life.

KEYWORDS
cold therapy; cryotherapy; chemotherapy-induced peripheral neuropathy; quality of life

DIGITAL OBJECT IDENTIFIER
10.1188/22.CJON.93-99

Downloaded on 03-29-2024. Single-user license only. Copyright 2024 by the Oncology Nursing Society. For permission to post online, reprint, adapt, or reuse, please email pubpermissions@ons.org. ONS reserves all rights.

THROUGH RESEARCH, SCIENTISTS HAVE TRANSFORMED CANCER TREATMENTS in the past 20 years to develop more effective antiemetics, targeted therapies, and immunotherapies, and safer dose densities. However, anticancer drugs have expected side effects, of which chemotherapy-induced peripheral neuropathy (CIPN) is at the forefront because it can be a dose-limiting factor. The development of CIPN can cause pain and fine and gross motor disabilities that can lead to safety issues and reduced quality of life (QOL) (Griffiths et al., 2018; Sato et al., 2016). Taxane drugs, specifically paclitaxel, are known for causing a high rate of peripheral neuropathy (PN) (Chan et al., 2019; Peyton & Fischer-Cartlidge, 2019). Hanai et al. (2018) found that 81% of patients experienced tactile deterioration, with roughly one-third of patients reporting severe symptoms (Majithia et al., 2016). In addition, Chan et al. (2019) found that objective measures of sensory and motor PN were significantly worse in patients with breast cancer receiving paclitaxel compared to docetaxel. However, there was no difference in the subjective measures of PN between the two groups. Depending on the severity of the CIPN, the oncologist may opt to withhold or decrease the dose of paclitaxel, which may negatively change the cancer outcome, or continue with paclitaxel and risk increasing CIPN, thereby affecting QOL (Shigematsu et al., 2020). No potential neuroprotective agents are effective in preventing or treating CIPN (Sundar et al., 2017). Literature suggests that cold therapy is a safe prevention strategy to reduce the incidence and severity of CIPN (Peyton & Fischer-Cartlidge, 2019).

Background

Cold therapy, or cryotherapy, is based on the principle of hypothermia. Ross and Fischer-Cartlidge (2017) cited that scalp cooling reduced alopecia via induced vasoconstriction, thereby reducing metabolism in the hair follicle and decreasing the susceptibility of injury to the hair follicle by the chemotherapy agent. A similar pathophysiologic mechanism is likely responsible for chemotherapy-related nerve damage seen in PN. Increasing studies provide evidence of the efficacy of cold therapy in CIPN. In a systematic review, Peyton and Fischer-Cartlidge (2019) synthesized five studies on the use of cryotherapy for PN. They found that cold therapy resulted in a 5%–6% incidence of PN, and the control resulted in a 20%–32% incidence. However, cold