Original Article

Comparison Between Subjective And Objective Assessment Of Chemotherapy Induced Peripheral Neuropathy In Cancer Survivor: A Case Study

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Abstract

Chemotherapy-induced peripheral neuropathy (CIPN) affects 19-85% of individuals who have received neurotoxic chemotherapy. CIPN is generally assessed subjectively using patient self-report or clinician-reported questionnaires. The goal of this study was to use mTNS to objectively measure CIPN in patients, as well as to investigate the concordance between mTNS and subjective EORTC QLQ – CIPN 20 assessment. Patients getting chemotherapy for cancer were recruited at the hospital for this case study. We measured CIPN using subjective and objective methods, namely the EORTC QLQ – CIPN 20 and the modified total neuropathy score. The prevalence of patients with abnormal sensation was observed on mTNS and EORTC QLQ – CIPN 20 grading. The level of concordance between quantitative and subjective measures was poor. CIPN should be evaluated objectively as well as subjectively.

Keywords: chemotherapy-induced peripheral neuropathy, tuning fork.

INTRODUCTION

Chemotherapy-induced peripheral neuropathy (CIPN) is a group of neuromuscular symptoms, both sensory and motor in character, produced by nerve damage caused by the neurotoxic effects of chemotherapy medications used to treat cancer. (Park et al.2013; Visovsky, 2003). At least 30% of individuals who receive paclitaxel, docetaxel, or oxaliplatin are expected to develop chemotherapy-induced peripheral neuropathy. The characteristics of CIPN are determined by the chemotherapeutic drug utilized, as well as the timing and amount of the agent injected into the treatment regimen. (Airley, 2009).

CIPN symptoms can be immediate, mild, or severe, transitory, or chronic, depending on the treatment regimen and agent dose, and can show in a variety of ways, including sensory and motor symptoms (Park et al., 2013). Sensory signs and symptoms may include numbness, tingling, burning, discomfort, diminished sense of touch, vibration loss, and loss of proprioception. Weakness, balance problems, and trouble executing fine motor skills are all examples of motor symptoms. (kaplow, 2007)

Chemotherapy-induced peripheral neuropathy symptoms are most typically bilateral and symmetrical in nature. (wilkes et.al 2007). The impact of CIPN varies, and consequently patients are affected differently. Cumulatively, CIPN symptoms may impair a patient's ability to complete everyday activities. (Park et .al 2013) Chemotherapy medications are known to frequently inflict neurotoxic effects on the axons and cell bodies of dorsal root ganglion neurons, resulting in axonal damage, which is characterized by a decrease in intraepidermal nerve fiber density and terminal nerve degeneration. (Han & Smith, 2013)

Chemotherapy-induced peripheral neuropathy in cancer survivors can be challenging to characterise and monitor in patients due to variations in assessment. There is debate on the optimal approach to assess Chemotherapy-induced peripheral neuropathy, which is a major disease impairing the quality of life for many cancer survivors. (Ashraf and group, 2017)

The European Organisation of Research and Treatment of Cancer Quality of Life Questionnaire-CIPN twenty-item scale (EORTC QLQ – CIPN 20) and patient reported outcomes are used to measure symptoms of chemotherapy-induced peripheral neuropathy such as pain, numbness, and quality of life (Subjective Methods). However, pain evaluation might

vary widely depending on the patient's mental and physical state. As a contrary, objective assessment methods such as modified total neuropathy score (mTNS) are required.

CASE REPORT

The 57-year-old female patient had been diagnosed with recurrent carcinoma ovary and had undergone chemotherapy. Based on medical records, demographic and clinical data on body mass index (BMI), cancer stage and diagnosis, recurrence, and previous cancer therapy were obtained. Prior to beginning cancer therapy, the patient had a history of hypertension but no known history of diabetes mellitus, alcohol use, or nutritional / vitamin deficiencies, and neither reported neuropathy. Unless the patient had conflicting appointments or family obligations, he was seen once a week. When first visited in the oncology department, the patient described walking on rocks/sand, being unable to move as far as they previously did, and experiencing increased pain at night with difficulties falling asleep. At the initial evaluation, Patient assessed the pain as 10/10 on average.

The patient was examined and evaluated for general range of motion (ROM), muscle strength, and gait abnormalities. The feet were assessed for light versus deep touch sensations, joint mobility, and discomfort to palpation. Based on the International Classification of Functioning, Disability, and Health (ICF) model, current levels of function and dysfunction were reported.

METHODOLOGY

For self-reported disability (subjective method) patient filled out The European Organisation of Research and Treatment of Cancer Quality of Life Questionnaire-CIPN twenty-item scale (EORTC QLQ – CIPN 20) that assesses the severity of neuropathy symptoms experienced by patients. It comprises three domains: sensory (nine items), motor (eight items), and autonomic (three items) subscales. With a 4-point Likert scale (1 = not at all, 2 = a little, Support Care Cancer 3 = quite a bit, and 4 = very much), patient will rate their symptoms during the past week. Sensory scale scores range from 1 to 36, motor scale scores range from 1 to 32, and autonomic scale scores range from 1 to 12 for men and 1–8 for women (erect dysfunction item excluded). All items are linearly converted to a 0–100 scale with higher scores indicative of more symptoms.

For objective assessment method modified total neuropathy score (mTNS) was used. It is a 6 -item tool that combines patient report of subjective sensory and motor symptoms, deep tendon reflexes, manual muscle testing of distal muscles, pin sensibility and quantitative vibration thresholds using a 128 Hz tuning fork. 0 -24 points, higher score indicates worse neuropathy.

RESULT

An objective evaluation showed substantial impairment manifested as gradual loss of sensation linked with both touch and vibration. In mTNS, the patient received a score of 15. SWM testing considerably enhanced the touch detection thresholds at all three test sites, and the vibration perception time during assessment was significantly shorter than at baseline.

Subjective assessment scores lies in range of 45 and also having abnormal sensation by mTNS were regarded as normal by EORTC QLQ – CIPN 20.

DISCUSSION

The mTNS and EORTC QLQ – CIPN 20 were used to measure the degree of congruence between objective and subjective evaluations. In both measures, the prevalence of patient experiencing aberrant sensations was nearly comparable. Decrease in Sensations linked with both touch and vibration are caused by A-beta sensory afferent fibres and are perceived through the activation of cutaneous mechanoreceptors such as the Merkel and Meissner corpuscles. Chemotherapeutic drugs destroy these receptors. As a result, our patient's sensory deficiencies could be the outcome of chemical-induced neurotoxicity.

There are few correlations and concordances between objective and subjective evaluation. Clinicians should perform both measures for symptoms screening in order to gain a better understanding of the patient's condition.

CONCLUSION

Correlation coefficients and concordance rates between quantitative and subjective ratings were both poor. As a result, CIPN should be evaluated quantitatively as well as subjectively.

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