Chemobrain

A pilot study exploring the severity and onset of chemotherapy-related cognitive impairment

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BACKGROUND: Chemotherapy-related cognitive impairment refers to a cluster of symptoms commonly referred to as "chemobrain". To date, nursing literature on the progression of and tools used to evaluate chemobrain is limited.

OBJECTIVES: The purpose of this pilot study was to explore the onset of chemobrain in patients who recently began chemotherapy treatment, as well as those who have been receiving chemotherapy for an extended period of time.

METHODS: This prospective, nonrandomized, observational pilot feasibility study used the General Practitioner Assessment of Cognition and the Trail Making Test Parts A and B to examine chemotherapy-related cognitive impairment symptoms in patients undergoing chemotherapy treatment.

FINDINGS: Paired t tests showed a significant difference in scores on the Trail Making Test Part A from baseline to eight months ($p < 0.05$) and in scores on the Trail Making Test Part B from four to eight months ($p < 0.05$). The mixed results suggest that the Trail Making Test Parts A and B may not be effective for testing chemotherapy-related cognitive impairment in patients.

KEYWORDS
chemotherapy; cognitive impairment; oncology; symptom management

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CHEMOTHERAPY-RELATED COGNITIVE IMPAIRMENT, commonly referred to as "chemobrain," occurs in as many as 75% of patients receiving chemotherapy treatment (Asher & Myers, 2015; Bompaire, Durand, Léger-Hardy, Psimaras, & Ricard, 2017). Chemobrain describes a cluster of symptoms related to the cognitive issues experienced by some patients undergoing chemotherapy treatment (Natori, Ogata, & Yamauchi, 2015; Orchard, Gaudier-Diaz, Weinhold, & Courtney DeVries, 2017; Selamat, Loh, Mackenzie, & Vardy, 2014; Wang et al., 2015). Additional studies on the symptoms of chemobrain during specific time points throughout chemotherapy treatment can better determine its prevalence, onset, and trajectory. This prospective, nonrandomized, observational pilot feasibility study examined the onset of chemotherapy-related cognitive impairment symptoms in patients, and assessed the cognitive function of patients at specific time points during the course of chemotherapy treatment.

Background

Although the mechanisms of action of neurotoxicity from chemotherapies are not well known, chemotherapeutics often cause peripheral neuropathies in patients receiving treatment (Beaver & Magnan, 2016; Eaby-Sandy & Lynch, 2014; National Cancer Institute, 2018). Findings from a preclinical research study have indicated that a decrease in neurogenesis can lead to diminished or delayed recall ability, as well as deficits in memory formation (Gondi et al., 2014).

According to a study by Moore (2014), chemobrain refers to a patient's inability to problem solve, lack of concentration, fogginess, difficulty finding the right words, forgetfulness, and loss of memory following chemotherapy treatment. Previous studies have focused on cognitive impairment in patients receiving chemotherapy treatment for breast cancer, such as taxanes (Jansen, Cooper, Dodd, & Miaskowski, 2011; Moore, 2014). Studies suggest that neurotoxicity and proinflammatory cytokine pathways are involved in cognitive impairment (Vitali et al., 2017; Wang et al., 2015). Although the mechanism of action of chemobrain has been previously studied, little is known about short- and long-term effects of chemobrain on patients, and research has indicated that cognitive impairment may reduce overall quality of life (Utne et al., 2018). Older age, dosage amounts, and the type of chemotherapy being administered can also affect cognition and functional decline (Natori et al., 2015; Wang et al., 2015). In addition, the results of a study by Patel, Hurria, and Mandelblatt (2014) suggest that chemobrain is more pronounced

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