Early Detection of Taxane-Induced Neuropathy in Women with Breast Cancer

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Abstract:

Background: Chemotherapy-induced peripheral neuropathy (CIPN) is a common, dose-limiting side-effect of cancer treatment that affects breast cancer survivors (BCS). CIPN is especially common among BCS receiving the chemotherapy drug paclitaxel (Taxol®), which leads to CIPN in as many as 80% of BCS during treatment. Early detection is critical to managing CIPN effectively, but current assessment tools are not sensitive enough to identify CIPN before symptoms begin. Recently, researchers have developed a highly sensitive method for identifying diabetic neuropathy that may be effective for identifying CIPN. The method involves using a heat probe to stimulate tiny nerve endings in the skin, causing them to dilate nearby blood vessels to which they are attached (axon-mediated vasodilation). This increase in axon-mediated blood flow can then be measured using one of several FDA-approved imagers in order to identify neuropathy.

Purpose: To determine if axon-mediated vasodilation can be used to identify CIPN in BCS receiving paclitaxel.

Methods: Design: Prospective, longitudinal. Sample: 20 BCS receiving weekly paclitaxel & 20 age/race-matched healthy controls (HCs). Data for the six week study will be collected at three time points: 1) prior to starting paclitaxel (baseline), 2) two weeks later, and 3) and four weeks after that. Setting: BCS will be evaluated at one of two participating cancer centers; HCs will be evaluated at a research center in downtown Indianapolis. Procedure: During the first 15 minutes, researchers will assess CIPN using a validated subjective measure. Next, we will attach the heat probe and blood flow imager to the right great toe, and heat the skin for 20 minutes, measuring the increase in axon-mediated blood flow during and after skin heating.

Implications for Practice: Earlier detection of CIPN in BCS receiving paclitaxel has the potential to improve outcomes for patients receiving paclitaxel and accelerate the search for treatments for CIPN.