

Marshall TF, Zipp GP, Battaglia F, Moss R, Bryan S. Chemotherapy-induced-peripheral neuropathy, gait and fall risk in older adults following cancer treatment. *Journal of Cancer Research and Practice*. 2017; 4: 134-138.

OVERVIEW AND METHODS:

Chemotherapy-Induced-peripheral-neuropathy (CIPN) is known to result from the nerve damage caused by the neurotoxic effects of chemotherapy. CIPN Symptoms may manifest in sensory and motor symptoms. Normal gait requires an intact somatosensory system and abnormalities in gait parameters may increase the risks of falling. Since older people are at risk for falls and 60% of people > 60 will be diagnosed with cancer, the combined effect of aging and cancer related neuropathy producing greater need to identify falls risk in order to prevent fall injuries. Exactly which gait parameters are affected by chemotherapy is the focus of this study.

The authors investigated how the presence of CIPN affected gait parameters and fall risk in breast and colon cancer patients who completed chemotherapy for cancer. They studied 2 groups of 8 participants each who were between 50 and 70 years of age who had a histologically confirmed stage 2-3 breast or colorectal cancer diagnosis and who also had a confirmed treatment plan consisting of taxane-based or oxaliplatin-based chemotherapy. Differences in spatiotemporal gait parameters were assessed using the TUG test and the GAITRite system. The independent variable was the presence of CIPN. There were multiple dependent variables including the TUG score and the spatiotemporal gait parameters obtained from the GAITRite system.

FINDINGS:

Mean TUG time was significantly different between the control group and the CIPN group (12.33 sec versus 6.62 sec).

Spatial temporal gait parameters of gait speed (velocity), step time, swing time, single support time, double support time, and HH base support (cm) were measured.

Only gait velocity and step length were significantly different between the 2 groups.

Gait velocity of those with CIPN was significantly slower.

Mean step length was significantly shorter in the CIPN group.

The mean TUG score in the CIPN group was not only significantly greater but was above the clinical fall risk cut off of 10.7 sec indicating fall risk.

LIMITATIONS OF STUDY:

The presence of CIPN was confirmed using the Common Terminology Criteria for Adverse Events (CTCAE) version 4.0. This method does not quantify the extent of damage to peripheral nerves or specify

the type of nerve fibers affected. Furthermore, the time of onset of CIPN was not quantified and therefore it cannot be known whether the gait changes observed were due to compensatory behaviors developed due to loss of sensor input caused by CIPN. Also, the decreased gait velocities observed may not only be due to the neurotoxic effect of the chemotherapy agents but due to the presence of pain. Lastly the physical health of the individual was not quantified. If these subjects had a general decrease in physical conditioning since their cancer diagnosis, the gait changes identified may not be related to the presence of CIPN but rather to this reduction in physical activity level.

FUTURE RESEARCH:

It is recommended that additional research studies be completed with larger sample sizes. Additionally, little is known about the specific gait impairments that are caused by CIPN and how or if they contribute to increased fall risk. The researchers recommend use of Maximum Step Length (MSL) test in future research since it can assess both dynamic balance and leg strength and may indicate increased fall risk. Future studies should also look at Physical Therapy interventions in this population and their effects on falls risk, gait speed, and step length. (ie. Can step length be altered with PT interventions with a resultant improvement in falls risk?)

COMMENTS:

Very interesting study looking specifically at gait parameters affected by CIPN and the relationship to falls risk in elderly patients who have undergone treatment for cancer. I look forward to further discussion on which outcomes measures can help us better identify fall risk in our cancer patients and facilitate PT's providing interventions designed to reduce fall risk before these patients are injured in a fall.