

The effect of photobiomodulation on chemotherapy-induced peripheral neuropathy: A randomized, sham-controlled clinical trial

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Background. Chemotherapy-induced peripheral neuropathy (CIPN) is a common side effect of cancer therapy with few efficacious treatments.

Methods. We enrolled 70 patients with CIPN in a randomized, double-blinded, sham-controlled, cross-over trial to determine if photobiomodulation (PBM) ± physiotherapy reduced the symptoms of neuropathy compared to sham treatment. At the conclusion of follow-up, sham-arm patients could cross-over into a third arm combining PBM and physiotherapy to determine if multimodal treatment had additive effects. Treatment included 30 minute sessions 3-times weekly for 6 weeks using either PBM or sham therapy. Neuropathy was assessed using the modified total neuropathy score (mTNS) at initiation and 4, 8, and 16 weeks after initiating treatment.

Results. Sham-treated patients experienced no significant change in mTNS scores at any point during the primary analysis. PBM patients experienced significant reduction in mTNS scores at all time points. Mean changes in mTNS score (and corresponding percent drop from baseline) for sham and PBM-group patients respectively were -0.1 (-0.7%) and -4.2 (-32.4%) at 4 weeks ($p < 0.001$), 0.2 (0.0%) and -6.8 (-52.6%) at 8 weeks ($p < 0.001$), and 0.0 (0.1%) and -5.0 (-38.8%) at 16 weeks ($p < 0.001$). Patients who crossed over into the PBM/PT-group experienced similar results to those treated primarily; changes in mTNS score from baseline were -5.5 (-40.6%) 4 weeks ($p < 0.001$), -6.9 (-50.9%) at 8 weeks ($p < 0.001$), and -4.9 (-35.9%) at 16 weeks ($p < 0.001$). The addition of physiotherapy did not improve outcomes over PBM alone.

Conclusion and relevance. Among patients with CIPN, PBM produced significant reduction in neuropathy symptoms.

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