Neuropathy arises from damage to the peripheral nerves. Within the peripheral nervous system, the motor axons (nerve fibers) are large and myelinated, and the sensory and autonomic axons are more susceptible to damage. Neuropathies (e.g., PND, carpal tunnel syndrome, diabetic neuropathy, metabolic neuropathy).

These include:
- Dose-dependent
- Onset after administration of chemotherapy, which may be progressive, rapid, or “coasting”
- Predominantly sensory symptoms (especially pain), both in frequency and severity, rather than motor symptoms and regeneration
- Typical patterns of sensory loss (the so-called stocking-glove distribution), which is caused by the denervation of the smallest and longest nerve fibers

Several studies have shown that LLEL has modulatory effects on inflammatory markers (PGE, TNF, IL-1β), and may help to reduce tissue inflammation and pain.

**PATIENTS AND METHODS**

Paediatric patients experienced diagnosed with cancer between the ages of 18 and 60 years with symptoms of peripheral neuropathy had chart reviewed. There were no ECOG performance status < 2 and patients underwent with LLEL therapy. Relevant data was collected from all patients who underwent with LLEL therapy. All relevant data was collected from all patients who underwent the LLEL treatment. This included demographic data, cancer type, and treatment details.

**RESULTS**

A total of 52 adults were treated with the LLEL. Some patients suffered from progressive symptoms due to ongoing chemotherapy. There were different grades of severity with the majority grade A. At each visit, the visual analog scale was scored on a scale of 1 to 10 by the patients. At the end of each treatment, all patients rated the laser therapy as a successful treatment. As Figure 2 shows, 32 patients reported improvement of CIPN symptoms within 1-4 treatments, others within a single week.

As Figure 3 shows, the majority of patients with CIPN were breast cancer patients on taxane-based regimens. Additionally, 77% of 42 patients were on a taxane-based chemotherapy regimen.

**DISCUSSION**

Because CTCAs delivers an integrated patient centered model of care, all patients received complimentary medical interventions including massage, acupuncture, nutritional supplementation, pranayama meditation, relaxation therapy, patient education, nutrition, and occupational health. We found there was consistency with patient comprehension and integration of care at the time of chemotherapy infusion and for the first time in the history of this study, we can utilize our neurophysiologic tests such as electromyography, nerve conduction studies, and quantitative sensory tests to further examine peripheral nerve function. Laboratory tests to look for metabolic disturbances and nutritional deficiencies and imaging tests to look for other possible causes of nerve damage. We had three providers administering the laser therapy.

**CONCLUSIONS**

The three main effects applicable to LLEL are: 1) to induce analgesic effect, 2) an anti-inflammatory impact, and 3) a faster second healing. Based on these properties and results of other studies, it can be concluded that in the present time the GaAlAs diode laser add could be in managing CIPN. However, it is a small sample size and a more extended study would be helpful to further confirm this promising result.

**FUTURE DIRECTION**

A couple of sites could help increase the strength of a future study. 1) Assigning patients randomly and in an active laser group or a placebo laser group (control group). 2) Use of analgesic adjuncts and analgesic medications in samples, like local anesthetics and integrative therapies could be delivered, should be used for all patients for at least four weeks before starting and during the study to deliver the laser therapy as part of a comprehensive cancer care strategy of care delivered. 4) Preclinical design addressing standardized parameters to be transported to clinical trials.

**REFERENCES**