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Acupuncture Therapy For The Treatment Of Chemotherapy-Induced Peripheral Neuropathy (CIPN) and Chronic Pain: A Case Report

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Abstract

Background: This case report describes a patient using acupuncture to manage chemotherapy-induced neuropathic pain (CIPN). Acupuncture helped relieve pain in the saphenous nerves of both legs radiating from his ankles, around both knees and up to the groin. Clinical and preclinical studies on the safety and efficacy of acupuncture and electroacupuncture for CIPN-informed treatment.

Clinical Case: A 67-year-old male was diagnosed with human papillomavirus-tonsil cancer in 2011. After chemotherapy, peripheral neuropathy and neuralgia began to affect his toes and legs. The patient sought acupuncture when no pharmaceuticals provided relief. During his initial treatment sessions, assessments were made to determine his constitutional type, the Chinese medicine pattern of disharmony he was presenting, and a treatment plan for his care. The Pain Quality Assessment Scale and Neuropathic Pain Scale (NPS) were the main assessment tools used to determine the tangible effectiveness of his acupuncture treatments. His mood, affect, outlook on life, and behavioral changes were also monitored. This study highlights eight 60-90-minute acupuncture and electroacupuncture treatments over two months for this patient. Using the Neuropathic Pain Scale (NPS) and Pain Quality Assessment Scale (PQAS), the patient reported having reduced pain in his legs and knees after two months of treatment.

Keywords: peripheral neuropathy, chemotherapy, acupuncture, neuralgia

she now sees the near limitlessness of traditional medicine. Jennifer's treatment philosophy is cultivating the body's own qi to enhance its healing ability. She provides acupuncture, herbal medicine, qigong, nutrition, and healing presence practices to help her patients along their wellness journeys. She resides in Leonardtown, MD, with her husband and young daughter.

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Introduction

Chemotherapy-induced peripheral neuropathy (CIPN) is a common side effect of patients undergoing chemotherapy treatment for various cancers. Because nerves of the peripheral nervous system have less protective myelination and lack a blood-brain barrier, chemotherapeutics damage peripheral nerves rather than affecting the central nervous system. The pathophysiological pathways involved in CIPN may include mitochondrial impairment, imbalance in redox homeostasis, inflammation, uncontrolled apoptosis, and nerve degeneration (Tsai et al., 2021).

Patients with CIPN report symptoms such as cold sensitivity, pain, loss of reflexes, problems with gait and balance, and paresthesia (Visovsky, 2012). Currently, there are not enough effective treatments for CIPN (Klafke et al., 2023). Conventional treatment mainly addresses pain relief with analgesics, antidepressants, and antiepileptics such as duloxetine, gabapentin, or amitriptyline. These medications can cause side effects such as dizziness, brain fog, and loss of focus and concentration.

Approximately 40% of patients will develop CIPN after receiving certain neurotoxic chemotherapies. Most patients have a complete resolution within six months; however, 30% of survivors will still suffer from cisplatin-induced CIPN (Prinsloo et al., 2017). CIPN can arise from damage to the dorsal root ganglion neurons or axons during treatment with commonly used platinum-containing compounds such as cisplatin, carboplatin, and oxaliplatin. Chronic pain syndrome is a significant long-term side effect of chemotherapy agents (Staff et al., 2017). In one study, long-term morbidity in the form of persistent neuropathy was found in 47% of cancer survivors six years after therapy was complete.

Case Description

The patient was a 67-year-old male. He suffered from severe saphenous neuralgia and peripheral neuropathy. The pain was characterized as constant, sharp, and tender with palpation. The pain extended from his medial ankle to his groin and was very severe with even gentle palpation. The patient's pain arose after seven cisplatin chemotherapy and 35 radiation treatments for HPV-tonsillar cancer approximately 12 years before (2011). Five years later, he had both knees replaced, which exacerbated the nerve pain in his legs. He had

visited a chronic pain specialist, was prescribed gabapentin, and began a series of radiofrequency (RF) therapies, nerve blocks, and steroids. These only provided intermittent pain relief, if any. He also tried a very effective topical cream containing gabapentin, ketoprofen, lidocaine, and prilocaine. However, his insurance company did not cover its high cost, and he could not continue its use.

Secondarily, he had pain near the cervical and base of the spine, and numbness and tingling in his feet and toes. Before beginning acupuncture, he had been self-medicating with alcohol and medical cannabis. He also tried 30mg of duloxetine (Cymbalta) at the same time as the course of acupuncture; however, he immediately stopped taking it after three days because he experienced side effects including dizziness, blurred vision, elevated severity in headaches, and unfocused thinking.

Diagnosis

The law of five elements describes energetic capacities that create transformation and are observable in nature, including individuals. In the Su Wen classic Chinese text, the correspondences of each element led to the constitutional five element theory. An individual's constitutional element was observed and diagnosed by determining their color (green, red, yellow, white, or black), sound (shouting, laughing, singing, weeping, groaning), odor (putrid, scorched, fragrant, pungent, rancid) and emotion (anger, joy, sympathy, grief, fear), each corresponding to one element: wood, fire, earth, metal, and water, respectively.

From observing the patient's personality, affect, and five element assessment, he was diagnosed as having a wood constitution. He had a loud, direct, booming voice (shout) and a tall, muscular build. He was a retired volunteer firefighter and used to run a hectic snow-plowing business. Moreover, he had worked in a high-stress (anger) environment for 30 years. Because of his stressful job, he had suffered from gastroesophageal reflux disease (GERD) and high blood pressure. Once he left the position, the GERD subsided.

Traditional Chinese medicine (TCM) diagnoses could be based on an eight-principle assessment: whether the condition was interior or exterior, hot or cold, deficient or excess, and yin or yang. Based on the eight principles, this patient had an interior heat and excess condition. Although his pulses were not rapid, they were full, often tight, and forceful. His tongue was red with

little to no coating and had a long crack down the center to the tip. He used to drink moderately in the evenings to help ease the pain experienced after exerting himself during the day. After many of his initial acupuncture treatments, he would experience vertex and temporal headaches.

The pain assessment tools used for this patient were the Neuropathic Pain Scale (NPS) and Pain Quality Assessment Scale (PQAS), an extended version of the NPS. The PQAS provided descriptive questions pertaining to the nature of the pain. It helped the practitioner understand what type of pain was present and how the patient perceived it. This type of assessment was valid diagnostically for TCM practitioners who wanted to treat pain based on the eight principles. The NPS provided a baseline for the pain levels and qualities.

Some challenges in TCM-based research studies pertained to peripheral neuropathy treatment. It remained challenging to compare complementary medicine, such as acupuncture, with the principles of evidence-based medicine. Specific practitioner training, knowledge, theory, acupoint selection, depth, and action of needle insertion, and treatment protocols needed to be standardized between studies, making it challenging to use research studies as guides in clinical practice. Some research stated that CIPN resulted from Spleen deficiency, qi deficiency, toxicity, stagnation, dampness, and Kidney deficiency (Tsai et al., 2021). While this might have been true, differential diagnosis was necessary with every patient. In this case, the patient's Chinese medicine diagnosis was Liver yang rising, Liver qi stagnation, yin deficiency, and internal heat. The patient also exhibited disharmony in the Jue Yin and Shao Yin meridian systems.

Treatments and Outcomes

The treatment plan overall included manual acupuncture, electroacupuncture (EA), moxibustion, bloodletting, cupping, wet cupping, and gua sha.

One-inch, 25mm gauge, DBC Spring Ten acupuncture needles were used, with each needle insertion aimed to elicit de qi. Liver and Xin Bao meridian points were sedated and retained for 20 minutes. Urinary Bladder meridian points were tonified and retained for 20 minutes. The patient had reported his right shoulder was tight and painful after lifting objects at home. Therefore, ashi Gall Bladder points on the neck were needled and gua sha performed on his back and shoulders. The amount of sha was significant on the upper back behind the shoulder blades and the lower edge of the trapezius muscles. Two

locations on the upper back with significant pain were bled and cupped, producing very dark (stagnant) blood.

During our intake at treatment #5, the patient revealed that he went to a hematologist and oncologist for an assessment and treatment plan for hyperferritinemia. The doctor requested the patient refrain from alcohol before being assessed. After doing so for 12 days, he noticed a significant reduction in headaches and slight pain in his legs. He also mentioned that he had to discontinue taking 30mg of Cymbalta (he took it for three days) because it caused headaches to return, along with blurred vision, dizziness, and unfocused thinking.

After treatment #8, he had a severe stomach virus that kept him at home and in bed for nearly five days; after it resolved, his pain lessened. During the last treatment, he talked about his brother, to whom he no longer speaks, and all of the upset his brother has caused him and his family. It is possible that opening up about his sibling relationship also provided him some relief. His pain and Liver disharmony are closely related to overwork and emotional upset or unresolved frustration. Because of his digestive history, another pattern of disharmony, Liver overacting on Spleen was considered.

Tx #	Treatment Principles	Points Used	Treatment Outcome
1-3	Sedate Liver, clear Heat, and harmonize Jue Yin	Yintang, Liver ear point, DU20, PC6, LI11, LI4, LR8, SP6, LR2, LR3, BL23, BL24, DU4, DU3	The patient experienced pain relief in both saphenous nerves from his ankles, around both knees to the groin.
	Target dermatomes corresponding to areas of pain	Electrostimulation at 5 Hz, continuous milliamperage; 10 minutes - BL25, BL26	
4	Sedate the Liver, clear heat, and harmonize Jue Yin	Treatment 1 repeated	The patient reported severe vertex headaches after treatment #2.
		GB25 bilaterally sedated, LR13 on the R side (selected d/t sensitivity on palpation) sedated and retained for 20 minutes	
5	Treat the patient's cold, tingling feet	Liver ear point, Yintang, GB25, LR13, LI4, LR3, SP6	No report form patient
6	Sedate the Liver, clear heat, and harmonize Jue Yin	Yintang, LI4, ear points Shenmen and Liver, PC5, SJ5, LR2, LR3, LR7, LR9, GB20, GB21, DU20; gua sha on upper back; wet cupping on ashi points on back	No report from patient
7	Sedate the Liver, clear heat, and harmonize Jue Yin	Yintang, Liver ear point, LR14, 8, 3, 2, LI4 all sedated	Effective. From the patient, "This past week was much better."
8	Sedate the Liver, clear heat, and harmonize Jue Yin	Treatment 1 repeated	PQAS (1-10 with 10 being worst). Pain reduced from 8-9/10 to 6-7/10.

Table 1. Acupuncture treatments, points, and outcomes

Patient Reported Outcome Measures:
The patient completed the Pain Quality Assessment Scale (1-10 with 10 being the worst). His pain score was reduced from 8-9 out of 10 to 6-7 out of 10. He also felt less deep and surface pain. Pain qualities were dull, sensitive, tender, sharp, and radiating. Getting up from a seated position resulted in aching knee pain. He also described the pain as better than usual and rated the unpleasant and bothersome level as 5 out of 10. He reported having positive energy and could do housework without fatigue and pain. His pain relief continued for several days, and he was able to exercise on a stationary bike for 25 minutes.

After treatment #7, he reported that he was on a boat and working a lot, and his knees felt it. Five out of the seven days, the saphenous and knee pain was not as bad, but his knees hurt severely within that time. He felt the most pain when moving from a sitting to standing position.

Research with Clinical Implications:
Two electroacupuncture animal studies for cancer pain report used points ST36 (Zusanli) and GB30 (Huantiao) to treat cancer-induced pain in the legs of mice and rats. One study stimulated GB30 (Huantiao) at 10 Hz for five consecutive days for 30 minutes and found alleviation of bone cancer pain, at least in part by suppressing dynorphin expression. The other study stimulated ST36 (Zusanli) at 2 Hz for 30 minutes for nine consecutive days and found decreased substance P and increased beta-endorphin. These studies supported the clinical use of electroacupuncture in treating cancer pain. For this case, electroacupuncture was utilized to help alleviate cancer-related pain through similar physiological pathways.

In a recent study to assess the efficacy of acupuncture on CIPN, patients experienced a technique of moving the needle back and forth upon insertion and removal (Molassiotis et al., 2019). This technique was adopted for the patient in this case. Several studies (Molassiotis et al., 2019; Huang et al., 2021) report using LI4 (Hegu), LI11 (Qichi), ST36 (Zusanli), PC6 (Neiguan), and SP6 (Sanyinjiao) to treat CIPN. These points were also utilized in this case. Although the patient's stopping alcohol consumption may have eased comorbidities, in one study that looked at risk factors of CIPN in cancer survivors, alcohol consumption and smoking were not associated with increased CIPN risk (Trendowski et al., 2021). However, in an animal study, researchers found that mild hepatic impairment aggravates chemotherapy-induced peripheral neuropathy after oxaliplatin treatment (Miyamoto et al., 2022). In a prospective observational study, alcohol consumption was a risk factor for CIPN in patients receiving taxane- and platinum-based chemotherapy; however, the sample size for this population was small and was only significant when assessment scales were combined.

In this case, the patient exhibited Liver disharmonies such as headaches, pain along the channel, digestive upset, and dizziness. Therefore, most of his treatments focused on harmonizing the Liver.

Herbal Recommendations:
Several herbal remedies, such as Ji Sheng Shen Qi Wan and Huangqi Guizhi Wuwu decoction, are indicated for diabetic neuropathy and recommended in

the literature for CIPN (Tsai et al., 2021). Single herbs such as ginkgo biloba can help with peripheral and cerebral circulation. Many clinical trials have been performed using *Cannabis sativa* and have found positive effects on central and peripheral neuropathic pain with different forms of application. These studies found that cannabinoid CB2 receptors may be therapeutic targets in treating CIPN (Schröder et al., 2013). The patient was also in the care of a Chinese herbal practitioner.

Discussion and Conclusion

Although some patients find relief soon after their cancer treatments, others suffer from chronic neuropathy and resulting peripheral pain as a common side effect. Analgesics are often prescribed for pain. Gabapentin, a pharmaceutical drug that is supposed to reduce the excitability of nerve cells, has harmful side effects and, in newer studies, has failed to reduce CIPN (Quintão et al., 2019; Rao et al., 2007; Scarborough & Smith, 2018). Safe, effective pharmaceutical therapies for CIPN are still an unmet clinical need (Quintão et al., 2019). Some complementary therapies, such as mind-body practices, nutritional supplements, specific herbal medications, and acupuncture, have been studied and hold some promise for CIPN patients (Brami et al., 2016). Acupuncture can significantly reduce CIPN, increase quality of life, enhance nerve conduction, and help nerve repair by increasing blood flow to the limbs (Tsai et al., 2021).

One limitation of this study was the inability to assess the patient's pain soon after his chemotherapy treatments with the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-CIPN 20- or 30-item scale . Either version of the scale would have provided evidence of the effects of CIPN on quality of life.

Although the patient benefited significantly from his first few treatments, addressing lifestyle modifications, such as encouraging adequate time to rest between treatments and tracking these changes, could have helped make the subsequent treatments more effective.

In a recent review and meta-analysis, acupuncture positively affected the recovery of nerve conduction velocity and improved pain in 19 randomized clinical trials (Jin et al., 2020). In one study, 14 out of 16 patients reported that acupuncture treatment improved their CIPN symptoms; seven patients received at least two additional benefits: better sleep, less stress, lowered

medication, or improved mood. Recent studies and case reports such as this one shine a new light on CIPN and the possibility for acupuncture to be utilized by patients as a primary or secondary therapy.

Patient Perspective

"I have found Jennifer to be extremely thorough and caring. She continues to offer very helpful advice in addition to her treatments. We continue to develop a positive course of treatment and lifestyle adjustments, keeping me able to function & have a better quality of life."

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Disclosure Statement

The author reported no conflicts of interest.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report, and a copy of the written consent is on file with the author.

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