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Case Report
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A Combination of Lumbar Sympathetic Nerve Blockade and Pulsed Radiofrequency in Chronic Central Neuropathic Pain - A Case Report

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Abstract

Background: Lumbar sympathetic nerve block and Pulsed Radiofrequency (PRF) are rarely performed in Chronic Central Neuropathic Pain (CCNP). We present a combination of bilateral lumbar sympathetic nerve block and ultrasound guided PRF in the management of spinal cord injury related CCNP that was refractory to medical and physical therapy.

Case Report: A female (60 to 70 years old) presented to our pain clinic with severe bilateral electrical and burning leg pain diffusely from her hip to toes, covering both volar and dorsal aspects of the limbs along with sensitivity to touch. She described her pain as 10/10 disrupted her functional ability despite taking high dose painkillers. We performed, first, bilateral lumbar sympathetic nerve block at L3 that led to complete pain relief of 0/10 of the proximal limbs from her back to the distal thigh after three months; then, ultrasound guided PRF of bilateral sciatic nerves at the popliteal fossa that yielded a significant reduction in pain of her lower legs, with a severity of 4/10 and sensitivity to touch. In addition, improvement in function and sleep along with a significant reduction in painkiller dosage earned patient high satisfaction.

Conclusion: Lumbar sympathetic nerve blockade can be a therapeutic option for spinal cord injury related chronic central neuropathic pain. And subsequently PRF can be effectively applied primarily to the peripheral nervous system as the second stage of the management of SCI associated central neuropathic pain.

Keywords: Sympathetic nerve block; Pulsed radiofrequency; Chronic pain; Central neuropathic pain

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Introduction

Chronic Central Neuropathic Pain (CCNP) attributed to Spinal Cord Injury (SCI), brain injury, post stroke pain, and Multiple Sclerosis (MS) is a devastating type of secondary chronic pain which, along with Chronic Peripheral Neuropathic Pain (CPNP) including peripheral nerve injury, painful polyneuropathy, post-herpetic neuralgia, and painful radiculopathy, falls under Chronic Neuropathic Pain (CNP) [1]. Pharmacologic therapeutic options include tricyclic antidepressants, serotonin-norepinephrine reuptake inhibitors, and gabapentin as first line treatments followed by weak (e.g., tramadol) and strong opioids (e.g., morphine and oxycodone) [2]. The medication refractory CNP are treated with non-pharmacological treatment including interventional therapies (e.g., sympathetic nerve/ganglion block, epidural steroid injection, peripheral nerve blockade), physical therapies (e.g., Transcutaneous Electrical Nerve Stimulation (TENS)), and psychological therapies (Cognitive Behavioral Therapy (CBT)) [2]. Minimally invasive interventional procedures such as sympathetic nerve blockade/neurolysis/neuro-ablation, Transforaminal Epidural Steroid Injection (TFESI), and Pulsed Radiofrequency (PRF) have been introduced recently for the management of chronic neurological pain including CCNP.

We present a rarely performed minimally invasive intervention of bilateral lumbar sympathetic nerve block at L3 and subsequently ultrasound guided PRF of bilateral sciatic nerves at the popliteal fossa in SCI related CCNP that was refractory to medical and physical therapy.

Case Presentation

In February 2021, a female (60 to 70 years old) was referred to the Pain Clinic (Toronto, Ontario) for severe, persistent bilateral leg pain after a remote anterior spinal cord infarct 8 years ago. After her SCI she had a full recovery of her motor and sensory function but had severe bilateral burning leg pain diffusely from her hip to toes, covering both volar and dorsal aspect of the limbs. She described her pain as 10/10 constant electrical and burning pain throughout that was worse at night. In addition, her skin was extremely sensitive to touch. The pain disrupted her functional ability to ambulate, perform physical exercise, and sleep. She denied any major weakness, sensory loss, muscle movements, cramps or tremors which were concordant with the findings on physical examination. Her current sensory and motor examination did not show any neurological deficits. She did not have any allodynia on examination, but she did have diffuse hyperalgesia to pin prick in bilateral lower extremities. In the past she had trialed a few analgesics, including gabapentin (30000 mg/d to 32000 mg/d) and duloxetine (60 mg/d) without significant pain relief. The diagnosis of CCNP secondary to SCI likely involving small fiber mediated pain was made. At this time bilateral L3 lumbar sympathetic block under fluoroscopic guidance was performed with each side receiving a total of solution injected (Figure 1).

In 3 month follow up the patient reported complete pain relief of 0/10 of the proximal limbs from her back to the distal thigh. She still had residual burning pain of the lower legs at an intensity of 7/10. She had functional improvements of increased ambulation duration and improved sleep. She was able to reduce her gabapentin dose to 1500 mg/d. Physical examination revealed bilateral hyperalgesia to pin prick diffusely over her lower leg and feet. Subsequently, ultrasound guided bilateral sciatic nerve pulsed radiofrequency simulation at the popliteal fossa was performed. Procedure details: 20 g 3.5-inch needle 45V 42°C 2 Hz 10 ms for 2 min bilaterally.

In 3 month follow up after this procedure she had significant pain relief of her lower legs, with a severity of 4/10 and reduced sensitivity to touch. At this time, approximately 6 months after her bilateral lumbar sympathetic block, her proximal leg pain continued to be tolerable, with a severity of 3/10.

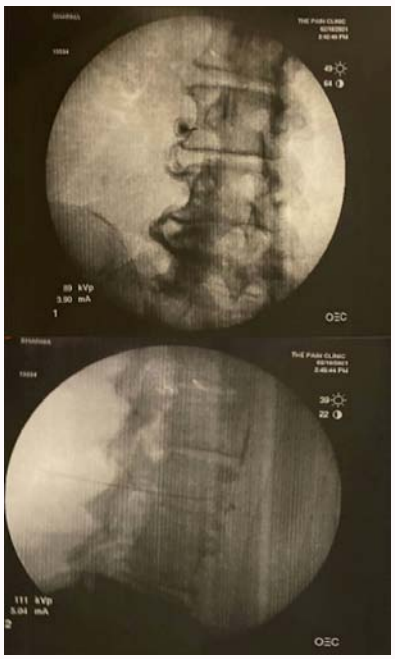

Figure 1: Lumbar sympathetic chain block.

Discussion

The current findings highlights that the multimodal and multistage approach, including targeting both the autonomic and somatic pain systems with sympathetic blocks and pulsed radiofrequency in the SCI related CCNP, which has been barely studied, can lead to lasting significant pain reduction.

Generally, there is no robust or sufficient evidence to support the efficacy of non-pharmacological treatment in SCI-related CCNP [2]. Sympathetic nerve or ganglion management (including blockade, neurolysis, or ablation) with medication, neurolytic modalities, and radiofrequency ablation have been used in CNP mainly in PCNP, including pain associated with herpes zoster, post-herpetic neuralgia, diabetic peripheral neuropathy, and complex regional pain syndrome [3,4]. With SCI-related CCNP, other modalities including spinal cord stimulation, intrathecal medication delivery, deep brain stimulation, and dorsal root entry zone lesion have been commonly investigated in literature. The level of evidence for this has been low and the recommendation for its use is inconclusive [4]. However, this case report supports the individualized approach can make the seldom- or non-studied interventional options in the SCI-associated CCNP, i.e., sympathetic nerve block, available and useful.

Systematic reviews and meta-analyses have yielded that PRF can lead to decreased pain, improved function, and quality of life, and reduced oral medication use in Post-Herpetic Neuralgia (PHN) [5], trigeminal neuralgia [6], knee osteoarthritis [7], perineal pain after delivery [8], while non-effective in radicular pain [5]. Merely, one case report was found presenting the efficacy of PRF on a refractory complex regional pain syndrome due to sciatic neuropathy with a disabling pain in the unilateral lower leg and foot [9].

The current finding shows that bilateral lumbar sympathetic blockade can reduce SCI-related CCNP within the proximal bilateral lower limbs. Then with the residual bilateral lower leg neuropathic pain, PRF of the sciatic nerve bilaterally was able to reduce the unresolved pain and hyperalgesia.

This case spotlight that individualized, multimodal, minimally invasive interventions for CCNP can be safe and effective in achieving high quality of pain control, and, ultimately, improve patient function and quality of life and earn patient satisfaction. Lumbar sympathetic nerve blockade can be a therapeutic option for spinal cord injury related chronic central neuropathic pain and, subsequently, PRF can be effectively applied primarily to the peripheral nerve system as the second stage of the management of SCI associated central neuropathic pain.

Statement of Authorship

SK: Generated idea, collected data, drafted, edited, and critically appraised the manuscript.

MP: Collected data, edited, and critically appraised the manuscript.

AS: Generated idea, collected data, drafted, edited, and critically appraised the manuscript.

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