PAIN MEDICINE CASE REPORTS

ISSN 2768-5152

Volume 10, Number 6, pp. 539-543

Cervical Facet Interventions in a Patient with a Spinal Cord Stimulator for Chronic Headache and Neck Pain: A Case Report

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Background: Cervical spinal cord stimulation (SCS) has been used in selected patients with refractory headaches and neuropathic painpain; however, evidence supporting its use specifically for cervicogenic headache remains limited. Overlapping conditions like cervicalgia, fibromyalgia, and inflammatory arthritis can result in persistent nonneuropathic pain that SCS may not adequately address.

Case Report: We present the case of a 40-year-old woman with a history of cervicalgia, fibromyalgia, chronic myofascial pain, and inflammatory polyarthritis who underwent a cervical SCS placement with 2 leads ending at C2 for chronic headaches and neck pain. While the SCS provided excellent headache relief, the axial neck and trapezius facet joint pain persisted despite device optimization, medication management, pain psychology, and physical therapy.

Conclusions: Fluoroscopically guided cervical medial branch blocks provided immediate and clinically meaningful symptomatic relief through 1-month follow-up. This case highlights the potential role of cervical medial branch blocks in patients with persistent facet-mediated pain despite an otherwise successful SCS response.

Key words: Cervical facet joint pain; spinal cord stimulation; chronic neck pain; cervicogenic headache; interventional pain management

BACKGROUND

Cervical spinal cord stimulation (SCS) has been used in selected patients with refractory headache disorders and neuropathic pain; however, evidence supporting its use specifically for cervicogenic headache remains limited (1,2). However, overlapping conditions like cervicalgia, fibromyalgia, and inflammatory arthritis can result in persistent nonneuropathic pain that SCS may not adequately address (3-5). Cervical facet joint pain is a frequent contributor to axial neck and shoulder symptoms and may benefit from targeted intervention even in the setting of prior neuromodulation (6,7).

CASE REPORT

A 40-year-old woman with a complex pain history, including cervicalgia, fibromyalgia, chronic myofascial pain, and inflammatory polyarthritis, presented with persistent axial neck pain and shoulder pain despite undergoing cervical SCS implantation with 2 leads and tips ending at C2. The SCS was implanted primarily for

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Disclaimer: There was no external funding in the preparation of this manuscript.
Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.
Patient consent for publication: Consent obtained directly from patient(s).
This case report adheres to CARE Guidelines and the CARE Checklist has been provided to the journal editor.
Accepted: 2026-03-05, Published: 2026-08-31

chronic headaches and neuropathic pain complaints rather than isolated axial neck pain.

She was under the care of a rheumatologist and prescribed gabapentin 600 mg twice daily, baclofen 10 mg 3 times daily, and diclofenac gel. Conservative management, in addition to pain psychology and physical therapy, failed to improve symptoms.

Cervical SCS with 2 implanted leads terminating at C2 provided excellent relief of headaches (reduction from 9/10 to 2/10 per the Numeric Rating Scale in intensity), but the pain in the neck and trapezius region remained at 8/10. Examination revealed positive bilateral axial loading, localized tenderness around the C5–C7 vertebrae, and no neurologic deficits.

Computed tomography imaging demonstrated straightening of cervical lordosis, mild disc space narrowing at C5–C6 with moderate bilateral neural foraminal narrowing, and 2 octad SCS leads with tips at C2. There was no evidence of disc herniation or cervical radiculopathy identified.

Fluoroscopically guided diagnostic cervical medial branch nerve blocks were performed at C3–C5 bilaterally after the SCS was turned off. SCS dual lead placement terminating at C2 was indicated on a high cervical AP view with fluoroscopy (Fig. 1). A 22-gauge, 3.5-inch spinal needle was used to inject 0.5 mL of 0.5% bupivacaine at each level after negative aspiration for blood or cerebrospinal fluid. Bilateral cervical facet joint needle placement along the articular pillars was confirmed on a lateral view with fluoroscopy in Figs. 2 and 3. Lead spread and lateral needle approach were appropriately visible prior to the injection of bupivacaine, as seen on an anteroposterior view with fluoroscopy in Figs. 4 and 5. The procedure was well tolerated.

Outcome

The patient reported immediate pain reduction from 8/10 to 1/10 within 24 hours. At the patient's 1-month follow-up, she continued to report significant improvement with better sleep, improved activity tolerance, and reduced analgesic dependence.

DISCUSSION

This case illustrates persistent cervical facet joint axial pain despite successful cervical SCS implantation. Inflammatory polyarthritis and fibromyalgia likely contributed to this complex presentation. Positive axial loading and localized facet tenderness, in conjunction with imaging, supported the diagnosis. The patient experienced significant relief after fluoroscopically guided cervical branch blocks, supporting facet-mediated pain as a contributor to her symptoms and illustrating the potential value of this adjunctive intervention.

Per the American Society of Interventional Pain Physicians (ASIPP) guidelines, there is level II evidence for diagnostic accuracy of facet joint nerve blocks in the cervical region, with moderate strength of recommendation for cervical spine regions (8). Common indications for diagnostic facet joint blocks include, but are not limited to: somatic or nonradicular neck pain, moderate to severe pain causing functional disability, and clinical assessment that implicates facet joints as the source of pain based on axial pain and paravertebral or facet joint tenderness with absence of radicular pain.

Medial branch blocks (MBBs) are frequently classified as diagnostic secondary to their short pharmacologic duration of the local anesthetics used; however, studies and a systematic review by Manchikanti et al (9-11) have demonstrated that both cervical and lumbar medial branch nerve blocks can produce analgesia for up to weeks, which is well beyond the expected half-lives of the anesthetics. Prolonged analgesia after bupivacaine and lidocaine injections has been indicated in controlled comparative block studies, upholding a chronic pain model in which, rather than being a discordant finding, sustained analgesia is an expected clinical response. Systematic reviews have further expounded on therapeutic MBBs as an effective management tool for chronic axial spinal pain across the cervical, thoracic, and lumbar regions. Furthermore, there is evidence for effective long-lasting analgesia when these blocks are used as part of a structured treatment protocol.

The mechanism underlying prolonged analgesia following medial branch blocks remains incompletely understood. Prolonged analgesic benefit following cervical medial branch blocks has been reported beyond the expected pharmacologic duration of local anesthetics, with proposed mechanisms including prolonged neural conduction blockade, reduction in neural inflammation, and reversal of peripheral or central sensitization (12). Local anesthetics may also exert antinociceptive effects beyond voltage-gated sodium-channel blockade through suppression of inflammatory processes and modulation of inhibitory and excitatory neurotransmission, although the clinical contribution of these mechanisms to prolonged relief following medial branch blocks remains uncertain (13,14). Clinical studies have demonstrated that

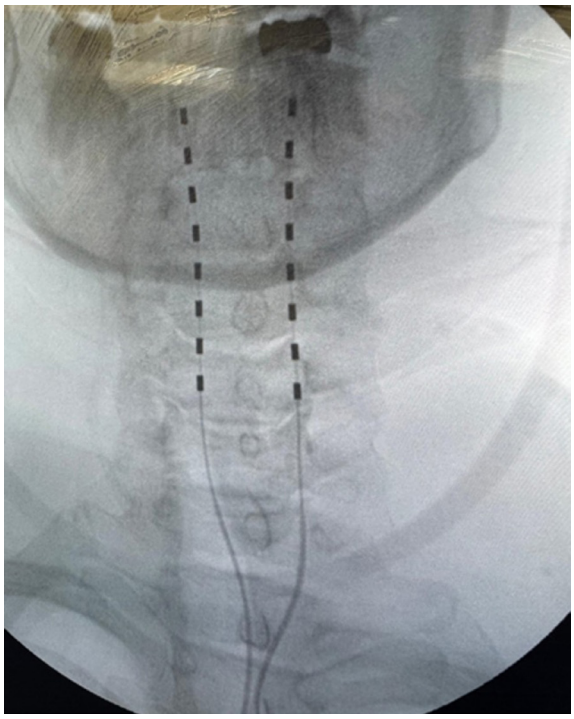

Fig. 1. High cervical AP view of dual lead placement terminating at C2.

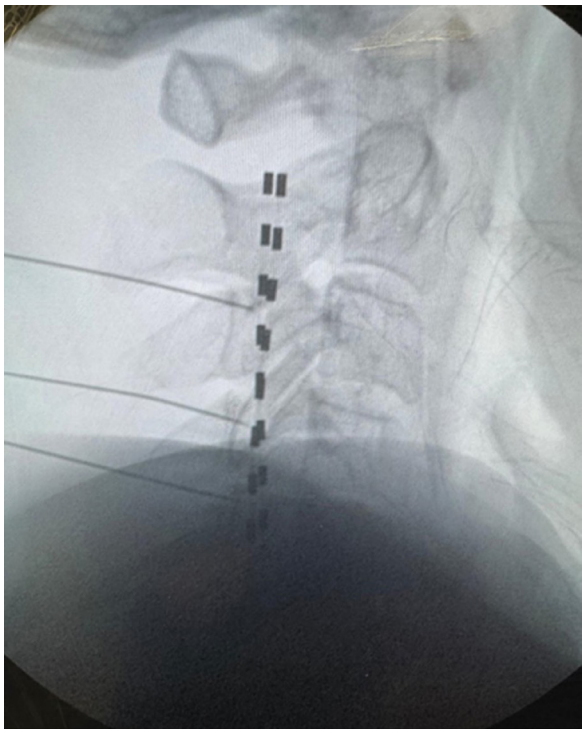

Fig. 2. Lateral fluoroscopic view of cervical facet joint needle placement at C3–C5.

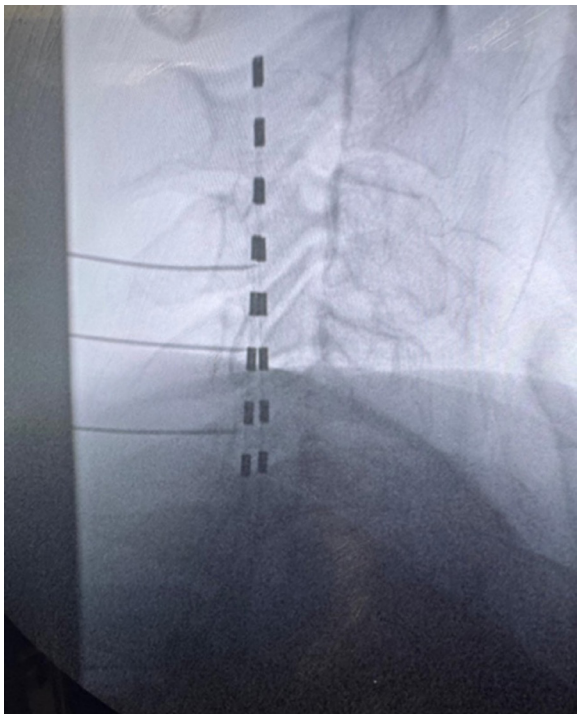

Fig. 3. Final lateral view confirming bilateral needle positioning along the articular pillars.

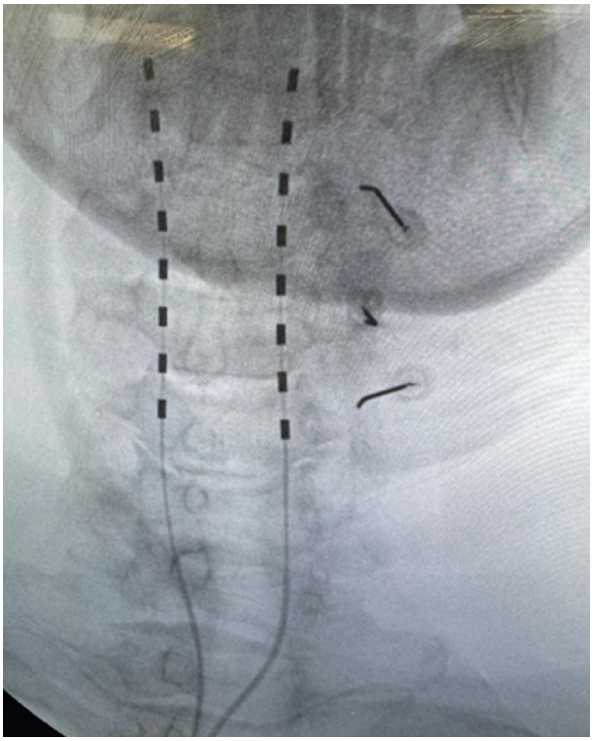

Fig. 4. Anteroposterior fluoroscopic view showing cervical spinal cord stimulator leads.

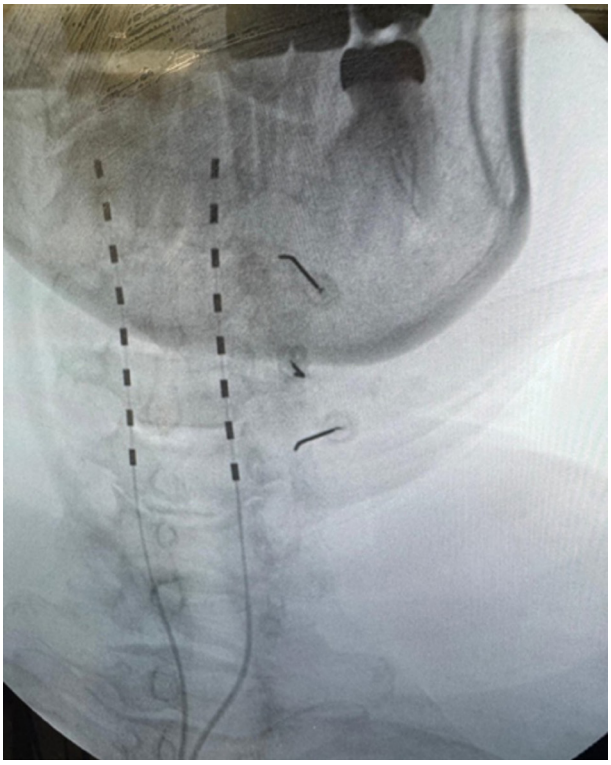

Fig. 5. AP fluoroscopic image with clear visibility of lead spread and lateral needle approach.

analgesia following cervical medial branch blocks may persist substantially longer than the expected duration of the local anesthetic (9-12). Repeated cervical medial branch blocks have also been associated with sustained pain relief in selected patients with chronic facet-mediated neck pain, although the evidence for long-term therapeutic benefit has methodological limitations (12).

Although the SCS was turned off in this case, it may not be necessary for diagnostic nerve blocks and is typically only turned off for radiofrequency ablation, which does carry some procedural risks. Additionally, current Medicare Local Coverage Determinations generally require a second confirmatory diagnostic facet procedure before initial RFA and describe RFA as the primary treatment goal after successful diagnostic blocks. Therapeutic facet injections may be covered in selected circumstances when the patient is not a candidate for RFA, including in some policies when an implanted electrical device is present. Medicaid and commercial-payer requirements should be verified under the applicable plan (15).

The spread of local anesthetics like bupivacaine from cervical medial branch nerve blocks to nearby spinal nerves may result in weakness or numbness that can last several hours. This epidural spread can also result in incomplete analgesia as it is impeded by fibrosis surrounding the SCS electrodes in the epidural space. In patients with SCS, neuraxial blocks should be performed using a local anesthetic under fluoroscopic guidance and strict sterile techniques to minimize the risk of lead damage or infection (16).

Whether the cervical MBB diagnostic injection can progress to cervical RFA due to the proximity of the SCS leads is debated. The RFA generates heat, and theoretically, the electromagnetic field can interfere with the function, induce current and heating, and damage the SCS device. This electromagnetic interference has been noted to cause a malfunction in the SCS, as seen in the spontaneous activation of a cervical SCS in a patient who received RFA of the third occipital nerve (17). There is a paucity of robust, high-quality medical literature addressing the safety and efficacy of RFA for axial spine pain when the SCS leads are in close proximity or at the same segmental levels of injection (18,19). RFA has been previously shown to be safely used in patients with a deep brain stimulator; a lumbar medial branch RFA has been used in two separate patients with preexisting deep brain stimulators without any adverse sequela (20,21). Furthermore, spine RFA procedures have also been performed in patients with cardiac implantable electrical devices (22). In both settings, RFA is feasible, provided that precautions and risk mitigation strategies are understood and applied. An implanted SCS is not an absolute contraindication to RFA. Because radiofrequency energy may cause electromagnetic interference or device malfunction, RFA should be considered on an individual basis with device-specific precautions and risk-mitigation strategies, including attention to the location of the leads and pulse generator, use of manufacturer guidance, and post-procedure confirmation of device function (18,19).

CONCLUSIONS

In patients with a partial response to cervical SCS, particularly when coexisting musculoskeletal or inflammatory conditions suggest facet-mediated pain, cervical medial branch blocks may provide additional symptomatic benefit. Progression to cervical RFA in patients with implanted SCS systems should be individualized using device-specific risk-mitigation strategies. This case supports a multimodal approach to evaluation and interventional management.

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