



Technical Notes

Success of lateral cervical spinal cord stimulation for the treatment of chronic neuropathic refractory pain

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Received : 24 August 2021

Accepted : 25 January 2022

Published : 11 February 2022

DOI

10.25259/SNI_853_2021

Quick Response Code:



ABSTRACT

Background: Spinal cord stimulation (SCS) is traditionally performed by implanting surgical leads along the midline of the spinal cord, over the dorsal columns. Here, we present a patient who successfully underwent lateral cervical SCS to treat chronic refractory neuropathic pain.

Methods: A 46-year-old female, with a schwannoma involving the right axillary nerve, presented with a chronic refractory right upper extremity pain syndrome. The tumor was located between the fibers of the teres minor and the posterior deltoid, and measured 2.2 cm in diameter. After 8 months of analgesics, opioids, physiotherapy, and acupuncture, the patient underwent surgery; however, the tumor was unresectable (i.e., due to significant adjacent vascular/neural structures). Three months later, she had a midline C6-C7 laminectomy for placement of a right-sided epidural SCS lead (i.e., containing 16 electrode contacts).

Results: Within 4 days following this SCS procedure, the patient's pain completely resolved; at 10 postoperative months, she still remains pain free.

Conclusion: Lateral SCS at the C6-C7 level provided a safe and effective option for the relief of chronic neuropathic pain attributed to an unresectable schwannoma of the right axillary nerve in a 46-year-old female.

Keywords: Epidural lead, Lateral spinal cord, Neurostimulation, Schwannoma, Spinal cord stimulation

INTRODUCTION

Spinal cord stimulation (SCS) is widely used to treat chronic neuropathic pain.^[3,4] Here, we placed a lateral epidural C6-C7 SCS (i.e., containing 16 electrode contacts) in a patient with intractable neuropathic pain attributed to an unresectable right-sided schwannoma of the axillary nerve.

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MATERIALS AND METHODS

A 46-year-old female with a schwannoma of the right axillary nerve (i.e., between the fibers of the teres minor and posterior deltoid muscles; it measured 2.2 cm in diameter) presented with chronic refractory pain in the upper right limb. The tumor was located in the right axillary nerve [Figure 1]. After 8 months of unsuccessful pain management therapy (i.e., analgesics, opioids, physiotherapy, and acupuncture), the patient underwent an attempted tumor resection; however, the lesion was unresectable (i.e., due to critical adjacent vascular/neural structures). Three months later, with 9/10 pain on the visual analog scale (VAS) and despite opioids, the patient successfully underwent a C6-C7 laminectomy for the placement of a right lateral SCS. The 16-electrode lead was then routinely connected to the internal pulse generator and placed into a left paramedian lumbar incision [Figures 2 and 3].

RESULTS

The postoperative MR confirmed the appropriate positioning of the surgical lead at the C6-C7 level in the right lateral epidural space [Figure 3]. Neurostimulation system was turned on 2 days after surgery; programming settings included a frequency of 130 Hz, pulse width of 100 microseconds, and amplitude of 1.8 mA. Four days postoperatively, the patient had complete resolution of pain

(0/10 on the VAS) without any surgical complications. Ten months later, the patient still remained pain free.

DISCUSSION

SCS is traditionally performed by the insertion of a surgical lead along the posterior midline of the spinal cord, over the dorsal columns.^[4] Recently, the lateral placement of these devices in the cervical spine proved a promising alternative to the routine midline approach. Here, we placed the 16-electrode SCS lead to the right of the midline at the C6-C7 level to treat this 46-year-old female's chronic pain attributed to an axillary nerve schwannoma.

Efficacy of lateral spinal cord stimulation

Lateral SCS is an effective treatment for neuropathic pain. Although dorsal root ganglion (DRG) stimulation is also an effective treatment for these pain syndrome,^[2,4,5,7] we maintain that lateral SCS is safer (i.e., leads in DRG stimulation are implanted through percutaneous punctures

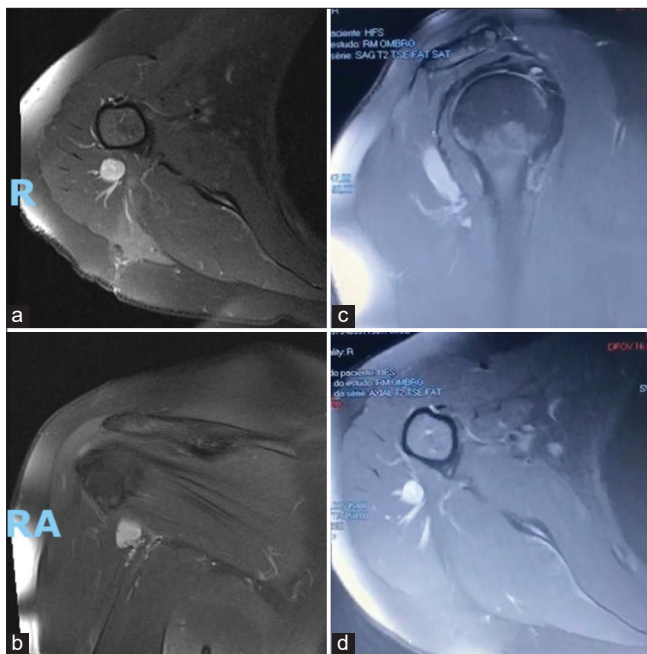


Figure 1: Magnetic resonance imaging showing a schwannoma of the right axillary nerve, between the fibers of the teres minor muscle and the posterior deltoid, with a measure of 2.2 cm in its widest axis (a, b: T1-weighted imaging; c, d: T2-weighted imaging).

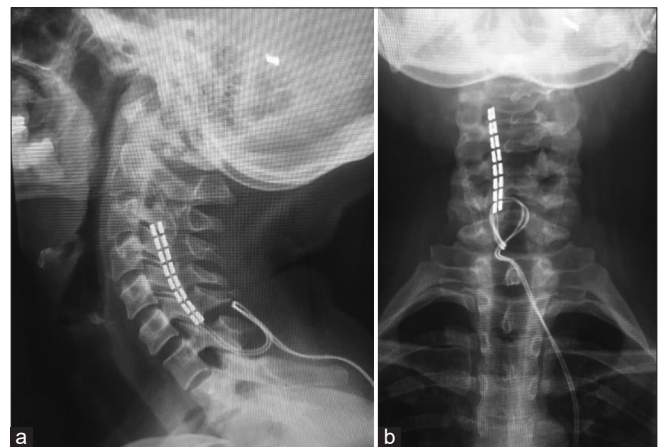


Figure 2: Cervical radiography showing surgical lead position in the lateral epidural space (a: lateral projection; b: anteroposterior projection).

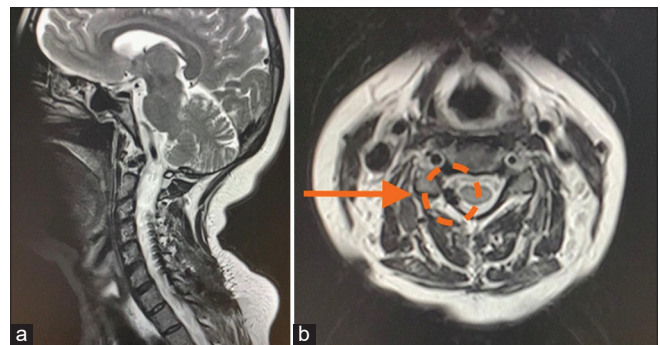


Figure 3: Magnetic resonance imaging showing lead position in the lateral epidural space. The circle and arrow highlight the appropriate positioning of the surgical lead over the lateral spinal cord (a: sagittal plane; b: axial plane).

Table 1: Literature on lateral placement of epidural spinal cord stimulators.

	Study design	Pain syndrome	No. of patients	Outcome	Time of follow-up
Chandrasekaran <i>et al.</i>	Case series	Upper limb amputation	4	Stimulation evoked somatosensory percepts that were perceived as emanating from the missing limb	29 days
Lynch <i>et al.</i>	Case report	Postherpetic neuralgia	1	50% pain reduction in 7 days and 20% reduction after 6 months, without pain medication	6 months
Garg <i>et al.</i>	Case report	Complex regional pain syndrome	1	> 70% pain reduction	1 week

with accompanying morbidities). In this case, the right-sided C6-C7 epidural lead was placed under direct visualization without perioperative morbidity. Additional studies have also confirmed the safety/efficacy of placing lateral epidural SCS electrodes to treat chronic pain syndromes [Table 1]. Chandrasekaran *et al.* reported somatosensory restoration after placing epidural lateral spinal cord stimulators in patients following upper limb amputations [Table 1].^[1] Lateral SCS epidural stimulation of the C2 DRG has also successfully managed cases of postherpetic neuralgia.^[8] Further, Garg *et al.* used lateral SCS to effectively target complex regional pain syndromes.^[6]

CONCLUSION

Lateral cervical epidural SCS proved to be an effective and safe treatment for managing chronic neuropathic pain in a 46-year-old female with an unresectable schwannoma of the right axillary nerve.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

Paulo Henrique Pires de Aguiar and Paulo Roberto Franceschini have received speaker honorarium from Medtronic. Other authors declare that they have no conflict of interest.

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How to cite this article: Caiado-Vencio R, Raffa PE, Lopes BM, Cobucci FL, Vieira RV, Franceschini PR, *et al.* Success of lateral cervical spinal cord stimulation for the treatment of chronic neuropathic refractory pain. *Surg Neurol Int* 2022;13:52.