

Neurostimulation of the L2 Dorsal Root Ganglion for Intractable Disc Pain: Description of a Novel Technique

Robert E. Wright, M.D., Julie W. Colliton, M.D.

Keywords: Neurostimulation, L2 ganglion, Disc pain

Purpose

This abstract describes a new technique of neurostimulation potentially valuable in the minimally invasive treatment of discogenic lumbar spine pain. Based on the pioneering work of Nakamura [1, 2] a technique was developed to stimulate the L2 ganglion in the hopes of modulating lumbar disc pain. The technique and initial case are presented.

Materials and Methods

The initial patient was referred with symptoms consistent with pain of disc origin. Distribution of pain was >50% axial. MRI demonstrated multilevel disc degeneration without focal disc herniation or foraminal stenosis. Bilateral L2 ganglion block was performed under fluoroscopy with confirmatory neurogram using ½ cc of ¾% marcaine. Pain relief during periods of attempted pain provocation (sitting, flexion, valsalva) was rated as >80% for 4-6 hours. Discography with manometry demonstrated two (2) level concordant pain reproduction at pressures <50 psi. The pressure tolerance doubled following highly selective L2 ganglion block. The patient was then consented for L23 transforaminal trial of percutaneous spinal cord stimulation. The patient selected the L2 stimulation technique after discussion of the relative risk of central canal stimulation versus proximal peripheral nerve stimulation. A retrograde approach to the epidural space at L12 was performed. An ANS octrode was then passed out the contralateral L23 foramen. Stimulation was accomplished sequentially from distal to proximal along the course of the root. A guarded cathode configuration was used with high frequency stimulation. Excellent paresthesia coverage was elicited into the ipsilateral low back and flank. A second octrode was passed out the opposite foramen. After a seven (7) day trial the patient requested permanent implantation.

Results

8 months have elapsed since implantation. The patient is averaging 14 hours of stimulation daily. Average VAS score have dropped from 8/10 to 2.5/10. Narcotic analgesics were discontinued on a routine basis. Patient returned to work increasing her functional capacity from light to low medium capacity. The patient feels that the procedure met expectations, she would undergo the procedure again for similar results

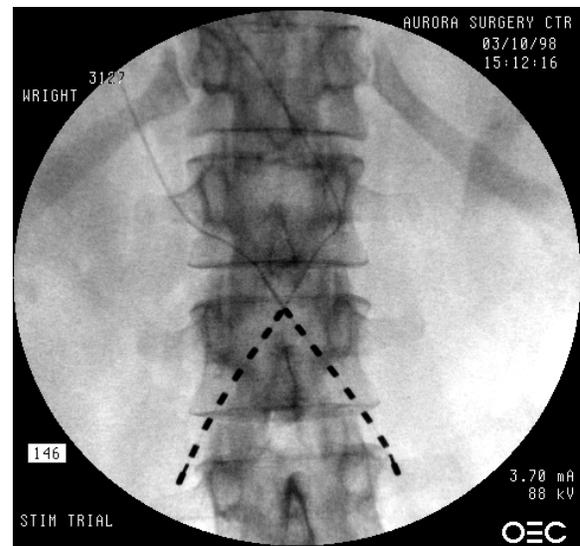
Discussion

Pain arising from the lumbar disc is common and may be severe and disabling. Treatment options, particularly for multilevel disease, are limited. Conventional conservative treatment for disc pain may include spinal cord stimulation. [3] Current techniques of spinal cord

stimulation for low back pain target the dorsal columns at T8-T10. It is difficult to consistently achieve adequate paresthesia coverage and pain relief in the low back. [4, 5] Nakamura has demonstrated that sympathetic fibers carrying afferent nociception from the lower lumbar discs pass through the L2 ganglion. This neural convergence provides a target for modulation of discogenic spine pain.

Conclusions

L2 ganglion stimulation can generate a paresthesia into the low back capturing topography not easily covered with conventional central spinal cord stimulation. Paresthesia coverage is associated with analgesia in the presented case. These results are consistent with Nakamura's model of the afferent pathways of discogenic low back pain.



1. Nakamura, S.I., et al., *The afferent pathways of discogenic low-back pain. Evaluation of L2 spinal nerve infiltration.* J Bone Joint Surg Br, 1996. **78**(4): p. 606-12.
2. Nakamura, S., et al., *Origin of nerves supplying the posterior portion of lumbar intervertebral discs in rats [see comments].* Spine, 1996. **21**(8): p. 917-24.
3. Turner, J.A., J.D. Loeser, and K.G. Bell, *Spinal cord stimulation for chronic low back pain: a systematic literature synthesis.* Neurosurgery, 1995. **37**(6): p. 1088-95; discussion 1095-6.
4. Burchiel, K.J., et al., *Prognostic factors of spinal cord stimulation for chronic back and leg pain.* Neurosurgery, 1995. **36**(6): p. 1101-10; discussion 1110-1.
5. Hassenbusch, S.J., M. Stanton-Hicks, and E.C. Covington, *Spinal cord stimulation versus spinal infusion*

for low back and leg pain. Acta Neurochir Suppl (Wien),

1995.

64:

p.

109-15