

Retrograde Spinal Cord Stimulator Lead Placement for Right L5 Radiculopathy

Dear Editor:

I want to present a case where a retrograde cervical approach was used to place spinal cord stimulator lead in a patient with right L5 radiculopathy.

A 55-year-old Hispanic woman was taken to the operating room (OR) for permanent transcutaneous spinal cord stimulator (SCS) insertion. She had a history of lower back pain, radiating to her right posterior thigh for 5 years. She had an L5/S1 laminectomy in 2007 that did not relieve her pain. She had a successful SCS trial for right L5 radiculopathy in 2008 and had a plate inserted surgically the same year. The SCS was helping her pain; however, the post-op course was complicated due to infection and the device was removed. The patient did not respond well on conservative treatment (opioids and transforaminal steroid injections). The surgeon refused to reinsert a plate due to the high risk of another infection. The possibility of repeated infection in a healthy adult with an uncompromised immune system and the benefits of SCS placement were discussed with the patient: she preferred to do the procedure.

Patient was taken to the OR on March 21, 2011. Her back was prepped with special precautions for sterility and 2 g of Mefoxin was administered via intravenous access. The first SCS lead was inserted using a traditional approach with some difficulty at the upper level of the T9 vertebra, right from the midline. The placement of the second lead was complicated due to adhesions from the previous surgical intervention. Several attempts failed to insert the second lead above T10 vertebra. The leads were tested for coverage and it was found to be helpful for her right leg but not for the lower back pain. What could be done next?

The retrograde SCS lead placement at the lumbar spine is well known. The author had an experience with a cervical epidural steroid injection performed with a needle placed retrograde. The needle was inserted into the cervical epidural place from the laminar of the upper vertebra. The procedure at this stage would fail in a patient who does not do well with conservative treatment, if something else had not been done. The author decided to attempt retrograde lead placement and that was discussed with the patient and the surgical team in the room. Verbal informed consent was obtained.

The patient's neck was prepped and draped in the usual sterile matter and a roll was placed under her shoulders. The patient was asked to bend her neck as much as possible to visualize the C7-T1 interspace better. An

Epimed 14 gauge needle was used. It advances the SCS lead at the needle tip at almost 90 degrees, thus facilitating lead movement into the posterior epidural space. Surprisingly, the needle placement was not difficult.

The needle was advanced to the lower edge of the C7 lamina at almost 90 degrees until the needle touched the lamina. Then the hub of the needle was redirected cephalad, allowing the tip of the needle into the epidural space. The epidural space was encountered using loss of resistance technique. The SCS lead was advanced toward the lower edge of T8 vertebra with ease. The leads were tested and were successful for coverage of the patient's lower back and right leg pain. The second lead that could not be advanced due to adhesions was removed. The rest of the procedure was uneventful.

The procedure was a success: no infection; good pain coverage. Nine months later, the patient complained of her shoulder, but not of her back pain. Her opioid's demand decreased significantly: she was off Oxycontin 80 mg and was taking only one to two tabs of Percocet a day.

The cervical retrograde SCS lead placement can stimulate further discussion. It possesses certain advantages to more traditional SCS lead insertion:

1. It is the only way, besides surgery, to insert leads at the desirable level when adhesions are present, such as with this patient.
2. It is also a choice if the needle placement in the lumbar area is not desirable (skin eczema, keloid scars due to burn, etc.).

It could be advantages to traditional lead placement. For instance, there is a high risk of lead migration with young, active adults and obese patients. Risk of the lead migration is one of the main reasons why pain practitioners send their successful SCS trials to spinal surgeons. Interestingly, placement of SCS lead retrograde using the cervical approach may decrease chances of downward migration but increase a chance of upward lead migration. One explanation of this hypothesis is that the SCS lead anchors above, not below the target. Another could be body mechanics. One pulls the SCS lead down when he or she flexes/extends lower back if the lead was inserted through the lower spine. However, one pulls the SCS lead up when he or she flexes/extends the neck in case the SCS lead was placed retrograde at the cervical spine. In the case presented, there was minimal upward lead migration that did not affect pain coverage.

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Possible disadvantages of the retrograde SCS lead placement include:

1. Higher risk of complications as with any cervical procedure.
2. More challenging technically.
3. Need for longer tunneling as with any SCS inserted at the neck.
4. Theoretical risk of upward lead migration, for example, with shoulder shrugs or forward bending (head to knees).
5. To be discovered.

The retrograde SCS lead placement for lower back and leg pain could be an option for those cases when the

traditional way could not be used for some reason or when a downward lead migration is a big concern.

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References

The author is unaware of previous reports on retrograde SCS placement using cervical approach and could find no reference to it in a computerized search utilizing MEDLINE.