The Importance of a Percutaneous Trial of a Spinal Cord Stimulator in a Patient with Extreme Scoliosis

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To the Editor,

As a technique that relies on anatomical landmarks, percutaneous placement of a spinal cord stimulator (SCS) can be very difficult in patients with scoliosis. This is due not only to the abnormal anatomy of patients with scoliosis, but also to the postoperative changes that occur as a result of corrective procedures. Because of this, surgical placement is often opted for over percutaneous placement. As current literature supports only about a 50–60% success rate in treatment of patients with failed back surgery syndrome (FBBS) [1], we feel that a percutaneous trial placement is a more conservative and subsequently superior modality compared with undergoing surgical placement without trial. A literature search revealed only one case report of percutaneous placement with a case of advanced scoliosis [2]. We present another successful placement and hope to encourage other practitioners to consider a minimally invasive trial prior to scheduling a patient for operative placement.

Percutaneous SCS placement has been shown to be a cost-effective technique and is minimally invasive [1,3]. Procedure-related discomfort that may compromise a therapeutic trial is also minimized. Percutaneous electrodes allow longitudinal access to multiple levels via a single interlaminar needle puncture. This facilitates mapping of multiple targets. The use of temporary electrodes for an SCS trial offers major advantages in screening candidates for implantation of permanent devices [4].

A 60-year-old woman presented with a longstanding history of left sacroiliac joint pain with radicular symptoms of pain radiating down her left leg and laterally to her ankle. She reported that the pain was sharp and throbbing. She also reported that the pain was a 10 on a scale of 1–10, with 10 being the most severe. Her daily medications included acetaminophen, chlorzoxazone, gabapentin, atenolol, tramadol, and aspirin. Her past medical history was significant for failed back surgery syndrome, scoliosis, hypertension, depression, and stomach ulcers. She had undergone four previous back surgeries, including placement, and removal of spinal rods.

Her treatment options were limited because of allergies to multiple medications, including morphine and cortisone. She reported some minimal success with RFA in the past; however, her pain continued to be debilitating. Aside from complaints of joint and back pain, her review of systems was otherwise negative. Her physical exam was significant for decreased spinal mobility because of her pain and severe scoliosis. She had an unsteady gait and required a cane for ambulation. Her motor strength and deep tendon reflexes were normal. Examination of her back revealed impressive deviation of her thoracic and lumbar spine laterally toward the left.

Examination of her spine via x-ray also revealed severe thoracolumbar levo-scoliosis, with a Cobb angle of 64 degrees. Severe osteopenia was noted throughout her spine. Laterolisthesis at L3–4 was noted with possible retrolisthesis. Mild sclerosis of the left sacroiliac joint was present. No obvious compression deformities were identified. Partial fusion of the scoliotic segment of the lateral masses of her spine because of previous surgery was present as well.

The patient’s distorted anatomy and severe osteopenia presented a major challenge to this case. No spinous processes were visualized at the L3–4 area of the patient’s spine under fluoroscopy. The transverse processes and facet joints served as landmarks for insertion of the Tuohy needle. A paramedian approach was chosen. A 14-gauge Tuohy needle supplied by the manufacturer (Boston Scientific Company, Natick, MA, USA) was advanced under fluoroscopic guidance using the loss of resistance to air technique. The angle of insertion was approximately 55–60° lateral to the midline with an insertion angle of about 30° above the skin. Once in the epidural space, an eight-contact, 70-cm lead was advanced through the needle. Three attempts were necessary to cover the area of the patient’s pain.

Upon stimulation, the patient stated that more than 70% of her pain was improved. At follow-up 3 days later, she
reported that the stimulator was covering her area of pain, the left side of the lower back, buttock, and sacroiliac joint area, but overall, it was only 50% improved. She stated that in the afternoon her pain was severe and the stimulator was not helping as much. As her pain relief was only at 50% she was not a candidate for permanent stimulator placement.

This case presents the importance of a minimally invasive percutaneous trial as well as technical difficulties that can be encountered in a patient with severe scoliosis. Despite the difficulties encountered, the lead was able to be appropriately placed and covered her area of pain. The trial determined that she would not receive appropriate benefit from the SCS and the lead was later removed. Secondary to the percutaneous trial, the patient was able to avoid surgical placement of the leads and a greater financial burden. In the minds of the authors, this is a success of its own. Given the multiple surgeries and chronic pain associated with scoliosis, we prefer the percutaneous approach to evaluate the effectiveness of the device prior to subjecting the patient to another surgical procedure.

There is very little information from randomized controlled trials regarding the effectiveness of SCS in FBBS. The literature available points to about a 50% success rate with reduction in pain and an increase in quality of life [5]. As the SCS is implanted “permanently,” we believe that a percutaneous trial is necessary to determine the level of benefit it will provide to the patient. Unfortunately, the anatomy of scoliosis makes percutaneous placement very difficult, to the point most practitioners will choose to forego the percutaneous trial and implant the lead via an invasive laminectomy. Spinal cord stimulation, has evolved into an easily implemented cost-effective technique for pain management [6]. Through unsatisfactory pain control via an appropriately placed lead, we have illustrated the importance of a minimally invasive trial. We have also shown, scoliosis should not preclude percutaneous placement of a SCS.

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References