Spinal cord at the conus medullaris for treatment refractory pudendal: a case report

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Pudendal neuralgia is a neuropathic pain syndrome consisting of debilitating pain along the pudendal nerve distribution. Current evidence offers a variety of therapeutic options, however many patients demonstrate inadequate pain control. We present a 56 year old woman with an eight year history of left groin, vaginal, and rectal pain consistent with pudendal neuralgia. After failing physical therapy, pharmacologic therapy, and surgical intervention, a spinal cord stimulator was placed at the conus medullaris with subsequent 65% pain relief and improved sitting time. This report demonstrates spinal cord stimulation uniquely targeted to the conus medullari as an effective treatment modality for pudendal neuralgia.

Key Words: *Neuromodulation; Spinal cord stimulator; Pudendal neuralgia; Chronic pain*

INTRODUCTION

Pudendal neuralgia is a debilitating neuropathic pain syndrome with significant impact on quality of life. It has an incidence of 1% of the general population and affects 4% of patients being evaluated for pain, most commonly women [1]. Current data may underestimate these values due to a relative paucity of medical literature and physician awareness, as well as the innate diagnostic challenge pudendal neuralgia creates from its vague symptoms and overlap with other pathologies [1-3].

Pudendal neuralgia is diagnosed clinically, comprised of a combination of features without any one definitive sign or symptom. The Nantes criteria, developed as a diagnostic aid, include five essential signs [1]. Pain in the anatomical territory of the pudendal nerve distribution from the anus to penis or clitoris [2]. Pain predominantly worsened by sitting [3]. Pain that does not wake the patient at night [4]. No objective sensory loss on clinical examination [5]. Pain relieved by a diagnostic pudendal nerve block [4].

The pudendal nerve is a mixed sensory and motor nerve originating from the ventral rami of S2-4 nerve roots. It exits through the greater sciatic foramen and enters the perineum via the lesser sciatic foramen and Alcock's canal giving rise to three terminal branches; inferior rectal, perineal, and dorsal nerves. Collectively, these branches innervate the external anal sphincter, perianal skin and mucosa, muscles of the urogenital triangle, penis, clitoris, labia, and scrotum [5,6]. Symptoms of pudendal neuralgia can be localized to any one, or all pudendal nerve distributions.

Treatment modalities for pudendal neuralgia are wide ranging, from conservative approaches involving physical therapy, medications, to surgery. Several interventional treatments, including direct peripheral nerve stimulation and spinal cord stimulation, may offer an alternative to pudendal nerve decompression, or treat remaining pain when surgery fails. At this time there is no consensus on the optimal management strategy, and many patients are left with inadequate relief. In a review by Hibner et al, over half of patients undergoing surgical decompression showed either no relief or partial improvement in their pain, and a small percentage had increased pain following surgery [1].

Spinal cord stimulation is a known effective therapy for neuropathic back and leg pain, but limited data exists demonstrating its benefits for the treatment of pudendal neuralgia [7,8]. This report supports that the novel approach of spinal cord stimulation targeted to the conus medullaris may provide immediate and significant reductions in neuropathic pain scores in patients with pudendal neuralgia. Written informed patient consent was obtained for this report.

CASE REPORT

This 56-year-old woman with a past medical history of constipation and polyneuropathy with right foot drop presented to our pain management clinic with an eight year history of bilateral lower lumbar radicular, left groin, urethral, vaginal, and rectal pain. Her perineal pain was acutely exacerbated by sitting, which limited her ability to drive or watch a movie while seated. On exam this tenderness was noted with the application of pressure from the perineum to ischial spines bilaterally, with left greater than right. Her pain was described as burning with an associated tingling sensation and was improved with either lying down or standing.

Seven years prior to our encounter she had a left posterior iliac bone cyst removed after presenting with lower back and buttock pain, which provided no relief. In the following year she underwent L5-S1 laminectomy fusion for low back pain with lumbar radiculopathy. Post operatively her lumbar pain improved for several years, but her perineal pain and right foot drop were unchanged. She was later referred to neurology and diagnosed with pudendal neuralgia and polyneuropathy by abnormal nerve conduction study and pudendal nerve block.

With a recurrence of her back pain and unchanged pudendal nerve pain, multiple interventions were attempted: physical therapy, medications including NSAIDs, gabapentin and milnacipran, and further surgery including sacroiliac joint fusion and pudendal nerve decompression (Figure 1). Facet joint injections, epidural steroid injections, and sacroiliac joint injections were also performed without adequate sustained relief. She was then discussed as part of a multidisciplinary team meeting to be a suitable candidate for spinal cord stimulator (SCS) placement. After a successful SCS trial demonstrated near complete resolution of her back pain, a permanent SCS was implanted under fluoroscopic guidance with the epidural lead tip located at T7.

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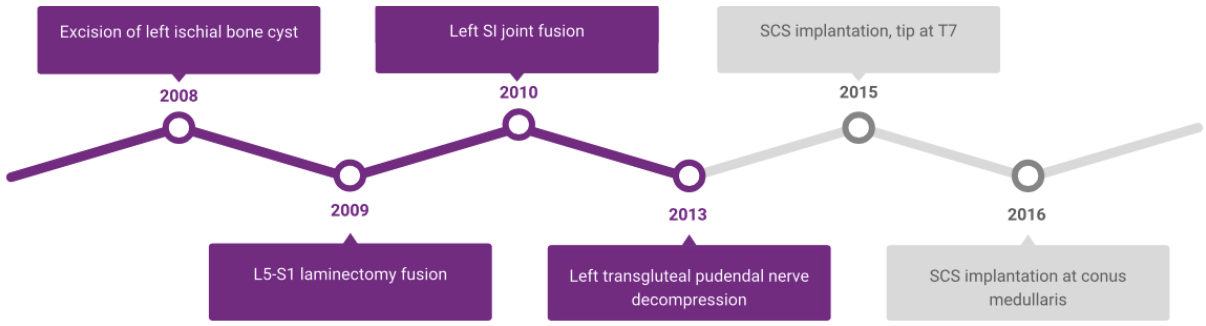

Figure 1) *Operative timeline*

The patient experienced a significant reduction in her lower back pain, however, the chronic perineal pain remained unchanged. Her discomfort was scored 9/10 and noted to be still disruptive to daily living. Four months later, after successful SCS trial, a single lead permanent SCS was implanted under fluoroscopic guidance at the left paramedian conus medullaris with the lead tip at T12-L1 (Figures 2 and 3). Preoperative MRI was used to confirm location of the conus medullaris and aid in lead placement (Figure 4). The SCS was activated eight days following placement to allow for staple removal. On initial programming, pain scores were reduced by 50% with an associated increase in sitting time and improved quality of life. During her 7 month and 1 year follow up appointments, she was noted to have 65%

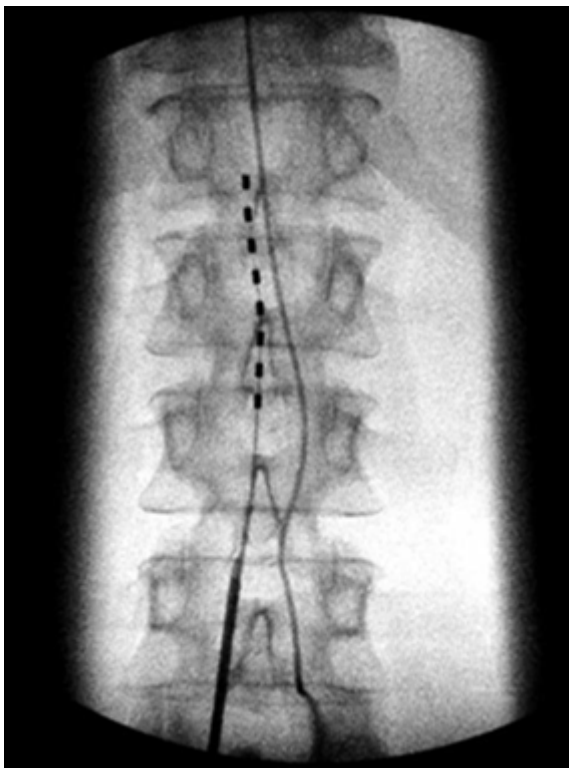

Figure 2) *Intraoperative x-ray of the thoracolumbar spine showing left paramedian SCS lead tip placed at T12-L1 junction*

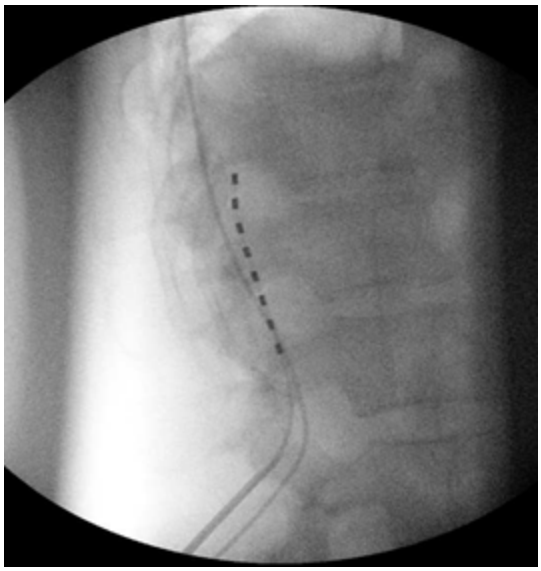

Figure 3) *Intraoperative x-ray of the thoracolumbar spine showing left paramedian SCS lead tip placed at T12-L1 junction*

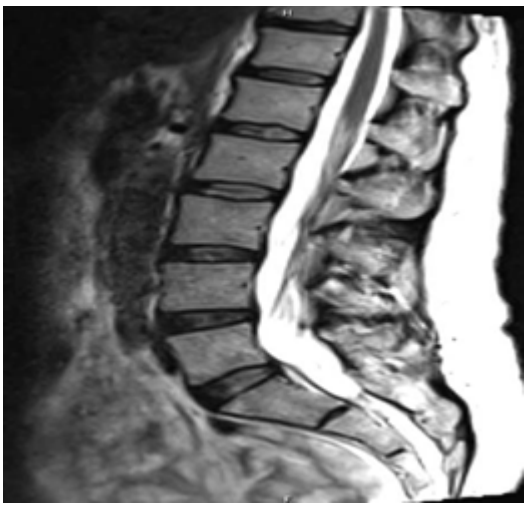

Figure 4) *Preoperative MRI identifying conus medullaris near L1-L2 junction*

SCS implantation and reprogramming were tolerated well, with minimal postoperative discomfort and no surgical or device related complications, and no adverse effects on bowel or bladder function.

DISCUSSION AND CONCLUSION

Pudendal neuralgia is debilitating neuropathic pain syndrome associated with pain along the pudendal nerve distribution. Patients commonly present with a burning discomfort that is highly exacerbated by sitting. Other associated symptoms include paresthesias, allodynia, hyperalgesia, rectal or vaginal foreign body sensation, and dyspareunia [2,4]. The nature of pudendal neuralgia in regard to its location and exacerbating factors, promotes a considerable loss of quality of life.

There are a number of available treatments, including neuropathic pain medications and antispasmodics, physical therapy, perineural steroid injections, and surgical decompression.

Supportive data for many interventions is lacking, and other studies suggest significant limitations in their benefit. Surgical decompression for example, frequently fails to provide relief and may exacerbate pain symptoms. Additionally, pudendal neuralgia does not resolve immediately after surgery, and may take 4 months or longer to achieve first pain relief, and over a year to achieve maximum relief [1].

Spinal cord stimulation confers a variety of benefits over other treatment modalities for the management of pudendal neuralgia: minimal adverse effects, immediate fully therapeutic pain control, and lifelong adjustable pain relief via reprogramming and battery upgrades. Our patient did not report any adverse effects of SCS placement, and pain control was nearly maximized upon first activation. During follow up appointments, reprogramming was able to be performed for further pain control, and adjustments were made if pain distribution had changed to any new anatomic territory. In approximately 10-25% of patients, SCS leads may migrate within the epidural space. Reprogramming allows for changes in stimulation distribution to accommodate for small changes in lead position [9]. Our patients' uniquely placed SCS at the conus medullaris did not appear to increase the risk of lead malpositioning, and required minimal adjustment in both the location and intensity of her stimulation. Some patients may also report a tingling sensation within the dermatomal distributions being stimulated, these paresthesias can include anatomic regions not affected by pain generating pathologies. This may pose a significant burden to patient comfort, and can be reliably reduced or even

In patients who have failed conservative management, spinal cord stimulation at the conus medullaris may offer an effective and targeted treatment strategy for pudendal neuralgia. To our knowledge there are no large prospective trials evaluating its efficacy. This data is also in concordance with prior studies that show neuromodulation can be an effective tool when treating neuropathic pain [7,8].

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