

## **Author information**

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## **Case Information**

**Presenting Symptom:** Chronic pelvic pain

**Case specific diagnosis:** Chronic pelvic pain

### **Learning Objectives:**

1. To identify the indication of neuromodulation in patients with chronic pelvic pain
2. To discuss the challenges of neuromodulation in patients with chronic pelvic pain
3. To discuss other possible therapeutic options for patients with chronic pelvic pain

### **History:**

A 70 year old man with a past medical history of a vasectomy almost 40 years ago referred to the pain clinic with right buttock and perineal pain since 2011. At the time of onset, the pain was mainly located in the right aspect of his scrotum. Over time, it has gradually radiated to the right medial thigh. It is achy and burning in quality. Symptoms are worsened with sitting and relieved with standing or laying down. He rates it about 8-9 out of 10 at maximum severity on a VRS scale. It is usually worse towards the end of the day. No associated focal weakness, weight loss, fevers, night sweats or bowel or bladder dysfunction. He reports very minimal relief with trials of gabapentin, pregabalin and amitriptyline.

### **Physical exam findings:**

Tenderness to palpation at the junction of the right scrotum to the groin area with palpable muscular band in the area.

Pain elicited with advanced right hip flexion.

No pain with hip adduction or abduction or internal-external rotation.

### **Diagnostic Imaging and results:**

Pelvis AP radiograph:

-Degenerative changes in lower lumbar spine and both hips.

-Heterotopic ossification adjacent to the left greater trochanter.

Ultrasound of the Pelvis:

-Unremarkable sonographic findings.

MRI of Pelvis with contrast:

-Mild degenerative irregularity of the anterior-superior acetabular labrum.

-No periarticular bursopathy, sports hernia, right groin masses, hydrocele or lymphadenopathy.

### **Differential diagnosis:**

-Right groin myofascial pain syndrome

-Chronic prostatitis

-Pudendal neuralgia

-Entrapment neuropathy of the genitofemoral, ilioinguinal and iliohypogastric nerves

-Major depressive disorder

-Right hydrocele

### **Medications and Interventions:**

-Prior to referral to our pain clinic, the patient had undergone a trial period of gabapentin, lyrica and amitriptyline.

-We initially attempted an ultrasound-guided right inguinal trigger point injection for diagnostic and therapeutic purposes. No relief in pain severity.

-Next, we performed, in sequence, an ultrasound-guided right pudendal nerve block, ultrasound-guided right ilioinguinal/iliohypogastric nerve block with no pain relief at all.

- Given the technical differences between ultrasound and CT pudendal nerve blocks, our radiology colleagues performed a right CT-guided pudendal nerve block with no relief. Finally, we attempted an ultrasound-guided right genitofemoral nerve block with no results as well.

- He was evaluated by one of our neuromodulation physicians, who recommended a dorsal root ganglion spinal stimulator trial. DRG stimulation trial was performed with leads placed under the left L1 pedicle and the right S3 foramen via fluoroscopy guidance. Following trial leads placement, the patient noted a 40% reduction in his pain with significant improvement in his overall functioning and mood.

-Given the positive results, we proceeded with permanent DRG stimulator placement. First attempt for permanent placement was aborted due to severe paresthesia as the leads entered the target foramen. The next attempt was performed while using EMG and SSEP monitoring to achieve a deeper anesthetic plane. Leads were successfully placed in the right L1 and right S3 foramen. Following two reprogramming attempts, he was able to achieve a significant reduction similar to the trial period. The patient is currently being followed by our clinic.

### **Literature supporting use of Neuromodulation in Chronic Pelvic Pain:**

- Complex and heterogeneous array of non-malignant pain localized in the pelvis and present for greater than 6 months (Hunter et. al)
- Treatment of CPP presents a significant challenge due to factors such as complex innervation of the pelvis, varied etiology, as well as cognitive and psychosexual contributions.
- Several options exist for neuromodulation and neurostimulation for CPP patients. Peripheral neuromodulation includes, percutaneous tibial, pudendal and sacral nerve stimulation. (Weissbart et.al) Options for neuraxial neuromodulation includes conus medullaris stimulation, dorsal root ganglion stimulation, and dorsal column spinal cord stimulation (Hunter et. al)

- **Evidence and limitation for neuromodulation techniques:**
  - **Pudendal nerve stimulation vs sacral nerve stimulation**
    - PN contains fibers from S2-S4 while sacral nerve stimulation targets the S3 nerve root.
    - Head to head RCTs comparing PNS to SNS in CPP patients with refractory interstitial cystitis (Peters et. al 2007)
    - Total of 22 patients. 17 (77%) had clinical response with IPG placement.
    - PNS gave 59% symptom improvement vs 44% in SNS (P = 0.05)
    - 13 out of 17 patients elected for PNS permanent lead placement
    - PNS can be trialed when SNS fails.
    - Limitation of PNS includes: small error margin, requires intraoperative EMG, proximity to large vessels.
    - SNS limitation includes: High incidence of dural puncture and anchoring difficulty/lead migration.
  - **Dorsal column SCS**
    - Can provide immense benefit in patients with refractory CPP who have failed conservative therapy and percutaneous blocks.
    - Limited RCT data
    - Mekhail et al 2006 published a case series of six CPP patients who underwent dorsal column SCS trial and implantation. Lead tip at T11-T12. Significant improvement in pain disability index and decrease in opioid consumption.
    - Limitations include: lack of consensus of optimal lead placement due to complex innervation of the pelvis as well as lead migration.
  - **Dorsal root ganglion stimulation**
    - DRG theoretically combines the coverage of PNS, SNS, dorsal column SCS all in one (Hunter et. al)
    - Precise coverage allows for less power requirement compared to dorsal column SCS
    - Case reports such as F.Wille et. al in 2016 describes successful use of S3 DRG stimulation in a patient with postsurgical perineal pain. While none exists in CPP patients, randomized control trials have shown that DRG stimulation is very effective in CRPS patients (Liem et al 2014, Mekhail et al 2017)
    - Case series such as Hunter et al in 2018 describes successful use of an L1/S2 DRG stimulation lead array in patients with chronic pelvic pain. This case series included seven patients with severe, CPP who failed to respond to a variety interventional treatments, and in some cases SCS. All seven patients were successfully trialed with DRGS utilizing leads placed over the bilateral L1 and S2 DRG. All seven patients experienced significant pain relief as well as reduction in opioid consumption and some cases improvement with sexual function and urination
  - **Take home points**
    - Neuromodulation could provide an effective therapeutic option in patients with refractory chronic pelvic pain.

- Complex innervation and heterogeneous presentation of chronic pelvic pain presents a challenge for identifying optimal targets for neuromodulation
- Neurostimulation of peripheral nerves such as pudendal and sacral nerve S3 could prove efficacious in patients with a well-defined pattern of neuralgia.
- Dorsal root ganglion stimulation with its more precise coverage relative to dorsal column SCS could serve as a more effective alternative for CPP treatment in the near future.

○ **References**

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