Pudendal nerve entrapment syndrome: surgical therapies and robotic-assisted laparoscopic neurolysis

Denis Rey, MD
Pudendal nerve

Motor, sensor and autonomic fibers derived from sacral roots $S_2$-$S_4$
3 branches: **dorsal nerve of penis/clitoris, perineal nerve, inferior rectal nerve.**
Pudendal nerve

It descends under the piriform muscle.
It exits the pelvis through the membrane of obturator internus muscle (Alcock canal)

Arcus tendineus
Alcock canal
Sacrospinous l.
Sacrotuberous l.
Pudendal nerve

It descends medial and caudal in relation to the trunk of the sciatic nerve!
Entrapment areas

1) At ischiatic spine
2) Between sacrospinous and sacrotuberous ligaments
3) Falciform process of the sacrotuberous ligament
4) Between the levator ani and obturator internus muscle
5) Compression from the piriformis muscle
## Diagnosis: Nantes criteria

**Inclusion criteria**
- Pain in area innervated by the pudendal nerve
- Pain more severe with sitting
- Pain does not awaken patient from sleep
- Pain with no objective sensory impairment
- Pain relieved by diagnostic pudendal block

**Exclusion criteria**
- Pain located exclusively in coccygeal, gluteal, pubic, or hypogastric area (without pain in area of distribution of pudendal nerve)
- Pruritus
- Pain exclusively paroxysmal
- Abnormality on imaging (CT, MRI) that can account for pain

**Complementary criteria**
- Pain characteristics: burning, shooting, numbing
- Allodynia or hyperesthesia
- Allotriesthesia
- Pain progressively throughout the day
- Pain predominantly unilateral
- Pain triggered by defecation
- Significant tenderness around ischial spine
- Abnormal neurophysiology test results

**Associated signs/symptoms**
- Buttock pain (around ischial tuberosity)
- Referred sciatic pain
- Pain referred to medial side of thigh
- Suprapubic pain
- Urinary frequency with full bladder
- Pain after orgasm/ejaculation
- Dyspareunia or pain after intercourse
- Erectile dysfunction

Precise clinical, diagnostic criteria.

70% of patients meeting these criteria improve with surgery

Labat et al, 2008
Innervated areas

Fig. 1. Sensory distribution of the pudendal nerve: (a) pudendal nerve (b) inferior cluneal nerve (c) obturator nerve (d) ilioinguinal and genitofemoral nerve.

_Hibner et al._ *Analysis of the Impact of Body Mass Index on the Surgical Outcomes after Robot-Assisted Laparoscopic Myomectomy*
Diagnosis

Debated value of ENMG: limited sensitivity and specificity in the diagnosis of pudendal nerve entrapment syndrome, no direct information about pain mechanisms.

No imaging studies that precisely diagnose pudendal neuralgia. Role of CT or MRI?
Diagnosis

Possible role of **Color Duplex Scanning**?
The CDS of internal pudendal vessels, satellites of the nerve, has a 89.6% sensitivity and 67.4% specificity in diagnosing pudendal nerve entrapment. Promising!

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Evaluation of diagnostic accuracy of Colour Duplex Scanning, compared to electroneuromyography, diagnostic score and surgical outcomes, in Pudendal Neuralgia by entrapment: A prospective study on 96 patients

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Treatment options

1) **Conservative**: oral medications and physical therapy
   - Pregabalin 75 mg BID
   - Muscle relaxants (local or systemic)
   - Physical: myofascial release, trigger point release
   - Muscle injection of Botulinum toxin A

2) **Pudendal nerve block**: 5% bupivacaine 5-7 ml + triamcinolone 80 mg

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**Pudendal Neuralgia**

Michael Hibner, MD, PhD*, Nita Desai, MD, Loretta J. Robertson, PT, and May Nour, MD, PhD

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Surgical options

1) TRANSGLUTEAL APPROACH (Robert et al)

Opens the clamp between the sacrospinous and sacrotuberous ligaments by cutting one of them.
2) TRANSPERINEAL APPROACH (Shafik et al)
Vertical para-anal incision, entering the ischio-rectal fossa. It opens the Alcock canal to give the pudendal nerve sufficient length to be unstretched or to suppress compression.

Surgical options

3) TRANSABDOMINAL LAPAROSCOPIC APPROACH (Possover et al). Careful dissection of the pudendal nerve from its emergence up to Alcock canal. It focuses on the proximal and medial portions of pudendal nerve.
Why laparoscopy?

1. It allows the **exploration** of the entire sacral plexus!
2. It enables the **diagnosis** of endopelvic situations or pathologies responsible for pelvic neuralgia (endometriosis, fibrosis, anatomical abnormalities)
3. It enables etiological **treatment** for lumbosacral radiculopathy!
4. It enables the selective **neuromodulation** of all pudendal afferent fibers together with only 1 electrode.
Why laparoscopy?

The perineal and transgluteal approaches do not represent an appropriate approach to the entire sacral plexus!!!

- Transgluteal: focused on ligament’s clamp
- Transperineal: focused on Alcock canal

Better cosmetic results for laparoscopy!

Laparoscopic Management of Endopelvic Etiologies of Pudendal Pain in 134 Consecutive Patients

Marc Possover*
And now, robotics
Advantages of robotics

Same approach of classical laparoscopy, **but**:  
- Improved dexterity  
- 3D vision  
- Enhanced magnification  
- Improved precision in movements  
- Improved degrees of freedom in movements
FAISABILITE D'UNE DECOMPRESSION BILATERALE DU NERF PUDENDAL SOUS ASSISTANCE ROBOTISEE: PREMIER CAS DECRIT
Neurological evaluation

Pain evaluation (Visual Analog Scale – VAS, from 0 to 10)

Not validated questionnaires

Evaluations at discharge and every month during the first year

Need for standardization!!!