NYU Langone Health

Department of Urology

Case of the Month

Pudendal Neuralgia: An Underdiagnosed Etiology of Vaginal Pain

Case Presentation

A woman in her early 40s was evaluated for bothersome stress urinary incontinence and vaginal pain following a second vaginal delivery 4 years prior. This vaginal birth was uncomplicated but did include an episiotomy. Following the delivery, she reported a constant vaginal irritation and burning sensation at the surface of her vaginal opening. The pain worsened during menses, as she found that blood irritated the tissues. She sometimes also experienced a rectal burning sensation. The burning sensation in the vaginal introitus was worse when she sat for long periods or sat on a hard surface; it did not wake her from sleep. She had no radiation of this pain into the lower extremities or the pelvis. She had no UTI-like symptoms. She had tried topical estrogen cream and steroid creams for this pain with minimal improvement. She denied dyspareunia. She had a hormonal IUD to manage heavy and painful menses. She denied any prior history of pelvic, sacral, or coccygeal trauma.

The patient's past medical history included hypothyroidism managed by levothyroxine. Her past surgical history included nasal septoplasty and cosmetic facial surgery.

Evaluation

The patient's pelvic examination was notable for normal-appearing labia majora and labia minora with no erythema, edema, or lichenification of the surrounding skin. Her vestibule appeared normal, with well-estrogenized vaginal and introital tissues. She had moderate urethral hypermobility, and no pelvic organ prolapse was elicited with Valsalva maneuvers on examination. No motor or sensory deficits were noted on examination. She had no evidence of bacterial infection in the vagina; her urinalysis was negative.

Comment

Pudendal neuralgia is a painful neuropathic condition. It can be caused by compression, inflammation, entrapment, or infection of the pudendal nerve, but it may also be idiopathic in nature. The condition can present in a variety of ways because of the complex course of the pudendal nerve. Some patients present with unilateral burning pain in the structures innervated by the pudendal nerve, including the perineum and rectum as well as the vulva, vagina, and clitoris in women and the glans penis and scrotum in men. Patients may also present with common urologic symptoms, including urinary frequency, urgency, dyspareunia, and painful bladder syndrome.[1] The neuropathy associated with the condition can present as a burning pain and as paresthesias and allodynia. Unique to this condition is the finding that the pain worsens when in the seated position and is improved or relieved completely by standing. The course of the pudendal nerve, adjacent to bony structures in the pelvis and through muscles of the pelvic floor, lends this nerve to compression in certain positions (Figure 1). The pain generally worsens throughout the day, since activity can increase friction and inflammation; pain is typically absent upon awakening in the morning.[2]

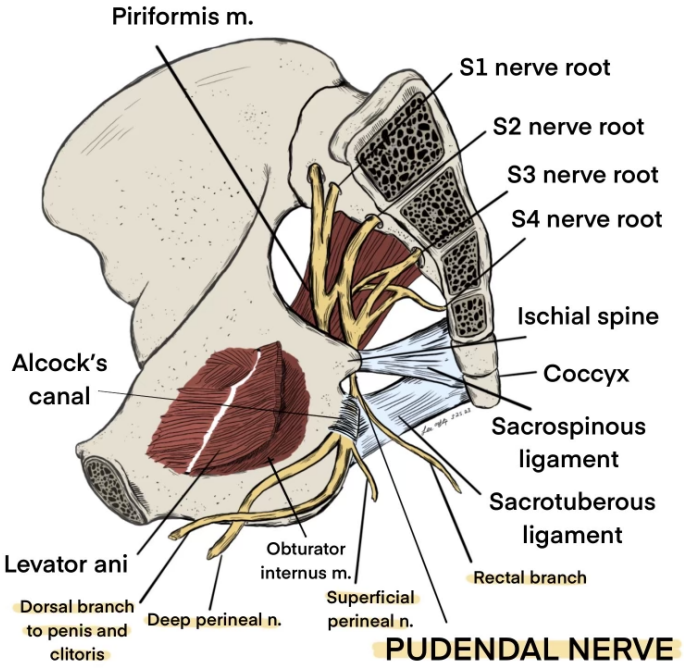

Figure 1. Anatomy of the pudendal nerve through Alcock's canal.

The hallmark symptom of pudendal neuralgia in females is a burning sensation in the vulva, vaginal vestibule, or vaginal canal. In postmenopausal women, these symptoms are often attributed to genitourinary syndrome of menopause and treated with topical vaginal estrogen therapy. Burning in the vaginal vestibule can also be attributed to vulvodynia/vestibulodynia, and treatment approaches include topical anesthetics, topical gabapentin, topical hormonal formulations, and, in severe cases, vestibulectomy. A diagnosis of pudendal neuralgia should be considered in cases of vaginal and introital burning and pain when the aforementioned therapies have not been effective. Furthermore, pudendal neuralgia can be misdiagnosed as persistent genital arousal disorder, interstitial cystitis, sacroiliitis, piriformis syndrome, lumbosacral radiculopathy, and coccydynia. In addition, persistent vaginal pain and neuralgia-type symptoms following vaginal delivery can be indicative of pudendal neuralgia, especially in the setting of a traumatic and/or assisted delivery with forceps or another instrument.

The pudendal nerve is the major somatic nerve of the perineum, containing both motor and sensory function, in addition to some autonomic function. The pudendal nerve originates at the S2-S4 level as part of the sacral plexus. The nerve roots, which originate in both the dorsal root of the spinal cord and Onuf's nucleus in the ventral horn, converge within the sacral plexus to travel together as the pudendal nerve. The nerve has a unique path in which it quickly exits the pelvis through the greater sciatic foramen inferior to the piriformis muscle. In this gluteal region, it travels around the sacrospinous ligament closest to the ischial spine. It then passes medially through the lesser sciatic foramen and enters the anal triangle of the perineum. At this point, the pudendal nerve enters the perineal region and travels along the lateral wall of the ischioanal fossa in the pudendal canal (Alcock's canal), which is made of fascia of the obturator internus muscle. Within the canal, the nerve splits into its 3 terminal branches, the inferior rectal nerve, the perineal nerve, and the dorsal nerve of the clitoris and the penis. The inferior rectal nerve travels medially to provide motor innervation to the external anal sphincter and surrounding levator ani muscles. It also provides sensory innervation to the skin of the anal triangle. The perineal nerve has 3 portions: a deep motor branch and 2 superficial sensory branches. The deep motor branch travels to

provide motor innervation to the transverse perinei muscle, the bulbospongiosus muscle, and the ischiocavernosus muscle, as well as to the external urethral sphincter. The 2 superficial sensory branches innervate the labia majora in women and the posterior scrotum in men. Finally, the dorsal nerve of the penis and the clitoris travels superficially along the lateral aspect of the pelvis parallel to the ischiocavernosus muscle toward the inferior aspect of the pubic symphysis, where it enters the clitoris and the penis, providing innervation to the glans of each structure.

The most common etiology of pudendal neuralgia is compression of the nerve, resulting in pudendal nerve entrapment syndrome. Compression and entrapment result from adjacent muscle spasm or direct pressure from ligaments, as well as from foreign bodies or scarring from prior surgery, such as surgery for vaginal prolapse. Trauma, including pelvic injury or irritation from bike riding and childbirth, can also produce entrapment of the nerve.[3] Pudendal neuralgia is a clinical diagnosis and the condition has 5 suggested criteria:[1]

1. Pain in the territory of the pudendal nerve
2. Pain worsened by sitting
3. Pain that does not wake the patient from sleep
4. No objective sensory loss on examination
5. Positive anesthetic pudendal nerve block

Imaging is not typically useful for diagnosis but can help to exclude alternative diagnoses such as spinal cord lesions, cauda equina syndrome, or disc disease, among others. Magnetic resonance neurography, a newer modality for evaluating the peripheral nerves in the pelvis, can be used to image the course of the pudendal nerves. If suspicion is high for pudendal neuralgia, an in-office pudendal nerve block can be both diagnostic and therapeutic. The pudendal block can be performed by landmark palpation or under image guidance with fluoroscopy, ultrasound, or CT scan. A transperineal approach is carried out with 1 finger in the rectum for a male or 1 finger in the vagina for a female and injection performed with 10 mL of local anesthetic.[4] If the patient experiences relief from the nerve block, this suggests a diagnosis of pudendal neuralgia and treatment can include pelvic floor physical therapy and referral to a pain specialist for long-acting nerve block performed at the level of the ischial spine with a lower dose of local anesthetic and a small dose of steroid. If this block is also short-lived, pudendal nerve radiofrequency ablation can be considered and, rarely, surgical decompression of the pudendal nerve.[5]

Conclusion

Pudendal neuralgia is an underdiagnosed clinical syndrome that requires an astute clinician with a high index of suspicion. The symptoms of pudendal neuralgia are characterized by vaginal and introital burning made worse with sitting and made better with standing. Pelvic surgeons and health care providers for women should consider this syndrome in cases of refractory symptoms that are not responsive to standard topical treatments and pelvic physical therapy.

References

1. Labat J-J, Riant T, Robert R, Amarenco G, Lefaucheur JP, Rigaud J. Diagnostic criteria for pudendal neuralgia by pudendal nerve entrapment (Nantes criteria). *Neurourol Urodyn*. 2008;27(4):306-310.
2. Benson JT, Griffis K. Pudendal neuralgia, a severe pain syndrome. *Am J Obstet Gynecol*. 2005;192(5):1663-1668.
3. Khoder W, Hale D. Pudendal neuralgia. Obstet Gynecol Clin North Am. 2014;41(3):443-452.
4. Ghanavatian S, Leslie SW, Derian A. *Pudendal Nerve Block*. In: StatPearls [Internet]. Treasure Island, FL: StatPearls Publishing; 2023. http://www.ncbi.nlm.nih.gov/books/NBK551518/. Accessed March 22, 2023.
5.. Levesque A, Bautrant E, Quistrebert V, Valancogne G, Riant T, Beer Gabel M, Leroi AM, Jottard K, Bruyninx L, Amarenco G, Quintas L, Picard P, Vancaillie T, Leveque C, Mohy F, Rioult B, Ploteau S, Labat JJ, Guinet-Lacoste A, Quinio B, Cosson M, Haddad R, Deffieux X, Perrouin-Verbe MA, Garreau C, Robert R. Recommendations on the management of pudendal nerve entrapment syndrome: a formalised expert consensus. *Eur J Pain*. 2022;26(1):7-17.

Nirit Rosenblum, MD

Dr. Rosenblum is clinical associate professor in the Department of Obstetrics and Gynecology and the Department of Urology at NYU Grossman School of Medicine. She is a board-certified urologist and is board-certified in female pelvic medicine and reconstructive surgery. She cares for women with pelvic floor disorders and urinary incontinence. She offers a full range of surgical and nonsurgical options for pelvic floor disorders. Dr. Rosenblum has interests in pelvic organ prolapse repair, including uterine-sparing techniques, incontinence treatments, female sexual dysfunction and lower urinary tract symptoms as well as recurrent urinary tract infections in women at all ages. She employs a comprehensive approach to female pelvic medicine encompassing medical, surgical and holistic treatment options. She often works collaboratively with physiatry, colorectal surgery, plastic surgery, endocrinology and physical therapy. Dr. Rosenblum is also co-director of the Female Pelvic Medicine Fellowship Program.

Meera K. Kirpekar, MD

Meera K. Kirpekar, MD, is clinical associate professor in the Department of Anesthesiology, Perioperative Care, and Pain Medicine at NYU Grossman School of Medicine. She is board-certified in anesthesiology and pain medicine. She specializes in managing pelvic pain, but also cares for patients who have neck and low-back pain; pain in the peripheral joints, which are in the arms and legs; nerve pain; and other conditions. Dr. Kirpekar collaborates with surgeons, obstetrician–gynecologists, physical therapists, and psychologists to provide personalized care. She conducts research on radiofrequency ablation and pudendal nerve blocks and has served as a panelist and moderator at anesthesiology and pain management conferences across the country, Dr. Kirpekar serves on the editorial board of the journal *Pain Physician*, and was a resident scholar for the American Society of Anesthesiologists. In addition, she has a podcast called *The Hurt, by the Female Pain Docs*, which aims to educate people about different types of pain and correct misinformation about pain diagnosis and treatment.

This case was prepared in collaboration with NYU Grossman School of Medicine's Meredith Wasserman MD, and Yeonsoo Sara Lee (MS3 at Mayo Clinic Alix School of Medicine).

Department of Urology

NYU Langone Health

Our renowned urologic specialists have pioneered numerous advances in the surgical and pharmacological treatment of urologic disease.

For questions and/or patient referrals, please contact us by phone or by e-mail.

Faculty	Specialty	Phone Number/Email
James Borin, MD	Kidney stones, Kidney Cancer, Ureteral Stricture, UPJ obstruction, Endourology, Robotic Renal Surgery, Partial Nephrectomy, Ablation of Renal Tumors, PCNL	646-825-6387 james.borin@nyulangone.org
Benjamin Brucker, MD	Female Pelvic Medicine and Reconstructive Surgery, Pelvic Organ Prolapse-Vaginal and Robotic Surgery, Voiding Dysfunction, Male and Female Incontinence, Benign Prostate Surgery, Neurourology	646-754-2404 benjamin.brucker@nyulangone.org
Seth Cohen, MD	Female Sexual Dysfunction, Male Sexual Dysfunction, General Urology, Benign Disease Prostate, Post-Prostatectomy Incontinence, Erectile Dysfunction, Hypogonadism	646-825-6318 seth.cohen@nyulangone.org
Christina Escobar, MD	Female Pelvic Medicine and Reconstructive Surgery, Pelvic Organ Prolapse, Incontinence in Women, Female Voiding Dysfunction, Neurourology	646-825-6324 christina.escobar@nyulangone.org
Frederick Gulmi, MD*	Robotic and Minimally Invasive Urology, BPH and Prostatic Diseases, Male and Female Voiding Dysfunction, Kidney Stone Disease, Lasers in Urologic Surgery, and Male Sexual Dysfunction	718-630-8600 frederick.gulmi@nyulangone.org
Joel Hillelsohn, MD†††	Erectile Dysfunction, Peyronie's Disease, Penile Prosthesis, Hypogonadism, BPH, Kidney Stones, Male Sexual Dysfunction, Chronic Prostatitis	646-660-9999 joel.hillelsohn@nyulangone.org
William Huang, MD	Urologic Oncology (Open and Robotic) – for Kidney Cancer (Partial and Complex Radical), Urothelial Cancers (Bladder and Upper Tract), Prostate and Testicular Cancer	646-744-1503 william.huang@nyulangone.org
Grace Hyun, MD	Pediatric Urology including Hydronephrosis, Hypospadias, Varicoceles, Undescended Testicles, Hernias, Vesicoureteral Reflux, Urinary Obstruction, Kidney Stones, Minimally Invasive Procedures, Congenital Anomalies	212-263-6420 grace.hyun@nyulangone.org
Matthew Katz, MD	Kidney Stone Disease, Upper Tract Urothelial Carcinoma, Ureteral Stricture Disease, and BPH/Benign Prostate Disease	646-825-6387 matthew.katz@nyulangone.org
Christopher Kelly, MD	Male and Female Voiding Dysfunction, Neurourology, Incontinence, Pelvic Pain, Benign Prostate Disease	646-825-6322 chris.kelly@nyulangone.org
Herbert Lepor, MD	Prostate Cancer: Elevated PSA, 3D MRI/Ultrasound Co-registration Prostate Biopsy, Focal (Ablation) of Prostate Cancer, Open Radical Retropubic Prostatectomy	646-825-6327 herbert.lepor@nyulangone.org
Stacy Loeb, MD, MSc**	Urologic Oncology, Prostate Cancer, Benign Prostatic Disease, Men's Health, General Urology	718-261-9100 stacy.loeb@nyulangone.org
Danil Makarov, MD, MHS***	Benign Prostatic Hyperplasia, Erectile Dysfunction, Urinary Tract Infection, Elevated Prostate-specific Antigen, Testicular Cancer, Bladder Cancer, Prostate Cancer	718-376-1004 danil.makarov@nyulangone.org
Meredith Metcalf, MD† ††	Urologic Oncology (Open and Robotic) - Kidney Cancer, Urothelial Cancer (Bladder and Upper Tract), Testicular Cancer, Prostate Cancer	718-630-8600 meredith.metcalf@nyulangone.org
Nnenaya Mmonu, MD, MS	Urethral Strictures, Robotic and Open Reconstructive Surgery for Ureteral Obstruction/Stricture, Fistulas, Bladder Neck Obstruction, Penile Prosthesis, Post Prostatectomy and Radiation Urinary Incontinence	646-754-2419 nnenaya.mmonu@nyulangone.org
Bobby Najari, MD	Male Infertility, Vasectomy, Vasectomy Reversal, Varicocele, Peyronie's Disease, Gender Dysphoria.	646-825-6348 bobby.najari@nyulangone.org
Valary Raup, MD†† ††††	Male Infertility, Varicocele, Penile Prosthesis, Artificial Urinary Sphincter, Peyronie's Disease, Penile Plication, Erectile Dysfunction, Male Sexual Health, Vasectomy, Vasectomy Reversal	646-754-2000 valary.raup@nyulangone.org
Nirit Rosenblum, MD	Female Pelvic Medicine and Reconstructive Surgery, Voiding Dysfunction, Neurourology, Incontinence, Female Sexual Dysfunction, Pelvic Organ Prolapse and Robotic Surgery	646-825-6311 nirit.rosenblum@nyulangone.org
Ellen Shapiro, MD	Pediatric Urology including: Urinary Tract Obstruction (ureteropelvic junction obstruction), Vesicoureteral Reflux, Hypospadias, Undescended Testis, Hernia, Varicocele, and Complex Genitourinary Reconstruction.	646-825-6326 ellen.shapiro@nyulangone.org
Gary D. Steinberg, MD	Muscle-Invasive Bladder Cancer, Non-Invasive Bladder Cancer, Radical Cystectomy, Urinary Tract Reconstruction After Bladder Removal Surgery	646-825-6327 gary.steinberg@nyulangone.org
Lauren Stewart, MD	Female Pelvic Medicine and Reconstructive Surgery, Pelvic Organ Prolapse, Incontinence in Women, Female Voiding Dysfunction	646-825-6325 lauren.stewart@nyulangone.org
Wei Phin Tan, MD	Urologic Oncology – Prostate Cancer, MRI-Guided Biopsy, Kidney and Prostate Cancer Surgery, Robotic Urological Cancer Surgery, Prostate Cancer Image-guided Focal Therapy (Ablation, HIFU), and Urothelial Cancer	646-825-6321 weiphin.tan@nyulangone.org
Samir Taneja, MD	Urologic Oncology – Prostate Cancer (MRI-Guided Biopsy, Robotic Prostatectomy, Focal Therapy, Surveillance), Kidney Cancer (Robotic Partial Nephrectomy, Complex Open Surgery), Urothelial Cancers	646-825-6321 samir.taneja@nyulangone.org
James Wysock, MD, MS	Urologic Oncology – Prostate Cancer, MRI-Guided Biopsy, Kidney and Prostate Cancer Surgery, Robotic Urological Cancer Surgery, Prostate Cancer Image-guided Focal Therapy (Ablation, HIFU), and Testicular Cancer	646-754-2470 james.wysock@nyulangone.org
Lee Zhao, MD	Robotic and Open Reconstructive Surgery for Ureteral Obstruction, Fistulas, Urinary Diversions, Urethral Strictures, Peyronie's Disease, Penile Prosthesis, and Transgender Surgery	646-754-2419 lee.zhao@nyulangone.org
Philip Zhao, MD	Kidney Stone Disease, Upper Tract Urothelial Carcinoma, Ureteral Stricture Disease, and BPH/Benign Prostate Disease	646-754-2434 philip.zhao@nyulangone.org

*at NYU Langone Hospital—Brooklyn **NYU Langone Ambulatory Care Rego Park ***NYU Langone Levit Medical †NYU Langone Ambulatory Care—Bay Ridge
††NYU Langone Ambulatory Care—Brooklyn Heights †††NYU Langone Medical Associates—Chelsea ††††Preston Robert Tisch Center for Men's Health