Neurogenic Pelvic Pain

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KEYWORDS

• Pelvic pain • Iliohypogastric • Ilioinguinal • Genitofemoral • Pudendal • Tarlov cyst

KEY POINTS

- Neuralgia of the iliohypogastric, ilioinguinal, and genitofemoral nerves typically presents as pain and paresthesia in the groin or upper pubic region.
- Pudendal neuralgia is the most common cause of chronic perineal pain. Its effects often include debilitating and unrelenting pain of the perineal region aggravated by sitting and relieved by standing.
- Tarlov cysts are also known perineural cysts, extradural spinal meningeal cysts, or meningeal diverticula of sacral nerve roots. Tarlov cysts most commonly affect the S1-S3 nerve roots and are one of the most overlooked causes of lumbosacral radiculopathy and pelvic pain.
- Treatment of neurogenic pelvic pain generally consists of starting with conservative measures, such as physical therapy, lifestyle modification, and medications with escalation to more invasive and novel treatments, such as nerve blocks, radiofrequency ablation, cryoablation, neuromodulation, and neurectomy/neurolysis if conservative treatments are ineffective.

INTRODUCTION

Chronic pelvic pain is estimated to affect 7% to 24% of the general population.[1] Neurogenic causes of pelvic pain are among the least well-described in the medical literature, and can be very difficult to diagnose and treat. Many of the conditions described in this article have been recognized only within the past 10 to 15 years, and there are very few published randomized controlled trials for this patient population. Most of what we know is in the form of sparse case reports and retrospective reviews. Neurologic pathology in the pelvic region can produce extreme pain, which greatly affects quality of life by limiting the ability to sit, void/defecate, and engage in sexual intercourse. This review provides an overview of the main causes of neurogenic pelvic pain, along with information on diagnosis and treatment options.

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ANATOMY OF PELVIC NERVES

The ilioinguinal and the iliohypogastric nerves arise from the anterior rami of L1 with contributions from T12. Both nerves emerge from the lateral border of the psoas major and remain subperitoneal as they cross the quadratus lumborum. These nerves run inferiorly and anteriorly, piercing the internal oblique above the anterior superior iliac spine (ASIS) and giving motor innervation to that muscle. The iliohypogastric nerve then divides into its anterior and lateral cutaneous branches. The anterior branch of the iliohypogastric nerve provides sensory innervation to the skin at the lower abdominal area and the superior portion of the mons pubis. The lateral branch provides sensory innervation to a portion of the lateral gluteal region. The ilioinguinal nerve supplies cutaneous innervation superomedial area of the thigh, the root of the penis, and the anterior scrotum in men or the inferior mons pubis and labia majora in women.

The genitofemoral nerve arises from the L1 and L2 nerve roots and travels through the psoas major muscle at the level of L3-L4 and travels anterior to the psoas muscle in a caudal direction before branching into the genital and femoral branches. The genital branch passes through the internal inguinal ring and then takes differing paths in men and women. In men, it provides sensation to a portion of the scrotum and supplies motor fibers to the cremaster muscle. In women, it provides partial sensation to the labia. The femoral branch descends along with the external iliac artery and pierces the fascia lata entering the femoral sheath lateral to the femoral artery. It supplies sensation to the anterior portion of the upper thigh.

The pudendal nerve originates from the nerve roots of S2-S4. It passes into the gluteal region through the greater sciatic foramen alongside the sciatic nerve, courses over the sacrospinous ligament near its attachment to the ischial spine, and traverses back into the pelvic cavity via the lesser sciatic foramen. The sacrospinous ligament and sacrotuberous ligament, ventrally and dorsally, respectively, border the nerve. The pudendal nerve then passes through the Alcock canal along the medial ischial tuberosity, within the fascia of the obturator internus muscle. From inside and distal to the canal, the terminal branches of the pudendal nerve arise: the inferior rectal nerve, the perineal nerve, and the dorsal nerve of the penis/clitoris. The inferior rectal nerve provides sensory innervation to the distal aspect of the anal canal and the perianal skin and motor innervation to the external anal sphincter. The perineal nerve gives motor innervation to the superficial pelvic floor muscles and urethral sphincter and sensation to the perineum and labia. There is some evidence to suggest that the perineal nerve provides some contribution to the levator ani muscle as well.[2] The dorsal nerve provides sensory innervation to the clitoris or penis. It must be noted that after the pudendal nerve has exited the Alcock canal, many possible variations may occur.[3]

The posterior femoral cutaneous nerve arises from the S2-3 nerve roots in the sacral plexus and exits the pelvic cavity through the greater sciatic foramen just below the piriformis muscle. The inferior cluneal branches turn upward after coursing beneath the gluteus maximus and provide cutaneous innervation to the skin that covers the inferolateral portion of the muscle, as well as sending perineal branches to the ischial region and perineum.

The groin/pubic region has significant overlap of cutaneous innervation shared by the iliohypogastric, ilioinguinal, and genitofemoral nerves, while the perineal region is innervated by the pudendal, inferior cluneal, ilioinguinal, and genitofemoral nerves. This significant cutaneous sensory overlap typically renders the sensory neurologic examination of little use in the diagnosis of these neuropathies. The innervations of the pelvic lumbosacral plexus nerves are summarized in **Table 1**.