

Botulinum Toxin A Injection of the Obturator Internus Muscle for Chronic Perineal Pain

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Abstract: Chronic perineal pain is often a difficult condition to manage. Current treatments include pudendal nerve injections and pudendal nerve release surgery. The obturator internus muscle has a close relationship to the pudendal nerve and might be a potential target for therapeutic intervention.

Perspective: A case is presented of refractory perineal pain that was successfully treated by injecting the obturator internus muscle with botulinum toxin A.

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Key words: Chronic pain, perineal pain, obturator internus, botulinum toxin.

The cause of chronic perineal pain is often difficult to identify and the syndrome difficult to treat.^{1,39} Musculoskeletal dysfunction might contribute to the signs and symptoms of chronic pelvic pain.^{7,57} Although the obturator internus muscle has been identified as a possible pain generator,^{18,32,48,60} little has been written about this muscle as a possible target for therapeutic intervention. The fascia of the obturator internus muscle contributes to the formation of the pudendal canal and when thickened might become a possible entrapment site.⁴⁷ Injections into the muscle, adjacent to the canal, might have beneficial effects because of actions on both the muscle and the nerve in terms of decreasing compression and modulation of neurotransmitters.²⁵ Botulinum toxin has been used successfully in the treatment of chronic pain.^{10,13,19,20,33,43,49} A case is reported indicating that injection of the obturator internus muscle with botulinum toxin might be a therapeutic option for patients with chronic perineal pain. This case report received institutional review board approval, and the subject of the case report gave signed consent for participation.

Anatomy of the Pudendal Nerve and Obturator Internus Muscle

Arising from the sacral plexus (S2, 3, 4), the pudendal nerve is a sensory and motor nerve to the peri-

neum.^{51,54} The pudendal nerve enters the gluteal region through the lower part of the greater sciatic foramen below the piriformis muscle. It hooks around the sacrospinous ligament near its attachment to the ischial spine; the pudendal nerve reenters the pelvis through the lesser sciatic foramen and through the pudendal (Alcock's) canal that is formed by the obturator fascia on the lateral wall of the ischioanal fossa (Fig 1). Within the pudendal canal, the pudendal nerve divides into 2 terminal branches, the perineal nerve and the dorsal nerve of the penis or clitoris.

The pudendal canal is a fascial tunnel on the medial aspect of the obturator internus muscle. The obturator internus muscle originates within the pelvis on the obturator membrane, a membrane that closes all but the superior border of the obturator foramen, and on those portions of the pubis and ischium that surround the obturator foramen. It is a lateral rotator of the thigh. Although broad in origin, the muscle tapers to a narrow tendon that passes through the lesser sciatic foramen and rides over the ischial body (over a bursa) just superior to the ischial tuberosity to attach on the medial aspect of the greater trochanter of the femur.

Case Report

A 64-year-old woman complained of right-sided pelvic pain affecting the upper leg, vagina, and rectum. The pain was rated at a level of 4 to 8 out of 10 on a visual analogue scale and had been present for 4 years. The pain was aggravated by sitting. Previous diagnoses made included lumbosacral radiculopathy, post-laminectomy syndrome, pudendal nerve entrapment, sacroiliac joint dysfunction, and piriformis syndrome. The patient had received numerous medications and injection therapies in the past including pudendal nerve injections with local anesthetic and steroid, sacroiliac joint injections, and

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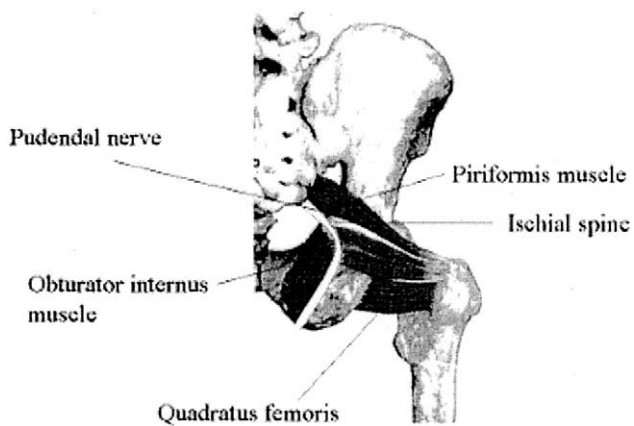


Figure 1. Anatomy of the obturator internus muscle and pudendal nerve.

piriformis muscle injections. Other previous therapies included physical therapy and water aerobics. The patient also had a pudendal nerve release procedure in France 2 years previously, but with only partial relief. Medications being taken at the time of the office visit included methadone 20 mg twice a day, zonegran 200 mg twice a day, Zoloft 50 mg once daily, valium 5 mg at night, and zanaflex 12 mg at night. Physical examination showed a distressed woman, uncomfortable while sitting, but there were no focal neurologic signs. A vaginal examination was not performed at that time but had been performed by a previous physician and showed tenderness at the right anterior and right posterior lateral regions.

The patient underwent a right obturator internus muscle injection with bupivacaine 0.25%, which gave 90% relief for 12 hours. The average preprocedural and postprocedural visual analogue scale scores were 7 of 10 and 1 of 10, respectively. After a subsequent botulinum toxin A injection, the patient again reported 90% relief from her pain for more than 3 months. Pain assessments were made before the procedure and then at 1-hour intervals after the procedure by using a 0 to 10 numeric rating scale. There were no adverse effects such as motor weakness or disturbance of bowel or bladder function.

Fluoroscopically Guided Obturator Internus Muscle Injection Technique

The patient was placed in the prone position. Standard monitors were applied consisting of electrocardiogram, pulse oximetry, and an automated blood pressure device. Sedation was achieved by using increments of intravenous midazolam and fentanyl. Fluoroscopy was used to visualize the obturator foramen. The skin and subcutaneous tissues were anesthetized by using 1% lidocaine. With an aseptic technique and transgluteal approach, a 22-gauge spinal needle was advanced to the lateral border of the obturator foramen, inferior to the ischial spine (Fig 2). Correct needle placement was confirmed by injecting 1 mL of iohexol. For the diagnostic injection 5 mL of 0.25% bupivacaine was injected. For

the second injection 100 units of botulinum A in 3 mL 0.25% bupivacaine was injected on a separate occasion.

Discussion

Pudendal nerve entrapment is a recognized cause of chronic perineal pain,^{42,46,47,54,63,66} typically presenting as pain in the penis, scrotum, labia, perineum, or anorectal region. Pudendal nerve pathology might also cause urinary incontinence, anal incontinence, and dysorgasmia. Pudendal nerve entrapment is a clinical diagnosis made in patients with the typical history of perineal pain aggravated by sitting, relieved by standing, and absent when recumbent or sitting on a toilet seat. No widely accepted confirmatory test is available, although a neurophysiologic examination might confirm nerve damage.³⁴

The pudendal nerve is predisposed to entrapment at the level of the ischial spine and within the pudendal canal.^{2,53} At the ischial spine, the nerve can be compressed between the sacrotuberous and sacrospinous ligaments. At the pudendal canal, the pudendal nerve can be compressed by the falciform process of the sacrotuberous ligament. The fascia on the obturator internus contributes to the formation of the pudendal canal. If thickened, the obturator fascia also might act as an entrapment site.⁴⁷ Treatments for pudendal nerve entrapment include local anesthetic and steroid injections, neurolysis, and surgical decompression.^{11,24,35,36,47,64} The analgesic effects of botulinum toxin have been reported in patients with cervical dystonia and spastic disorders.^{12,30,61,65} More patients reported improvement in pain than dystonia, raising the possibility that pain relief might not be solely the result of reduced muscular contractions.⁶⁵ Botulinum toxin has been used successfully in pain management for a number of conditions including headache,^{17,41,50,52,59,62} temporomandibular disorders,¹⁶

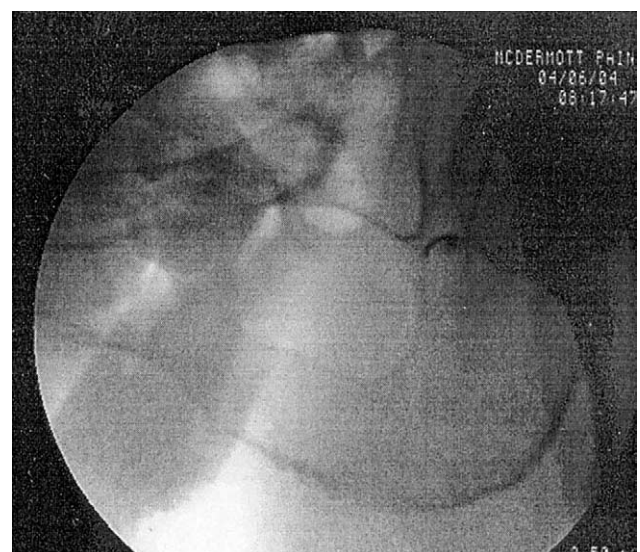


Figure 2. Fluoroscopic view of right obturator internus muscle injection.

neck pain,^{21,68} low back pain,^{14,15,26,44} piriformis syndrome,³¹ nonrelaxing puborectalis syndrome,⁵⁵ spasm of the levator ani muscles,²⁸ and vulvodynia.¹⁹ Botulinum toxin not only inhibits acetylcholine release but also the release of pain neurotransmitters such as glutamate, substance P, calcitonin gene-related peptide, and histamine.^{6,8,56,9,4,25,29,67} Reduced neurotransmitter release might prevent local sensitization of nociceptors and thus reduce the perception of pain. Botulinum toxin might also alter impulse transmission within the dorsal horn pathways responsible for hyperalgesic mediation.³ Other proposed mechanisms of action include changes in the sensitivity and response patterns of muscle nociceptors, diminished activity in the gamma-motor neurons with consequent changes in muscle spindle afferents, alterations in cholinergic control of vascular and autonomic functions, and direct noncholinergic effects on pain afferents.⁵ The duration of action of botulinum toxin correlates with neural sprouting and reinnervation of the muscle, which restores function in 1 to 4 months.²³ Adverse events from botulinum toxin therapy are not generally serious and might include localized pain, tenderness,

and bruising at the injection site, a flu-like syndrome,²⁷ weakness of adjacent musculature, dry mouth, dysphagia, and formation of neutralizing antibodies.^{37,38} Although botulinum toxin is not recommended as a first-line therapy for pain management,⁵⁸ it can be very useful in refractory cases.⁴⁵ Botulinum toxin is usually reconstituted by mixing the contents of a vial with normal saline, although it is also common practice to use local anesthetic as a diluent.⁴³ In the case reported, the pain relief obtained by the botulinum toxin injection might have resulted in part from the bupivacaine, although this effect would be expected to last only hours rather than months. Injection of botulinum toxin into the obturator internus muscle has not been previously described.

In conclusion, obturator internus muscle injections might be a therapeutic option for patients with chronic perineal pain whose other treatments have failed. The precise mechanism of action and the relative actions on the muscle and pudendal nerve remain to be elucidated. Evidence for efficacy from a single case report clearly has limitations,^{22,40} and so future randomized controlled studies are required.

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