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Case Report

CT-Guided Percutaneous Infiltration for the Treatment of Alcock's Neuralgia

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The pudendal nerve may be strained either between the sacrospinous and sacrotuberous ligaments at the ischial spine level or within Alcock's canal. Alcock's neuralgia is a rare, painful condition caused by compression of the pudendal nerve within Alcock's canal (pudendal canal) which is an aponeurotic tunnel that cannot be stretched. Patients usually present with intense, unilateral pain involving anatomic areas along the pudendal nerve's root, genital, anal, and pelvic regions causing mobility impairment. A computed tomography (CT) - guided percutaneous infiltration of the pudendal nerve with a mixture of a local anesthetic and a long-acting corticosteroid is a safe and efficient method that reduces the pain caused by the neuralgia. Corticosteroids and local anesthetics interfere with the neurons, the encoding, and the processing of noxious stimuli; interrupt the pain-spasm cycle; and reduce inflammation. The injected glucocorticosteroid may take 3-5 days to reach its anti-inflammatory effect; therefore, the initial pain relief from the local anesthetic is followed by a baseline pain return and then secondary pain relief at 3-5 days. The procedure is performed under minimal or no anesthesia. In general, at discharge, a responsible person must accompany the patient and ensure a safe return home. Clinical evaluation is performed after 7-10 days. There are 2 types of potential complications that are associated with percutaneous steroid infiltrations: intra-operative (associated with needle placement) and post-operative (infection, bleeding and those associated with the injectate administration). In all cases that steroids were administered within therapeutic doses, no complications were noted. In conclusion, CT-guided percutaneous infiltration with a mixture of long-acting corticosteroid and local anesthetic seems to be a safe and efficient method for the treatment of Alcock's neuralgia.

Key words: Alcock's canal, neuralgia, corticosteroid, pudendal; nerve, local anesthetic, computed tomography, infiltration, percutaneous, image guided.

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The pudendal nerve is formed from the union of the S2, S3 and S4 nerves which derive from the sacral plexus (1). Pudendal nerve neuralgia is a rare disorder caused by a perineal injury, a spine process fracture, or a nerve compression within Alcock's canal (Alcock's syndrome). In the majority of cases the disorder is characterized by intense, unilateral pain involving anatomic areas along the pudendal nerve's route, genital, anal, and pelvic regions (1-3). A CT-guided percutaneous infiltration of the pudendal

nerve with a mixture of a local anesthetic and a slow-acting corticosteroid is a safe and efficient method that reduces the pain caused by the neuralgia.

Case Presentation

A 37-year-old male patient (a former professional cyclist) was referred to our department for a CT-guided percutaneous infiltration of the pudendal nerve for the treatment of Alcock's neuralgia. The patient reported a burning sensation in the perineal region but he could not recall any former traumatic injury. All his laboratory evaluations were within normal limits. The patient was asked to fill in a pain inventory with questions about pain and mobility impairment as well as their effect on his quality of life. Answers were given in the form of the Numeric Visual Scale (NVS) ranging from 0 (no pain at all) to 10 (the worst pain the patient can imagine). The mean value of pain prior to the infiltration was 7/10 NVS units with a mobility impairment of 8/10 NVS units. The patient was then informed on the technique, the benefits, and the potential complications of the intervention as well as post-procedure care, and a written informed consent was obtained. The hematological examination including a blood coagulation check-up that was obtained 48 hours prior to the session; it was within normal limits.

The patient was placed in a prone position and CT images of sections of 3 mm thickness were obtained at the level of the sacrospinous process (4). These images were used for the general control of the area's anatomy, and to limit the entry point and the course of the needle (a relatively vertical root of the needle avoiding the sciatic nerve and the proximal pudendal vessels constitutes an important factor that indicates the correct entry point). Under extensive and strict local sterile measures and local anesthesia (1-3 mL lidocaine hydrochloric 2%) a 22-guage needle was advanced under CT guidance through the gluteal muscle to the fascia of the internal obturator muscle (the pudendal nerve and the vessels protrude from a small deficit of the fascia of the internal obturator muscle) (Fig. 1). The appropriate needle placement near the pudendal nerve, but away and outside from the vessels, was confirmed with an injection of 1-2 mL of non-ionic contrast media (Fig. 2) (5). Before injecting the mixture (a long-acting particulate corticosteroid (Cortivazol) and a local anesthetic (1-2 mL lidocaine hydrochloric 2%), aspiration was preceded in order to avoid intravascular injection (6-8). Following the end of the procedure the patient remained in the interventional radiology department for 2 hours. Immediate clinical and neurologic examinations were within normal limits and the patient exited

Fig. 1. *The needle tip (arrow) is advanced through the gluteal muscle to the fascia of the internal obturator muscle where the pudendal nerve protrudes from a small deficit of the fascia*

the department with written instructions. One week later the patient reported a 60% improvement concerning pain and mobility. A second session was performed and 10 days later the patient reported a mean pain value of 1/10 NVS units and 0/10 for mobility impairment. Three months later, the patient reported a mean pain value of 2/10 NVS units and 0/10 for mobility impairment.

Discussion

The pudendal nerve is a mixed nerve (both sensory and motor) that innervates the anal, perineal, and genital areas; the muscles of the pelvic floor; and the anal and urethral sphincters. It is formed from the union of the S2, S3, and S4 nerves which derive from the sacral plexus (1). It passes through the lower part of the great sciatic foramen, leaves the pelvis, and crosses the ischial spine under the sacrospinous ligament. It courses together with the internal pudendal vessels, the fascia of the internal obturator muscle, and the sacrotuberal ligament. The pudendal or Alcock's canal is formed by a duplication of the internal obturator fascia and encloses the internal pudendal vessels and the pudendal nerve. The pudendal nerve branches off into the inferior rectal nerves after leaving the lesser pelvis and then divides into its terminal branches: the dorsal nerve of the clitoris or penis, and the perineal nerve in the perineal region.

There are two possible levels at which the pudendal nerve may be strained (1,9):

- At the ischial spine the nerve may be compressed between the 2 ligaments (sacrospinous and sacrotuberous)
- In Alcock's canal (an aponeurotic tunnel that cannot be stretched).

Patients suffering from Alcock's syndrome complain of chronic and intense pain (a burning type of perineal pain) with bouts of skin hyperalgesia, dermal sensitivity, paresthesia and numbness (1-3). All these clinical symptoms concern at length the anatomical regions included in the course of the pudendal nerve, the genital bodies, and the anus. The pain may radiate out into the entire pelvis and it usually aggravates when the patient remains seated, while alleviation is observed during walking or a standing posture (1).

A CT- guided percutaneous infiltration of the pudendal nerve with a mixture of a local anesthetic

Fig. 2. *Injection of 1-3 1ml of contrast medium (arrow) confirms the appropriate needle placement near the pudendal nerve but away and outside from the vessels*

and a long-acting corticosteroid can be done to one or both points of possible nerve compression in the same session (an injection of the entire dose or half the dose of the mixture for each point). The procedure is performed under minimal or no anesthesia. The corticosteroid administration is performed in order to achieve a neural blockade which will alter or interrupt the neural processes of encoding and processing of the noxious stimuli, the afferent fibers reflex mechanisms, the neurons' self-sustaining activity, and the central neuronal activities pattern. In addition, the corticosteroid administration will inhibit the synthesis and/or the release of pro-inflammatory mediators, thus reducing inflammation (9,10). On the other hand, administration of the local anesthetic interrupts the pain-spasm cycle as well as the transmission of noxious stimuli (9,10). The injected glucocorticosteroid may take 3-5 days to reach its anti-inflammatory effect; the initial pain relief from the local anesthetic is followed by a baseline pain return and then secondary pain relief at 3-5 days (11).

Post-discharge instructions vary from center to center. In general, at discharge, a responsible person must accompany the patient and ensure a safe return home. The patient is usually allowed to return to normal activities after the first 24 hours. Clinical evaluation is performed after 7-10 days. However, in many centers throughout Europe, immediate mobilization of the patient is performed and an accompanying person is not required.

Kastler et al (8) reported greater pain reduction scores after infiltration of both possible points (70-80% pain reduction after infiltration of both points versus 30-40% after the infiltration of one point) with a mean period of 3 months improvement . Moreover, Kastleher et at (1) features a study that shows correlated full pain elimination after infiltration, lasting for at least 2 weeks (particularly if 2 sessions have been done) with the effectiveness of a future operation. There are 2 types of potential complications that are associated with percutaneous steroid infiltrations: intra-operative (associated with needle placement) and post-operative (infection, bleeding and those associated with the injectate administration) (12-21). In all the cases that steroids were administered within therapeutic doses, under imaging guidance, and the appropriate technique, no complications were noted. In general, CT-guided, percutaneous steroid infiltrations for the treatment of Alcock's neuralgia constitute a safe technique; clinically significant complications are quite unusual with a threshold ≤ 0.5%.

Multiple other treatments include pulsed radiofrequency (22) and peripheral nerve stimulation (23).

Limitations

Limitations of this case report include the radiation exposure and the potential availability of CT in everyday clinical practice for Interventional Radiology techniques. On the other hand we are performing a low budget technique since the needles and drugs used are not expensive. The only real cost has to do with the CT guidance however this type of imaging guidance seems to add on both the safety and the efficacy of the technique.

Conclusion

In conclusion, taking account the minimally invasive nature, the short duration and low cost of the technique it seems that CT-guided, percutaneous infiltration of pudendal nerve is a safe and efficient technique for the therapy of pudendal neuralgia (Alcock's neuralgia).

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