Ultrasound–guided pudendal nerve pulsed radiofrequency in patients with refractory pudendal neuralgia—Three cases report—

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Pudendal neuralgia is characterized by severe sharp pain along the innervation area of the pudendal nerve, which may be worsened when sitting position. Successful pudendal nerve block is crucial to the diagnosis of pudendal neuralgia. Although fluoroscopy-guided pudendal nerve blocks have traditionally been performed, recently ultrasound-guided pudendal nerve blocks were reported. For the long term effect of nerve block, pulsed radiofrequency was performed under fluoroscopic guidance in some reports. We report our successful experiences of three cases using ultrasound-guided pulsed radiofrequency. (Anesth Pain Med 2014; 9: 250-253)

Key Words: Perineal pain, Pudendal nerve, Pudendal neuralgia, Pulsed radiofrequency, Ultrasound guidance.

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CASE REPORTS

Case 1

A 72-year-old male had been diagnosed with prostate cancer when he had visited a different hospital three years prior. He had undergone robot-assisted retropubic radical prostatectomy. The patient complained of erectile dysfunction and urinary incontinence after recovery. He underwent sling surgery a year later, because the symptoms had not improved following conservative management. After that, a perineoscrotal and urethral pain appeared which took the form of a lancinating, sharp, and burning sensation with a numeric rating scale (NRS) of 8/10. The pain was aggravated by static activity and in a sitting position, and was relieved by dynamic activity. Urination was not associated with the nature of the pain. Urologic evaluations could not reveal the cause of the pain. The patient was referred to our pain clinic. A US-guided pudendal nerve block was carried out using 5 ml of 1% lidocaine with triamcinolone acetonide 5 mg. The patient was placed in the prone position with a pillow beneath the pelvic area. The skin from the left lower gluteal line to the iliac crest was draped with a sterile technique. After the block, the
perineoscrotal pain improved to a NRS of 3/10 for four hours. For pain management, a 37.5 mg tramadol/375 mg acetaminophen combination tablet three times a day, 5 mg nortriptyline twice a day and 400 mg gabapentin three times a day were administered for 2 weeks. A second diagnostic US-guided left pudendal nerve block with 5 ml of 0.25% bupivacaine was performed 2 weeks later. The patient experienced significant pain relief again for 6 hours. Therefore, a US-guided PRF of the left pudendal nerve was performed for treatment.

The patient lay in the prone position. A US-guided PRF of the left pudendal nerve was performed using a 5–12 MHz curved transducer (SonoSite Inc., Bothell, WA, USA). By tracing the US transducer caudally from ilium, the ischium became progressively straighter as it transformed into the ischial spine. The transducer was positioned in the supposed position of the sacrospinous ligament. At this level, we identified the internal pudendal artery and the pudendal nerve (Fig. 1). A 22-gauge, 10 cm long, 10 mm active tip radiofrequency (RF) needle (Radionics Inc., Burlington, MA, USA) was moved near to the left pudendal nerve (Fig. 2). The sensory stimulation at 50 Hz and 0.4 V produced paresthesia in the innervation of the pudendal nerve. The US-guided PRF was performed at 42°C for 120 seconds. The curved RF needle was turned by 90 degrees clockwise from the initial target lesion and the PRF was then performed again. In the same manner, the PRFs were repeated until the entire 360 degree area had been covered. The position of the needle tip was checked under fluoroscopy (Fig. 3).

After the procedure, the pain decreased to NRS of 0/10. The pain relief was continued for 6 months and the patient is currently being monitored as part of follow-up.

**Case 2**

The second patient was a 34-year-old male experiencing pain in the glans penis and the external urethral orifice. His penile pain had been expressed as a burning sensation with a NRS of 6/10 for 5 years. He visited the urology department to evaluate the cause of the pain but there was no specific finding. The symptoms progressively worsened and turned into a lancinating, burning and penetrating pain in a sitting
position. He took 150 mg pregabalin, and 10 mg amitriptyline, 10 mg oxycodone three times a day for 2 years, but the effects were minimal. Differential diagnostic blocks of the pudendal nerve were performed twice under US guidance. As a result, the patient’s NRS significantly decreased from 6/10 to 3/10 for six hours. We decided to perform a PRF under US guidance. The procedure was carried out in using the same technique as in case 1. The patient’s NRS was maintained as 3/10 for two years after the procedure.

**Case 3**

The third patient was a 61-year-old female referred to the pain clinic for intractable vagina, vulva, and perineal pain. She was diagnosed with atrophic vaginitis and was treated conservatively in gynecology for 10 months. However, the patient’s symptoms had gradually worsened. The pain was rated as NRS 8/10 and was aggravated in a sitting position. Furthermore, she had side effect of opioid and anticonvulsant such as nausea, vomiting, and dizziness. An US-guided pudendal nerve block was performed using 5 ml of 2% lidocaine, and resulted in gradual improvement of the perineal pain. We performed a US-guided pudendal nerve PRF in the same fashion as in cases 1 and 2 (Fig. 4). As a result, the patient’s pain decreased to NRS 0/10 for one year.

**DISCUSSION**

In the first case, the symptoms occurred after sling-surgery. Urinary incontinence is a significant complication of retropubic radical prostatectomy, and a sling operation is sometimes needed [4]. Senechal et al. [7] demonstrated the origin, course and termination of the perineal nerve as a branch of the pudendal nerve derived from the second, third and fourth anterior sacral rami. Pudendal nerve branches are located in the zone of lateral dissection towards the ischiopubic rami. The pudendal nerve innervates to the penis, clitoris, bulbospongiosus muscle, ischiocavernosus muscles, scrotum, and anus. The pain can occur from pudendal nerve entrapment or damage. Some studies reported pudendal nerve block as an effective treatment for urinary urgency, hesitancy, and male pelvic pain [8,9]. Pudendal neuralgia may occur without a specific provoking factor. Patients with pudendal neuralgia experience disturbance in their daily life activities, such as working at a desk, studying in school, and driving a car. However, definite treatment guidelines have not been established for pudendal neuralgia [10]. Pudendal nerve block is a possible method for diagnosis and treatment.

Although multiple techniques of pudendal nerve block have been demonstrated [6,10], the success rate of US-guided pudendal nerve block is comparable with that of fluoroscopy guided block [5]. A computed tomography (CT)-guided pudendal nerve block technique has been reported in previous studies. The use of CT images to guide the pudendal nerve block adds to the level of accuracy of the procedure. However, the physician becomes exposed to radiation. Ultrasound scanning in the transverse plane was used to find the ischial spine, sacrotuberous ligament, sacropinous ligament, and internal pudendal artery. A low frequency transducer was located at the level of the ilium, and was caudally moved. The ischium became progressively straighter. Bellingham et al. [5] reported that the time needed to perform the US-guided technique was 3.5 minutes longer than in the fluoroscopic approach, despite the theoretical advantage of the visualization of the interligamentous plane, ischial spine, internal pudendal artery, and pudendal nerve. They showed that patients in the US-guided group had a lower incidence of sciatic numbness than in the fluoroscopy-guided group. Furthermore, the real challenge was to direct the needle near the pudendal nerve with the in-plane approach. The nerve block with US-guidance present several advantages, such as being less hazardous than a fluoroscopy-guided nerve block and requiring a relatively small amount of local anesthetics due to visualization of the target nerve [11]. If a US-guided PRF is to be performed, accurate visualization of the target nerve may be a weighty factor.
Fluoroscopy-guided pudendal nerve block is also available. However, fluoroscopy finds a shortcoming in radiation exposure. A sensory test should be performed in the fluoroscopy guidance. Tagliafico et al. [12] reported that US can identify all the terminal branches of the pudendal nerve by up to 75% with a high-frequency transducer. Furthermore, in young female patients of reproductive age, US-guided nerve block can be performed more safely than fluoroscopy-guided block.

RF has been a generally popular treatment modality since the 1950s. Unfortunately, the long-term outcomes of pudendal nerve blocks have been worse than expected for pudendal neuralgia [3]. Therefore, it is believed that the long-term therapeutic effect from RF treats the underlying peripheral lesion. RF lesioning is clinically used in two ways [13]. The conventional method uses a constant output of high-frequency current and produces heat over 45°C, whereas the PRF temperature generally does not exceed 42°C [13]. Conventional RF can cause permanent nerve damage by neuroablative thermocoagulation. PRF produces the same voltage fluctuations in the lesion of the treatment target without thermocoagulation. Unlike in conventional RF neurotomy, the therapeutic effect of PRF is obtained from the delivery of an electromagnetic field and the dissolution of heat between pulses instead. Numerous case reports of PRF for the treatment of intractable pain can be found, and significant clinical results are found with PRF of the pudendal [6], femoral, obturator, supraorbital [14], and third occipital nerve [15]. Importantly, PRF is safe and there are few reports of adverse effects. To get a successful outcome from PRF, multiple cycles should be performed. Besides, there are several small branches of the pudendal nerve [6]. In order to successfully perform a US-guided pudendal PRF, the acquisition of the ultrasound anatomy around the pudendal nerve and of the scanning techniques is required.

In this report, we presented a case series of successful US-guided pudendal PRFs. We suggest that US-guided pudendal PRF is one of the management methods for intractable pudendal neuralgia.

REFERENCES