

Successful management of a refractory case of postoperative herniorrhaphy pain with extended duration pulsed radiofrequency

ABSTRACT

Chronic postsurgical pain (CPSP) is a distressful condition following hernia surgery. A 25-year-old, 55 kg male patient presented with severe pain on the right side of the lower abdomen that radiated to the testicle and the inner side of the thigh. Patient was symptomatic since 5 months following inguinal herniorrhaphy surgery. The pain was not relieved with pharmacological and interventional nerve blocks. An ultrasound-guided ilioinguinal-iliohypogastric (II-IH) block with extended duration (42°C, four cycles of 120 s each) pulsed radiofrequency (PRF) and a diagnostic genital branch of genitofemoral nerve (GGFN) block provided pain relief. After 1-month, an extended duration PRF in GGFN resulted in complete resolution of symptoms. During a regular follow-up of 9 months, patient reported an improved quality-of-life. We believe the successful management of CPSP following hernia repair with single extended duration PRF of II-IH and GGFN has not been described in the literature.

Key words: Analog pain scale; chronic pain; neuralgia; pulsed radiofrequency

Introduction

Chronic postsurgical pain (CPSP) following inguinal hernia repair surgery has a mean incidence of 11% (range 0-43%).^[1] Due to the lack of comparative studies, the best modality for the treatment of CPSP is yet to be elucidated.

Recent literature suggests that pulsed radio frequency (PRF) application to the saphenous nerve for 8 min with a temperature below 42°C improved knee pain and patient satisfaction.^[2] The current literature supports the idea of provision of PRF for an extended duration with encouraging results. We describe the successful management of CPSP following hernia surgery with a single application of extended

duration PRF of nerves, which we believe, has not been described earlier.


Case Report

A 25-year-old, 55 kg male presented with severe pain on the right side of the abdomen that radiated to the testicle and the inner side of the thigh, was aggravated on walking and incapacitated him to perform routine work. Other complaints were daytime sedation and loss of job since 5 months. The past history revealed inguinal hernia surgery 6 months back. The patient developed severe pain after 1-month of surgery which progressively increased to hyperalgesia and allodynia.

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Patient was on regular medical management including per oral diclofenac, paracetamol-tramadol combination, and gabapentin with no relief in pain and had received several interventional pain injections earlier. Systemic and neurological examination was unremarkable. Blood and other investigations were acceptable. After explaining the procedure to the patient, a written informed consent was taken. In the pain management theater, intravenous access was secured, and noninvasive blood pressure, oxygen saturation, and electrocardiograph monitoring were monitored.

Ilioinguinal-iliohypogastric nerve block

Under strict asepsis and a linear high-frequency ultrasound probe (Sonosite, Inc., Bothell, WA 98021 USA) was placed medial and inferior to anterior superior iliac spine. Ilioinguinal-iliohypogastric (II-IH) nerves were identified between the internal oblique and transverses abdominis muscle and a 5 cm, 22 G RF cannula (Cosman Medical Inc., Burlington, MA, USA) was inserted using the in-plane technique. The correct placement of needle tip was verified with sensory stimulation at 50-Hertz frequency and 0.5 volts. Extended duration PRF was applied at 42°C with four cycles of 120 s each (8 min). After negative aspiration for blood, a mixture of 5 ml of 0.2% ropivacaine and 20 mg of triamcinolone was injected. The visual analog scale (VAS) reduced from 100 to 0 in the II-IH territory.

Genital branch of genitofemoral nerve block

Under strict asepsis, high-frequency ultrasound probe was placed in the right inguinal area. The femoral artery was followed cranially until the spermatic cord was located (above the inguinal ligament) just lateral to the symphysis pubis. On gentle traction of the testis, the spermatic cord was confirmed. The testicular and vas deferens vessels were located with color Doppler.^[3] Using an in-plane technique, a 5 cm, 22 G RF cannula was advanced toward the genital branch of the genitofemoral nerve (GGFN) using the in-plane technique. Correct needle positioning was verified with sensory stimulation and motor stimulation. A diagnostic block in GGFN with 5 ml of 0.2% ropivacaine and 20 mg of triamcinolone resulted in preblock VAS of 100 to zero in the right testicular area. However, after 2 weeks, the VAS increased to 50 on movement and after 1-month PRF of GGFN^[3] was performed (8 min) using the same methodology described above. The procedure reduced VAS from preblock VAS of 50 on movement to postblock VAS of zero. Thereafter, the patient received Amitriptyline 10 mg once daily at night, Gabapentin 100 mg twice daily and occasional analgesics for 5 months. At present, the patient has resumed his earlier job after a gap of more than 1-year and is now currently not on any analgesics from the past 4 months. The World Health Organization Quality of Life BREF score^[4] increased from an

initial score of 32 (first visit in pain management center) to 106 at follow-up of 9 months.

Discussion

During surgery nerve damage occurs which leads to altered ectopic electrical activity and abnormal neural function leading to CPSP. This may cause spontaneous pain, dysesthesia, and hypersensitivity like allodynia, hyperalgesia or hyperpathia.^[1] Similar symptoms were present in the present case. The initial benefit observed in our patient was due to extended duration PRF to II-IH and a diagnostic block of GGFN. However, complete resolution of symptoms occurred after application of extended duration PRF in GGFN.^[1,5] The diagnostic nerve block was required in GGFN since it is a mixed nerve (motor-sensory).^[2]

Pulsed radio frequency provides high-intensity currents in pulses allowing heat to dissipate in the latent period and acts selectively on A-delta and C-fiber leading to increase in c-fos protein and an up regulation of intermediate early gene expression.^[6] The extended duration of neuro-modulation (8 min) provided an effective nonsurgical management of the patient. The strength of the present case report is early and long-term pain relief with improved quality-of-life following the use of single application of extended duration PRF in II-IH and GGFN.

Earlier studies that reported the application of PRF in the management of CPSP had performed it for 2-3 min only. Rozen and Parvez applied PRF at 45°C for 2 min in T₁₂, L₁, and L₂ nerve root blocks in five patients with chronic inguinal pain. They reported unpredictable results to as low as 55 to a maximum of 100% pain relief for 6-9 months.^[7] PRF at 42°C for 120 s duration in II-IH and GGFN in three patients with groin pain required repeated PRF applications and patients had a follow-up of 6 months.^[8] A systematic review concluded that PRF treatment of 2 min resulted in pain relief between 63% and 100% with a follow-up period of 3-9 months.^[9]

Conclusion

Single application of extended duration PRF to II-IH and genitofemoral nerves can provide effective relief from refractory CPSP following inguinal hernia surgery.

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Conflicts of interest

There are no conflicts of interest.

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