A 58-year-old very obese female with a history of chronic low back pain presented with severe numbness and a tingling sensation in the left anterior lateral thigh. Severe disabling conditions had manifested over a 4-month period. The numbness and tingling sensation lasted no more than 5 minutes per episode, and the pain attacks occurred 40-50 times a day. A neurological examination was normal, except for the severe numbness and tingling sensation in the left anterior lateral thigh. Lumbar magnetic resonance imaging (MRI) revealed no acute lesions except for a mild posterior disc bulging at the L2-3 level. This lesion was unchanged when compared with a lumbar MRI taken two years prior. Her chronic back pain was relatively well controlled without medication, but her thigh pain was unresponsive to conservative treatment with medication.

Before visiting our outpatient clinic, the patient had undergone various treatments including weight reduction, medication, and acupuncture around the left anterior lateral thigh. However, her symptoms did not improve, and instead had progressed. Treatment with non-steroidal anti-inflammatory drugs and anticonvulsants was unhelpful, as was using suspenders instead of a belt to avoid waist compression. LFCN blocks using a local anesthetic and steroids were performed twice at 1-week intervals in our outpatient clinic. These blocks provided temporary pain relief that lasted about 1 week. After the positive results of the diagnostic nerve blocks, the patient was scheduled for PRF.
treatment of the LFCN.

We performed fluoroscopically guided selective LFCN PRF using a NeuroTherm NT1,000 (NeuroTherm, Inc., Middleton, MA, USA) radiofrequency generator. In the operating room, the patient’s position was supine. The target site was prepped with betadine and aseptically draped, and the anterior superior iliac spine was identified under C-arm fluoroscopy. A disposable 20-gauge, 15 cm radiofrequency cannula (Model S-1505, NeuroTherm, Inc., Middleton, MA, USA) with a 5 mm active tip was inserted (Fig. 1). The introducer needle was withdrawn and the disposable RF electrode (Model RFDE-15, NeuroTherm, Inc., Middleton, MA, USA) was advanced. This was accomplished without bleeding.

Selective stimulation of sensory fibers (50 Hz) showed concordant pain between 0.3 and 0.5 V, which confirmed proper localization of the PRF electrode. Motor stimulation was negative at 1.7 V. After stimulation, PRF lesioning was performed for a total of 240 pulses. The pre-set maximal temperature was 42°C. After the procedure, her pain, as measured on a visual analog scale, had decreased by 75% without medication. The pain intensity did not aggravate after 4 months of follow-up without medication.

**DISCUSSION**

Meralgia paresthetica is a compressive mononeuropathy with a reported population incidence of 1 in 10,000. It results from compression of the LFCN where it crosses between the anterior superior iliac spine (ASIS) and the inguinal ligament to enter the thigh. Because the LFCN is purely sensory, clinical symptoms are characterized by numbness, tingling, pain, or a burning sensation without motor symptoms in the anterior lateral thigh.

More than half of patients with MP are successfully managed with conservative treatment, including weight reduction, avoidance of a tight belt, and medication. A small group derive lasting relief from an LFCN block. When patients do not respond to these treatments, physicians consider spinal cord stimulation, PRF, chemical or surgical neurolysis, or surgical nerve transaction. In this case, LFCN blocks provided temporary pain relief, but symptoms recurred within 1 week. Moreover, our patient strongly refused surgery. Thus, we recommended PRF neuromodulation treatment.

Two types of radiofrequency lesioning are clinically used, conventional radiofrequency and PRF. PRF neuromodulation is non-destructive but can relieve pain by delivering an electrical field to neural tissue. While the effects of conventional radiofrequency thermal lesioning have a clear pathophysiological background in the destruction of nerve tissue and the subsequent blockade of pain transmission, the mechanism of PRF is still unknown. One theory that explained PRF suggests a neuromodulatory effect via changes in gene expression in pain processing neurons. There are several advantages to using PRF for pain control: 1) it may provide long lasting pain relief with less side effects; 2) it can be repeated if the pain recurs, since no tissue has been destroyed; and 3) many published reports have revealed the efficacy of PRF for peripheral nerve lesions. Thus, PRF is a promising treatment for patients with chronic pain refractory to conservative treatment.

The LFCN typically arises from the dorsal branches of the ventral rami of the L2 and L3 spinal nerves. After emerging from the lateral border of the psoas major, the LFCN travels across the iliac muscle toward the ASIS, and then enters the anterior lateral thigh by passing under, through, or above the inguinal ligament. In most individuals, the LFCN crosses into the anterior lateral thigh approximately 1 cm medial to the ASIS. However, the relationship of the LFCN to the ASIS is quite variable. The nerve may cross into the anterior lateral thigh as much as 2 cm lateral or 6 cm medial to the ASIS. A bifurcation into anterior and posterior divisions occurs approximately 5-12 cm below the anterior superior iliac spine. Kostiyantrakul et al. reported that 58.3% of LFCNs passed medial to the ASIS, 22.9% passed at the ASIS, and 18.8% passed lateral to it. While the medial branch, dorsal root ganglion, and suprascapular nerve have confident bony landmarks for local injection and PRF neuromodulation, the LFCN landmarks are relatively uncertain. Thus, it is difficult to accurately target the LFCN due to its anatomical variations. On the other hand, nerve blocks with injections may deliver their effects through diffusion to the surrounding tissue, which means relatively inaccurate targeting can be tolerated. However, when ablat- ing the nerve with radiofrequency, the practitioner should be aware of the exact anatomy, because lesion creation should be more restricted and exact. In this case, the nerve was found and
targeted somewhat inferior to the usual location of the LFCN block (Fig. 1). More clinical trials and studies are needed for better identification of the target point.

**CONCLUSION**

Experience and documentation of PRF neuromodulation of the LFCN is rare. But, PRF neuromodulation of the LFCN may offer an effective, low risk treatment in patients with meralgia paresthetica who are refractory to conservative treatment or are unwilling or unfit to undergo surgery. Further controlled prospective studies are necessary to evaluate the exact effects and long term outcomes of this method.

**References**

1. Barna SA, Hu MM, Buxo C, Trelia J, Cosgrove GR : Spinal cord stimulation for treatment of meralgia paresthetica. *Pain Physician* 8 : 315-318, 2005
2. Cahana A, Vutskits L, Muller D : Acute differential modulation of synaptic transmission and cell survival during exposure to pulsed and continuous radiofrequency energy. *J Pain* 4 : 197-202, 2003
3. Cosman ER Jr, Cosman ER Sr : Electric and thermal field effects in tissue around radiofrequency electrodes. *Pain Med* 6 : 405-424, 2005
4. de Ridder VA, de Lange S, Popta JV : Anatomical variations of the lateral femoral cutaneous nerve and the consequences for surgery. *J Orthop Trauma* 13 : 207-211, 1999
5. Dias Filho LC, Valença MM, Guimarães Filho FA, Medeiros RC, Silva RA, Morais MG, et al. : Lateral femoral cutaneous neuralgia : an anatomical insight. *Clin Anat* 16 : 309-316, 2003
6. Friedlander WJ : Meralgia paresthetica. *U S Armed Forces Med J* 3 : 1857-1862, 1952
7. Higuchi Y, Nashold BS Jr, Sluijter M, Cosman E, Pearlstein RD : Exposure of the dorsal root ganglion in rats to pulsed radiofrequency currents activates dorsal horn lamina I and II neurons. *Neurosurgery* 50 : 850-855; discussion 856, 2002
8. Khalil N, Nicotra A, Rakowicz W : Treatment for meralgia paraesthetica. *Cochrane Database Syst Rev* : CD004159, 2008
9. Kosiyatrakul A, Nuansalee N, Luenam S, Koonchornboon T, Prachaporn S : The anatomical variation of the lateral femoral cutaneous nerve in relation to the anterior superior iliac spine and the iliac crest. *Musculoskelet Surg* 94 : 17-20
10. Munglani R : The longer term effect of pulsed radiofrequency for neuropathic pain. *Pain* 80 : 437-439, 1999
11. Nouraei SA, Anand B, Spink G, O’Neill KS : A novel approach to the diagnosis and management of meralgia paresthetica. *Neurosurgery* 60 : 696-700; discussion 700, 2007
12. Philip CN, Candido KD, Joseph NI, Crystal GJ : Successful treatment of meralgia paresthetica with pulsed radiofrequency of the lateral femoral cutaneous nerve. *Pain Physician* 12 : 881-885, 2009
13. Ray B, D’Souza AS, Kumar B, Marx C, Ghosh B, Gupta NK, et al. : Variations in the course and microanatomical study of the lateral femoral cutaneous nerve and its clinical importance. *Clin Anat* 23 : 978-984, 2010
14. Rohof OJ : Radiofrequency treatment of peripheral nerves. *Pain Pract* 2 : 257-260, 2002
15. Seror P, Seror R : Meralgia paresthetica : clinical and electrophysiological diagnosis in 120 cases. *Muscle Nerve* 33 : 650-654, 2006
16. Son JH, Kim SD, Kim SH, Lim DJ, Park JY : The efficacy of repeated radiofrequency medial branch neurotomy for lumbar facet syndrome. *J Korean Neurosurg Soc* 48 : 240-243, 2010