Interventional Pain Management Reports
ISSN 2575-9841 Volume 2, Number 3, pp 89-92

Case Report

Pulsed Radiofrequency Ablation after One Block for the Treatment of Meralgia Paresthetica

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Meralgia paresthetica describes a condition in which impingement of the lateral femoral cutaneous nerve (LFCN) causes anterolateral thigh numbness, and often pain. Treatment options include conservative care with nonsteroidal anti-inflammatories, local anesthetic nerve blocks with corticosteroids, radiofrequency ablation of the LFCN, and surgical interventions, such as neurolysis and neurectomy. When a left femoral cutaneous nerve block is used to treat meralgia paresthetica, it is typically repeated before advancing to pulsed radiofrequency ablation (pRFA). We hypothesized that a single trial of a LFCN block, which relieved pain, but for only a short duration was sufficient to advance to pRFA .

Our patient was a 55-year-old woman with right anterior lateral thigh pain for 1 year, which made activities of daily living difficult and was resistant to conservative treatment which included non-steroidal anti-inflammatories, an antidepressant, and an anticonvulsant. Diagnosis of meralgia paresthetica was established by physical exam, nerve conduction study, and electromyography. A LFCN block under ultrasound guidance was successful in resolving 100 percent of the pain for approximately 2 weeks duration, at which time the pain and paresthesia returned to original intensity. The patient was deemed an appropriate candidate for pRFA of the LFCN, which resulted in complete resolution of symptoms as of her 9 month follow-up visit.

To our knowledge, this is the first report of the use of pRFA after a single LFCN block providing faster resolution of symptoms and return to activities of daily living.

Key words: Pulsed radiofrequency ablation, RFA, pRFA, meralgia paresthetica, lateral femoral cutaneous nerve, LFCN

Meralgia paresthetica commonly presents with numbness and paresthesia of the anterolateral thigh, with or without pain, and is typically caused by impingement of the lateral femoral cutaneous nerve (LFCN). The LFCN originates in the lumbar plexus, most often from the L2 and L3 nerve roots, travels obliquely along the lateral border of the psoas major muscle, anterior to the iliacus muscle, and then under the lateral inguinal ligament 1 cm medial and inferior to the anterior superior iliac spine (ASIS) (1,2). It then most commonly divides into anterior and posterior branches within the thigh 5 to 12 cm below the ASIS as it emerges from the fascia latae although research has shown that there may be variability in the position of the nerve (3,4). The most common site of impingement is below the inguinal ligament with etiologies including obesity, pregnancy, ascites, ASIS avulsion, tight fitting garments, seat belt use, and prolonged sitting (1). Iatrogenic causes include surgical complications following posterior spine surgery, iliac crest bone grafts, lumbar disk surgery, hernia repair, and appendectomies (5).

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Meralgia paresthetica can be easily diagnosed by physical exam and electrophysiology studies, however, with a prevalence of only 4.3 cases per 10,000 patient years in the general population, research has been limited (1). There are also many conditions that can mimic meralgia paresthetica such as lumbar stenosis, disc herniation, nerve root radiculopathy, and trochanteric bursitis. Treatment options include reassurance, conservative care with nonsteroidal anti-inflammatory drugs (NSAIDs) until spontaneous resolution, local anesthetic nerve blocks with corticosteroids, radiofrequency ablation (RFA) of the LFCN, and surgical interventions such as neurolysis and neurectomy (2). An evidence based literature search reveals RFA is the least studied of the treatment modalities, not mentioned within the Cochrane Library treatment guidelines, and limited to a handful of case reports (2,3,6) along with a single retrospective review (7). The strategy chosen by individual providers often depends on how the neuropathy was provoked, whether the trigger is avoidable going forward, duration, and severity of symptoms.

CASE REPORT

A 55-year-old woman with a body mass index of 30.8 presented in the outpatient neurology clinic with 5 years of chronic lower back pain, as well as right anterolateral thigh paresthesia, which had progressed over the course a year from “pins and needles” to “burning and numbness,” both at rest and with activity. The progression of symptoms had begun to affect her ability to work as a school bus driver and basketball referee. On neurological exam, the right anterior lateral thigh was found to have diminished sensation with pin prick, temperature, and vibration in the LFCN distribution. None of the special tests (e.g., straight leg raise) revealed positive results. Trials of ibuprofen, gabapentin, cyclobenzaprine, duloxetine, and tramadol yielded minimal relief.

Given the clinical suspicion for meralgia paresthetica, the patient underwent a nerve conduction study during which no response could be elicited from the right LFCN, and an electromyography which was normal.

At the follow-up neurology visit, the patient reported increased pain in the same distribution. She had previously decided to continue with conservative medical management including gabapentin and duloxetine. After experiencing medication side effects including increased grogginess and tinnitus, she decided to proceed with the nerve block at the pain management clinic.

A right LFCN block was performed under ultrasound guidance. With the transducer immediately inferior to the ASIS, parallel to the inguinal ligament, the tensor fasciae latae and the sartorius muscle were identified. The nerve appeared as a small hypoechoic oval structure between the muscles in the short-axis view. The skin was prepped and draped in the usual sterile fashion, 2 mL of 1% lidocaine was used, and a 22-gauge, 3.5 inch needle was advanced in an in-line approach under ultrasound guidance. With the tip of the needle visualized at the target structure, in plane between the tensor fascia latae and sartorius muscle, aspiration for blood was negative and 40 mg of depomedrol along with 2 mL of 1% lidocaine were injected. There were no complications and the patient noted an immediate improvement in pain.

At the one-month follow-up, the patient described complete (100%) resolution of thigh pain and tingling for 2 weeks including the day of the nerve block. However, after 2 weeks, the symptoms returned with the same distribution and severity as prior to the nerve block. With complete resolution for this short time frame, the decision was made use radiofrequency treatment for longer lasting relief. Two weeks later, pRFA of the right LFCN was performed. A similar procedure as above was used to prepare and visualize the nerve under ultrasound guidance. A 22-gauge, 3.5 inch RMK needle was used, and sensory stimulation was positive at 0.3-0.4 volts in the appropriate distribution, and impedance was less than 350 mOhm. Radiofrequency was applied at 40-70 volts for 120 seconds, with a maximum temperature of 42°C. Two cycles of pRFA were instituted, and 2 mL of 1% lidocaine was injected. Our patient again achieved complete resolution of symptoms following the procedure, and continued to be pain free at the 9-month follow-up visit.

DISCUSSION

RFA and neuromodulation are alternatives to chemical nerve ablation, surgical neurolysis, and surgical neurectomy, which utilize temperature and electrical currents to interrupt axonal continuity and cause distal Wallerian degeneration to the target nerve (8). Continuous RFA, application of 500 kHz for 90 seconds causes precisely targeted tissue necrosis occurring via rapid alternating currents when the probe reaches 60 to 80°C (8,9). In comparison, pulsed radiofrequency neuromodulation utilizes quick high-voltage bursts of energy keeping temperature lower and causing microscopic damage to intra-axonal structures; which depending on the situation, may be preferred to limit thermal injury. Pain control is believed to occur via temperature independent rapidly changing electrical fields targeting pain carrying A-delta and C fibers with minimal destruction to the A-beta fibers (9,10).

As used in our case, nerve conduction studies and electromyography can aid in the diagnosis of meralgia paresthetica. However, there is some debate about whether sensory nerve conduction is more reliable and sensitive, with somatosensory evoked potentials only being required in obese patients when the sensory nerve conduction is not obtainable (11). However, other research demonstrates somatosensory evoked potentials as the primary electrophysiological study in the diagnosis of meralgia paresthetica (12). In our study, the LFCN sensory nerve action potential (SNAP) was unobtainable on the affected side, but present on the unaffected side. It is reasonable to consider anatomic variation as a cause for this unobtainable SNAP; as up to 7 common variations for the nerve's pelvic exit have been demonstrated in surgical literature (4). Furthermore, research has suggested that the placement of electrodes for this "unobtainable" sensory nerve conduction result may be responsible (13). In a single study, response rates increased from 36% when placed 1 cm medial to the ASIS to 90% when placed 4 cm distal to the ASIS (13).

In previously reported case reviews using radiofrequency neuromodulation for meralgia paresthetica a set of 2 or 3 nerve blocks were used to achieve temporary relief ranging from 1 to 2 weeks per block (3,6,14). More recently, a retrospective review performed to show pRFA efficacy also used 2 nerve blocks of greater than 50% relief as criteria for inclusion in their study (7). There are currently no guidelines for how many blocks should be performed before advancing therapy. More thorough research is needed to determine any benefit to stacking 3 sets of nerve blocks versus advancing therapy immediately after a single successful block with short-term complete relief of symptoms. We acknowledge that with each successful block diagnostic certainty is improved, pretest probability is increased, and fewer false positive diagnoses are made. However, with no evidence based reasoning specific to stacking LFCN injections and minimal duration of 100% pain control, we feel in our single case it was reasonable to consider advancing treatment to pulsed radiofrequency neuromodulation after a single injection. While successful, it is impossible to hypothesize or derive conclusions from one case, and more thorough research is needed to determine any benefit to stacking sets of LFCN blocks versus advancing therapy immediately after a single successful block with short-term complete relief of meralgia paresthetica symptoms. Similarly, there are currently no comparison studies between radiofrequency treatment and surgical options to counsel the patient on efficacy or adverse event outcomes. The literature does support that surgical treatment options have displayed a very high success rate (15,16). However, for many patients who are opposed to the idea of surgery, radiofrequency neuromodulation can provide a safe, effective, and minimally invasive option.

CONCLUSION

In patients with meralgia paresthetica, a quick diagnosis with special consideration for known etiologies and delivering extended pain relief are the ultimate goals. Herein we presented a case of successful pulsed radiofrequency treatment following a single LFCN block. More research is needed to compare efficacy of pain control, duration of pain free interval, and complication rates of pRFA after one LFCN nerve block compared with a series.

Disclosure and Acknowledgements

Dr. Paul Weaver had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Drs. Phillip Suwan, Sachin Bahadur, and Anterpreet Dua designed the study protocol, reviewed initial drafts, and provided editorial support. Dr. Paul Weaver

managed the literature searches and summaries of previous related work and wrote the first draft of the manuscript. Dr. Anterpreet Dua provided revision for intellectual content and final approval of the manuscript.

Conflict of Interest

All authors have no conflicts of interest to report. There was no external funding in the preparation of this manuscript. None of the authors of the manuscript received any remuneration. Further, the authors have not received any reimbursement or honorarium in any other manner. The authors also wish to thank Nadine Odo, research associate, for editorial assistance. We also would like to thank the editorial board of *Interventional Pain Management Reports* for review and criticism in improving the manuscript.

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