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Ultrasound-guided alcohol neurolysis of lateral femoral cutaneous nerve for intractable meralgia paresthetica: a case series

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Abstract

Meralgia paresthetica is a rare sensory entrapment neuropathy which leads to burning, tingling and numbness in the antero-lateral aspect of thigh. Mostly it runs a benign course, and responds to conservative measures. We present a case series of six patients with intractable *meralgia* paresthetica with severe pain over antero-lateral thigh along the distribution of lateral cutaneous nerve of thigh which was further confirmed by nerve conduction study. These patients did not respond to the oral anti-neuropathic medications. The two successive diagnostic lateral femoral cutaneous nerve block *not only* had confirmed the diagnosis but also provided pain relief for a few days. Then the ultrasound-guided lateral femoral cutaneous nerve neurolysis was done using 50% alcohol. In all the patients, there were more than 50% decrease in pain intensity and improvement in quality of life after the procedure, and the relief and improvement were maintained for up to 12 weeks. This case series shows ultrasound-guided lateral femoral cutaneous nerve neurolysis is a safe and effective treatment for intractable meralgia paresthetica and also provides prolonged pain relief and is a good option in avoiding the surgery.

Summary points

The literature on neurolysis is rare, with only few case reports. This is the first case series on this topic, and it will greatly improve the evidence that ultrasound-guided neurolysis can also be used for intractable meralgia paresthetica patients who do not respond to conservative measures before proceeding to surgery.

Keywords

Meralgia paresthetica, alcohol neurolysis, lateral femoral cutaneous nerve

Introduction

Meralgia paresthetica is a very rare sensory mononeuropathy caused by compression or entrapment of lateral femoral cutaneous nerve (LFCN) as it passes under the inguinal ligament and is characterized by pain, paraesthesia and numbness along the distribution of the nerve in antero-lateral thigh.¹ It usually runs a benign course and gets a good relief with conservative measures; however, in some patients presenting with intractable pain, surgical decompression or neurolysis may be required.²

The other options tried for meralgia paresthetica are perineural steroid *injection*, alcohol neurolysis and

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pulsed radiofrequency *leisioning*. There is some evidence of perineural steroids with a prospective study, whereas pulsed radiofrequency and neurolysis had a limited evidence with only a single case report of each procedure.³⁻⁵

We are describing a case series of six patients undergoing alcohol neurolysis of LFCN for intractable meralgia paresthetica who had failed to respond to conservative measures.

Method

This is a retrospective case series of six patients with intractable meralgia paresthetica in Asian Institute of Medical Sciences, Faridabad, India over a period of 10 months from September 2014 to June 2015. The patients had underwent ultrasound-guided LFCN neurolysis after a successful diagnostic LFCN block after written informed consent for the procedure and the publication of the procedure *explaining all the risks associated with the procedure like anaesthesia dolorosa, differentiation pain and so on*.

All the patients had severe intractable pain (numerical rating scale (NRS) > 7) over the antero-lateral part of thigh in the distribution of LFCN of thigh with some sensory loss; and the pain got aggravated by walking, climbing stairs, hip extension and so on. The sensory examination had revealed decrease in sensation in the distribution of LFCN. All the patients had normal motor examination and normal pelvic and hip radiographs. Nerve conduction study had shown that there was decrease in the amplitude of sensory nerve action potential with side-to-side amplitude difference in all patients.

All the patients had first given diagnostic LFCN block under ultrasound guidance. The patient were positioned supine, and the ipsilateral limb was externally rotated. The monitoring was done as per American Society of Anesthesiologists (ASA) standard, and an intravenous access was obtained. The area between ipsilateral mid-thigh and umbilicus painted with anti-septic solution and draped. The LFCN is visualized with the high-frequency (6–13 Hz) linear USG probe (M-Turbo® ultrasound system; Sonosite international, Washington, DC). A systematic scan was done below and medial to anterior superior iliac spine. The lateral cutaneous nerve was found to lie between the fascia lata and fascia iliaca and above the sartorius muscle. A 22G 50mm SonoPlex Stim cannulae (Pajunk Medical Systems L.P., Georgia, USA) is directed towards the nerve under the ultrasound guidance with in-plane approach to its final position between the two fascia where LFCN was identified as an hyperechoic structure (Figure 1). Hydro-dissection with 1 mL of normal saline was also done to aid in identification of the nerve.

The final position was also confirmed by nerve stimulator and was identified by eliciting paraesthesia along the LFCN by stimulating at 50 Hz a current of <0.5 mV using nerve stimulator NS-100 (Inmed equipments private limited, Akota Road, Vadodara, India). A volume of 4 mL of 0.25% bupivacaine with 10 mg of methylprednisolone was injected, and it was seen to encircle the nerve and move cephalad along the nerve in all the patients under the ultrasound. The block was considered successful, if there is more than 50% relief in the pain for at least 2 hours after the block. The second diagnostic block was given only after a minimum period of 4 weeks after the first diagnostic block, and only if they do not got prolonged relief from the first diagnostic block with steroid. They were considered for therapeutic LFCN neurolysis, if the two successive LFCN diagnostic block is successful in relieving the pain for at least 2 hours after the block.

The therapeutic LFCN neurolysis was done using the same technique as diagnostic LFCN block (Figure 2). The neurolysis was done using 3 mL of 50% alcohol in 0.25% bupivacaine. The patients were observed for 2 hours after the procedure for any immediate complications and discharged on the same day. The demographic profile, duration of pain, pain intensity in NRS, medication use and quality of life in 36-Item Short Form Health Survey (SF-36) questionnaire were observed at baseline and at 2 and 12 weeks. *The patients were planned to be followed up later up to a period of 12 months, but the data were available only till 3 months.*

Statistical analysis

The statistical analysis was done using SPSS (version 16, SPSS Inc., Chicago, Illinois) for Windows. The variables were expressed as mean and standard deviation. The changes in variables with time were analysed with paired t-test to test the effectiveness of neurolysis. The level of significance was set at $p < 0.05$.

Results

The average age of patients were (45.5 ± 9.58) years and, out of them, 2 were male and 4 were female. All the patients were either overweight or obese, and the average body mass index was 29.21 ± 2.01 . The average duration of pain was 79.17 ± 22.63 days. The demographic profile and duration of pain relief from the diagnostic blocks are given in Table 1.

The duration of relief from the first and second diagnostic LFCN block with steroid were (17.5 ± 10.52) days and (16.5 ± 6.74) days, respectively. The pain intensity significantly improved from 8.83 ± 0.753 before the neurolysis to 2.33 ± 1.03 and 1.83 ± 0.73 at

2 and 12 weeks, respectively, after the alcohol neurolysis ($p < 0.05$) (Figure 3). The quality of life as measure by SF-36 questionnaire significantly improved in terms of physical health from 22.35 ± 3.91 to 49.01 ± 3.27 and 46.35 ± 2.08 at 2 and 12 weeks after the procedure ($p < 0.05$), whereas there was only mild improvement

in mental health from 45.48 ± 2.74 before the neurolysis to 50.76 ± 5.03 and 48.68 ± 2.53 at 2 and 12 weeks after the neurolysis, respectively (Figure 4). There were $>50\%$ improvement in pain intensity (NRS) and quality of life in all the patients. The pain intensity and quality of life of all the patients were given table 2.

There were hypoesthesia and numbness in two and three patients, respectively, which remained till 12 weeks in all patients with moderate improvement, but these did not cause much discomfort in those patients. In about three patients, the anti-neuropathic medications were also stopped and in rest of three patients, the dose was decreased to a much lower dose. There was no incidence of anaesthesia dolorosa, differentiation pain in any patient.

Discussion

Meralgia paresthetica is a sensory mononeuropathy of LFCN, presenting as burning, tingling and numbness along the antero-lateral thigh with variable decrease in the sensation in the distribution of LFCN. It can be iatrogenic or spontaneous. The iatrogenic variety occurs after surgery, whereas the spontaneous variety occurs without surgery.⁶ The spontaneous causes include obesity, pregnancy and other conditions with increased abdominal pressure; wearing of belts, corsets and tight trousers; and pelvic masses like uterine fibroids and so on.^{7,8}

The diagnosis of meralgia paresthetica is simple and is mostly based on the clinical findings. In some cases, it can be confirmed by nerve conduction studies which shows decrease in the amplitude of sensory nerve action potential with side-to-side amplitude difference in all patients and has a specificity of $>98\%$.⁹ In cases where there was little doubt about the diagnosis, it can be further confirmed by the diagnostic LFCN block with local anaesthetic with or without steroid.¹⁰ In our case series, all the patients had both of the positive nerve conduction study which shows decrease in the amplitude of sensory nerve action potential with

Figure 1. The ultrasound image of LFCN is seen to be in between the two layers of fascia, fascia lata and fascia iliaca.

Figure 2. The ultrasound image of alcohol neurolysis of LFCN. The LFCN is seen to be surrounded by the alcohol in between the two layers of fascia, fascia lata and fascia iliaca.

Table 1. Demographic profile and duration of relief from first and second LFCN block with perineural steroids.

S. no.	Age (years)	Sex	Duration of pain before neurolysis in days	BMI	Pain relief after first diagnostic block with steroid in days	Pain relief after second diagnostic block with steroid in days
1	37	M	120	31.12	21	24
2	42	F	105	31.2	6	13
3	35	M	120	28.19	35	19
4	49	M	180	26.63	15	21
5	61	M	105	30.9	20	17
6	49	F	120	27.71	8	5

LFCN: lateral femoral cutaneous nerve; BMI: body mass index.

Figure 3. Showing significant improvement in pain intensity measured in NRS after the neurolysis.

Figure 4. Showing the improvement in quality of physical and mental health measured by SF-36 after the neurolysis.

Table 2. Pain intensity (NRS) and quality of life in SF-36 at baseline and at 2 and 12 weeks after the neurolysis.

NRS			Quality of life (SF-36) (physical health)			Quality of life (SF-36) (mental health)		
Baseline	2 weeks	12 weeks	Baseline	2 weeks	12 weeks	Baseline	2 weeks	12 weeks
8	2	2	17.4	44.3	47.2	47.8	57.6	45.5
9	3	1	22.6	48	49.1	46.9	56.9	51.3
9	4	3	19.3	53.2	47.3	48.2	47.9	49.7
10	1	2	28.8	47.2	46.3	40.9	47.4	46.9
8	2	2	23.5	52.1	45.2	44.3	47.7	47.1
9	2	1	22.5	49.3	43	44.8	47.1	51.6

SF-36: 36-Item Short Form Health Survey; NRS: numerical rating scale.

side-to-side amplitude difference and two positive successive diagnostic blocks.

The meralgia paresthetica usually runs a benign course and responds well to conservative measures.¹¹ Pain is usually alleviated by medications like tricyclic antidepressants, anticonvulsants and so on. In some patients, local infiltration of local anaesthetics with or without steroids is also helpful.¹² There had been case report of alcohol neurolysis of LFCN in intractable cases of meralgia paresthetica and one case report of using pulsed radiofrequency ablation of LFCN.⁴ Finally, in-patients with intractable meralgia paresthetica, who do not respond to above, surgical procedure like neurolysis or nerve resection is done.^{2,13,14,15}

In our patients, the conservative measures with anti-neuropathic medications and even opioids were tried. The LFCN block with both local anaesthetic and steroid were also given to all patients, which resulted in only temporary relief for about average of 2 weeks in both the occasions. Although, there has been evidence that perineural steroids had resulted in substantial pain relief for up to 2 months.³ So, the option of alcohol neurolysis was given to the patients as all the patients had two successive positive diagnostic block and also they did want go for the surgical treatment.

There were >50% relief in pain and improvement in quality of life in *physical health* after the neurolysis in all the patients, and it had lasted for more than 12 weeks. All the patients were able to resume their normal life after the procedure. The anti-neuropathic medication use was also decreased in all patients, and in 3 patients, it was weaned off.

The radiofrequency is an emerging technique, but only one case report with fluoroscopy-guided pulsed radiofrequency has been described.⁵ There was only one case report of ultra-sound guided alcohol neurolysis.⁴ As this is only a sensory nerve, there is no fear of any motor damage from the use of alcohol. Also with the use of ultrasound, the nerve can be easily localized and the spread of medication can be easily seen, and spillage into the adjacent structures had been prevented. There has been numbness and hypoesthesia in about three patients, but it did not result in much discomfort to the patient.

The accidental blockade of the femoral nerve had been described in literature while doing an LFCN block, this in our study has been prevented by the use of ultrasound which helps us to real-time visualizing the spread of the medication during the block.¹⁶ The use of ultrasound increases the safety of the procedure by decreasing the time of needle placement, accurate needle placement and complications.^{17,18}

There had been no complications like differentiation pain, anaesthesia dolorosa, dysaesthesia in our case series, but the risks of developing these had been described in literature.¹⁹

The neurolysis seemed to be a good option for intractable meralgia paresthetica, who are not responding to conservative measures. The ultrasound-guided alcohol neurolysis is a safe and effective procedure and also provides a long-term pain relief. This article will help to improve the evidence for the use of ultrasound-guided alcohol neurolysis as there were only few case reports of alcohol neurolysis.

Limitations of our case series are that it is retrospective case series with only limited number of patient with limited follow-up.

Conclusion

This case series gives us the evidence that ultrasound-guided LFCN neurolysis with alcohol is a safe and effective procedure for patients with intractable meralgia paresthetica, and it provides a prolonged relief of more than 12 weeks. But, to come to a conclusion, randomized control studies with larger sample size and prolonged follow-up is needed.

Declaration of conflicting interest

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