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Original Article

Ultrasound guided radiofrequency ablation of Morton's neuroma: A substitute for surgery

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ABSTRACT

Objectives: To assess the efficacy of radiofrequency ablation of Morton's neuroma (MN) as a substitute to surgery, in patients not responding to conservative treatment.

Methods: 15 patients, who performed radiofrequency ablation (RFA) of Morton's neuroma between November 2015 and December 2016, were submitted to follow up to assess the response to therapy over a period of 6 months by assessment of pain relief through visual analogue scale (VAS) scale from 1 to 10 from least to severe pain.

Results: All of the 15 patients suffered from intense pain during their normal daily activity prior to RF ablation, pretreatment VAS average was 7.

Follow up of the patients was done after 1 week, 1 month, 3 months and 6 months.

After RF ablation, pain disappeared in 9 cases (60%), 3 had mild pain (20%), 2 moderate pain (13.3%) and 1 with severe pain (6.6%) and proceeded to surgery. Complete resolution of pain was encountered in the patients with mild and moderate pain with conservative or second session of RFA.

Conclusion: Radiofrequency ablation of Morton's neuroma, is an effective technique in treatment of symptomatic patient's after failure of conservative treatment and prior to surgical intervention.

1. Introduction

Morton's neuroma (MN) is a painful condition affecting the common digital nerve of the foot. It is a nerve entrapment condition under the transverse metatarsal ligament [1,2].

This condition is aggravated by the wearing of tight shoes or by using compressive stockings. The pain is usually described by the patient as: acute, severe, radiating to the toes, leg sometimes with strong burning sensation. Local paresthesia of the 3rd and 4th toes is very common. The pain is commonly felt in the third intermetatarsal space, less often in the second, rarely in the fourth and extremely rarely in the first intermetatarsal space [3].

The incidence of Morton's neuromas is common in females at their fifth decade and it affects the digital nerve of the third inter digital space more than in the second space with ratio 2:1 [1,4].

Radiofrequency ablation is a practical and effective solution in patients not responding to conservative treatment. Above 88% of the affected patients had complete resolution of the pain without further surgical intervention or any other procedures [5].

2. Materials and methods

15 patients were reviewed with 15 MN all were females with mean age 42 years. Patients were diagnosed clinically to have MN, confirmation of diagnosis was made by ultrasound and/or MRI (Fig. 1), (Fig. 3A–C).

None of the 15 patients responded to conservative treatment for at least 3 months and were candidates for surgical excision.

RFA of the neuromas was their last option prior to surgery.

2.1. Technique

The study was approved by our institution review board.

A written consent was taken from the patients with detailed steps of the procedure and its possible complications.

First ultrasound was done to region of complain to confirm the diagnosis of Morton's neuroma, and assess the access for RFA.

The patient is in supine position with sterile field prepared.

Under ultrasound-guidance, a sterile 5 cm long radiofrequency needle was inserted, through either plantar or dorsal aspect access, inside the neuroma (Fig. 2).

Peer review under responsibility of The Egyptian Society of Radiology and Nuclear Medicine.

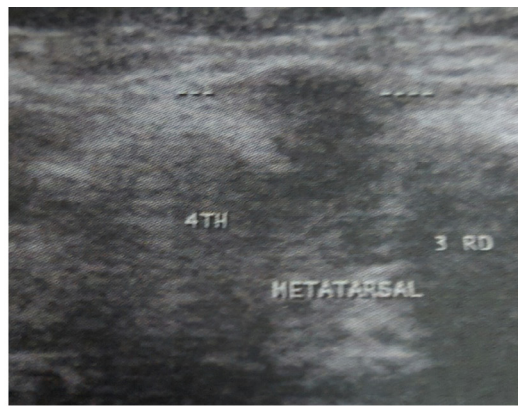
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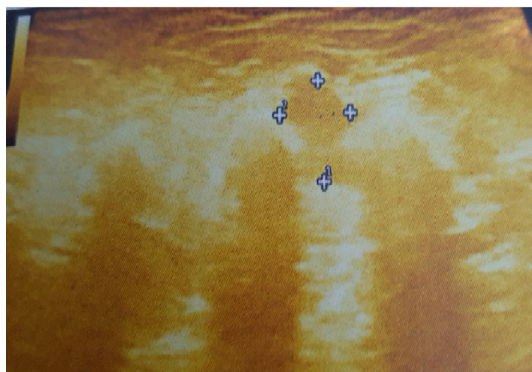
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(A)



(B)

Fig. 1. Figures (A) and (B) show ultrasound appearance of Morton's neuroma between the 3rd and 4th metatarsal bones.

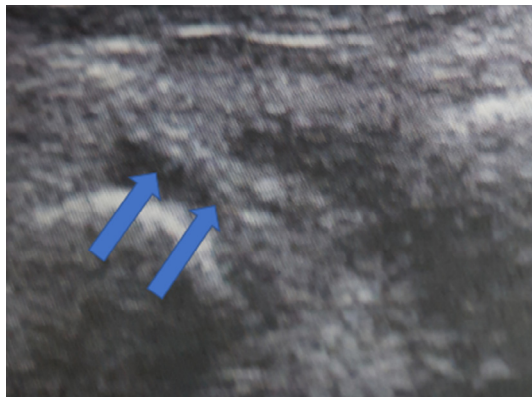


Fig. 2. Radiofrequency needle in Morton's neuroma.

Proper position of the needle tip is confirmed by ultrasound and sensory stimulation, where the patient feels pain similar to that of her symptom, then local anesthesia using 1 cc of 2% Xylocaine was applied.

RFA was done using our machine Neurotherm NT1100 (Neurotherm, USA), guided by superficial ultrasound probe 7.5 MHz (My Lab 40, Esaote, ITALY) 3 times along the course of the neuroma with temperature up to 75–80 °C each time for about 60 s.

Pain relief after local radiofrequency nerve ablation is thought to

result from an increase in local temperature at the site of application around the electrode to the point of disruption of the tissue protein chains, which subsequently destroys the peripheral nerve endings, and the myelin sheaths, blocking only nociceptive input [6,7].

Other authors thought that pain regression after RF ablation results are not from the actual destruction of nerve tissue, but are from powerful electric fields induced by voltage fluctuations in the area of lesion [8,9].

Patients are allowed to leave with bandage at operative site after observation for 30 min.

Rest at home for 24–48 h and wearing comfortable not tight shoes is advised before returning to normal life style.

Patient can take NSAIDS for postoperative pain if necessary.

Follow up ultrasound is done at 1, 3 and 6 months post ablation, MRI was done in selected cases according to their complain or pain score.

2.2. Statistical analysis

Analysis of data was done by IBM computer using SPSS (statistical program for social science version 12).

- Description of quantitative variables as mean and range.
- Description of qualitative variables as number and percentage.

3. Results

Of the 15 patients, all suffered from pain during their normal daily activity prior to RFA, pretreatment VAS average was 7 (Table 1), pain duration was variable ranging from 3 months up to 8 months, conservative treatment was given for 3 months.

In our study patient's not responding conservative treatment for at least 3 months are candidates for RFA.

13 MN were found in the 3rd web space (86.6%) while only 2 were found in the 2nd web space (13.3%).

Follow up of the patients was done after 1 week, 1 month, 3 months and 6 months.

After RF ablation pain disappeared in 9 cases (60%), 3 had mild pain (20%), 2 moderate pain (13.3%) and 1 with severe pain (6.6%) proceeded to surgery (Table 2).

Patients with mild and moderate pain were treated by bupivacaine/triamcinolone, resolved pain was encountered in the three cases of mild pain and one of the moderate pain cases, the second patient with moderate pain was offered another setting of RFA, that totally resolved the pain (Table 3).

4. Discussion

In patients with symptomatic Morton's neuroma not responding to conservative treatment, RFA is considered a second option prior to surgical solution.

In our study, none of our patients had complications, thus supporting the safety and efficacy of the procedure.

Open neurectomy complications are minimal, however as any surgery there are risks, as hematoma, stump neuroma and abscess formation.

Surgical endoscopic decompression of the neuroma (EDIN-Barrett technique), requires at least 6 months to evaluate success [10].

Previous study showed that failure to respond to conservative measures radiofrequency treatment is considered a more beneficial procedure than open neurectomy. It causes destruction of the peripheral nerve endings and myelin sheath at site of maximum tenderness [11].

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