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Ultrasound guided radiofrequency ablation of painful stump neuroma in amputees - a retrospective case series

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Background

Post-amputation pain is very common after limb amputation, and stump neuroma is a significant cause of this[1].

Stump neuroma-associated pain can be difficult to treat and is often managed using an interdisciplinary approach with a combination of neuropathic analgesia, physiotherapy, adjustments to the prosthesis, prosthetic counselling and eventual surgical excision.

There is a paucity of studies in the literature concerning ultrasound guided (US) radiofrequency ablation (RFA) as a treatment for stump neuroma pain in terms of its effectiveness in reducing pain and analgesic requirements, improving comfort when wearing prosthetic limbs and reducing the need for surgical intervention.

Aim

To investigate the effects of US guided RFA as a treatment for painful stump neuroma in amputees

Study design

Retrospective case series during the period 2015-2019

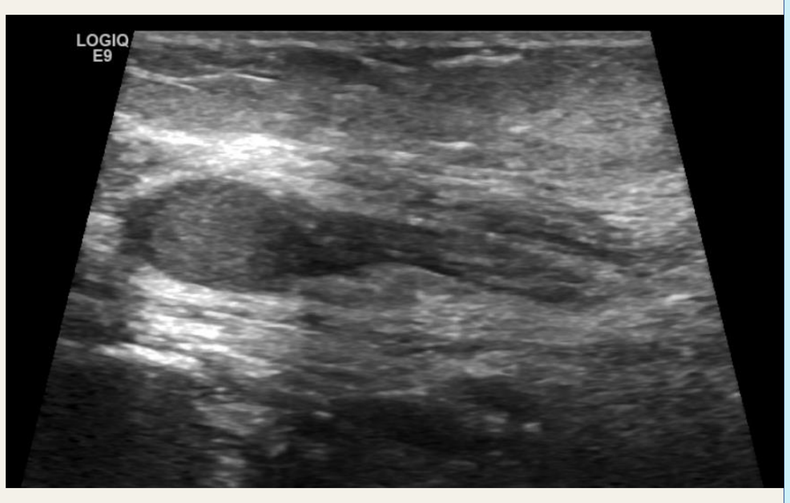

Fig 1: US image of 11x6mm neuroma along the ulnar nerve in the stump of a transradial amputee

Methods

The clinical notes and imaging of nine patients who underwent RFA for stump neuroma-associated pain were reviewed.

Information obtained included:

1. Patient demographics
2. Site of amputation
3. Reason for amputation
4. Size of neuroma and nerve involved
5. Phantom pain (if any)
6. Duration, temperature and pulsation (continuous vs alternating) of RFA
7. Pain (VAS) scores – at 6 months pre-RFA, immediately pre and post RFA, 1 day, 2 days, 2 weeks and 3 months post-RFA.
8. Analgesic requirements pre- and post-RFA
9. Adverse effects of RFA (if any)
10. Comfort and ease of using prosthetic limb pre- and post-RFA

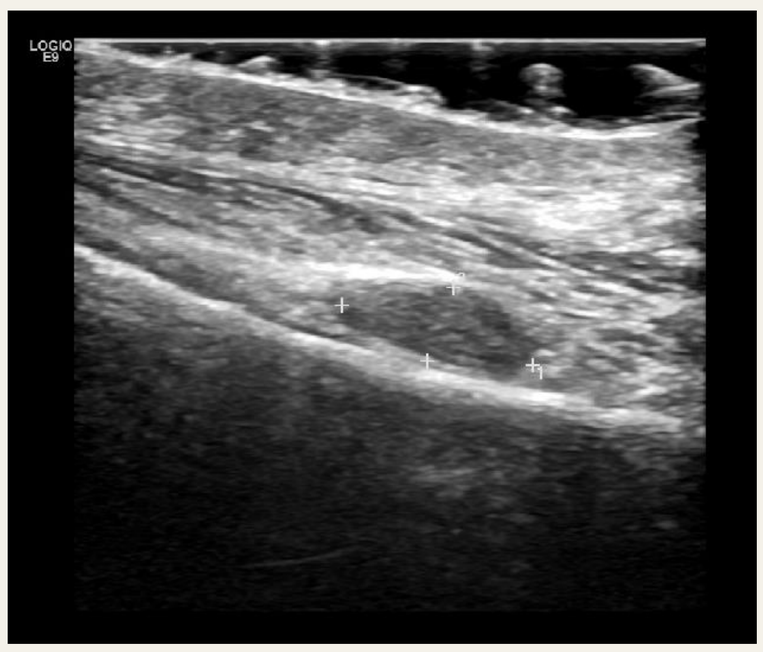

Fig 2: US image of 11x8 mm neuroma along the common peroneal nerve in the stump of a transtibial amputee

Table 1: Patient characteristics and pain scores pre- and post- RFA

Case	Sex	Age	Amputation site	Cause of amputation	Years since amputation	Stump pain (VAS) at presentation	Size of neuroma (mm) on MRI	Nerve involved	Pain (VAS) at 3 months post-RFA
1	F	67	Transradial	Peripheral vascular disease	6	10	11x6	ulnar nerve	10
2	M	30	Transtibial	Trauma	2	7	10x7	common peroneal nerve	0
3	M	27	Transtibial	Trauma	7	10	14x8	tibial nerve	2
4	F	37	Transtibial	Trauma	10	10	10x6	tibial nerve	0
5	M	47	Hip disarticulation	Neoplasm	26	10	30x30	sciatic nerve	10
6	f	49	transtibial	peripheral vascular disease	6	9	12x10	tibial nerve	1
7	f	42	transfemoral	neoplasm	1	10	18x13	sciatic nerve	6
8	f	69	transtibial	infection	5	10	12x12	superficial peroneal nerve	3
9	f	36	transfemoral	trauma	3	10	19x15	sciatic nerve	0

Results

There were 9 patients (3 men and 6 women) aged between 30 and 69 years.
Eight had lower limb amputations (5 had transtibial, 2 transfemoral, 1 hip disarticulation) and one had transradial amputation.
Nerves involving the neuroma included the ulnar nerve (Fig 1), common peroneal nerve (Fig 2), superficial peroneal nerve, tibial nerve and sciatic nerve (Fig 3).

All patients bar one underwent a diagnostic US guided steroid injection to confirm that the neuroma was the source of the pain, prior to RFA.

Six patients report significant reduction in pain VAS scores (defined as at least 50% reduction) with no adverse effects (Table 1).

Of the three other patients who did not report a significant reduction in pain, one had a large sciatic nerve neuroma that was eventually successfully treated with surgical excision, one had confounding pain from an adjacent bony spur, whilst the third patient reported an initial reduction in pain for 1 week post RFA but then experienced a return of the pain with heightened phantom sensation.

Interestingly, the third patient did not receive a routine diagnostic steroid injection prior to undertaking the RFA.

Conclusion

1. Our retrospective case series suggests that US guided RFA is a safe and effective treatment for stump neuroma-associated pain in amputees.

2. US guided RFA can reduce pain and analgesic requirements, improve comfort and ease of wearing the prosthesis and reduce the potential need for surgical excision of the neuroma and its associated surgical risks.

3. We recommend all patients undergo a diagnostic steroid injection prior to RFA to confirm that the neuroma is the source of the stump pain.

4. We plan on conducting a prospective longitudinal series study to investigate this further.

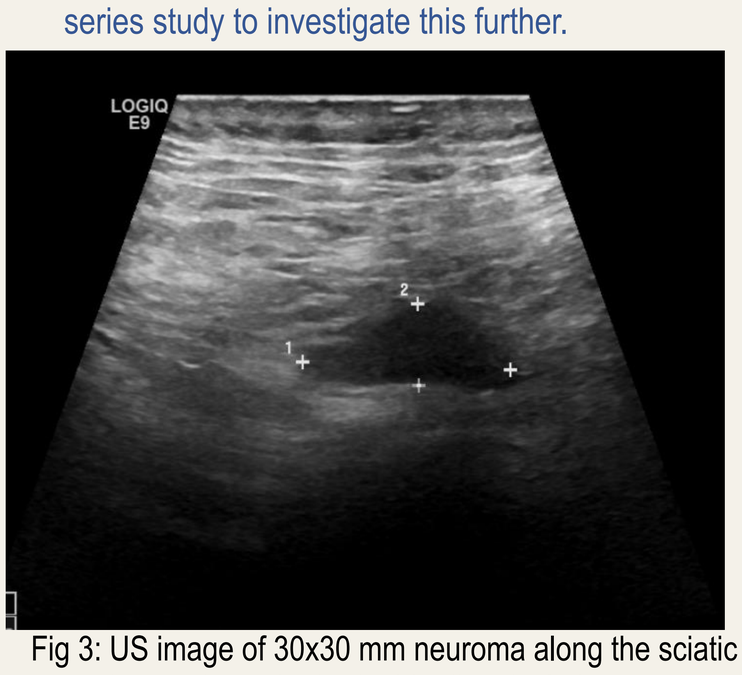

Fig 3: US image of 30x30 mm neuroma along the sciatic nerve in a patient who had a hip disarticulation

References

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