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Case report

Giant schwannoma of the medial plantar nerve

Joseph Carter*, Najla Ben-Ghashir, C.R. Chandrasekar

RLBUHT, United Kingdom

HIGHLIGHTS

- Presenting features and clinical findings.
- Gold standard investigation as per regional sarcoma centre.
- Ultrasound scan ± biopsy, MRI findings.
- Histological appearance of schwannoma.
- NICE guidance on sarcoma referral.

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ABSTRACT

In this article the authors present an exceptionally rare case of giant schwannoma of the foot in a 23 year old male. This article demonstrates the key principles of investigation and management of such cases as conducted by a regional sarcoma centre.

1. Introduction

Schwannomas or neurilemmomas are benign nerve sheath tumours of a fairly indolent nature that occur in peripheral nerves. The most common type is acoustic neuroma [1], which are more rarely seen in the axial skeleton. They most frequently occur in isolation but can be observed in greater numbers as part of a hereditary condition called schwannomatosis. It is estimated that 1% of cases have malignant potential [2,3], however due to their intimate relationship with the nerve many patients present with neuropathic symptoms (site dependent). Less than 20 cases of schwannomas of feet have been reported in the literature, most commonly causing compression in the tarsal tunnel [4–10], however it is rare for them to be seen more distally.

According to the currently available literature this is only the second case report of a giant schwannoma of the foot measuring 4.5 × 3 cm [11].

2. Case report

A rare case of giant schwannoma of the sole of the foot arising from the medial plantar nerve is presented here.

A 23-year-old male student presented to sarcoma clinic with a two year history of painful lump arising from the medial plantar arch of the right foot. Past medical history included nephrotic syndrome as a child. The patient complained of intermittent pain, including night pain, however there were no constitutional features of weight loss or general malaise. The patient was complaining of progressive pain whilst walking as well as altered sensation on the sole of his foot and was also finding increasing difficulty wearing normal footwear due to the size of the plantar mass.

On examination there was a deep swelling on the proximal aspect of the medial plantar arch measuring 4.5 × 3 cm. There was tenderness on palpation, causing neuropathic symptoms distally along the medial plantar nerve distribution. The other sensory areas of the foot were normal. There was no evidence of motor deficit in the foot. There was no palpable lymphadenopathy.

MRI features were suggestive of a benign schwannoma (Figs. 1–3). Due to the size of the lesion and the symptoms an ultrasound guided biopsy was performed. The biopsy results confirmed a benign schwannoma.

* Corresponding author. Tel.: +44 07915643269.
E-mail address: josephcarter@doctors.org.uk (J. Carter).

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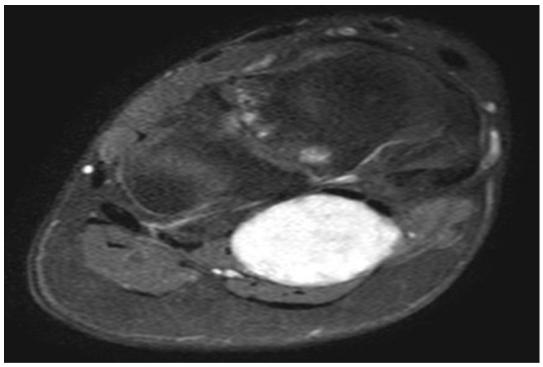

Fig. 1. MRI scan showing a 4.5 × 3.5 cm tumour arising from medial plantar nerve.

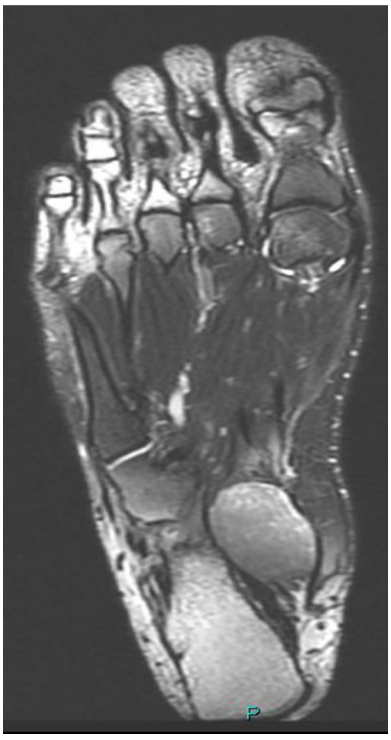

Fig. 2. MRI sagittal view showing the large tumour.

Biopsy results were discussed with the patient and the potential risks and benefits of surgical excision were considered. There was a significant risk of losing medial plantar nerve function and vascular injury. Symptoms were so severe that the patient preferred to have the swelling surgically excised despite the explained risks.

The surgery was performed under general anaesthetic with an ankle tourniquet inflated to 300 mmHg. Surgical excision was through a medial longitudinal incision along the medial plantar arch of the foot.

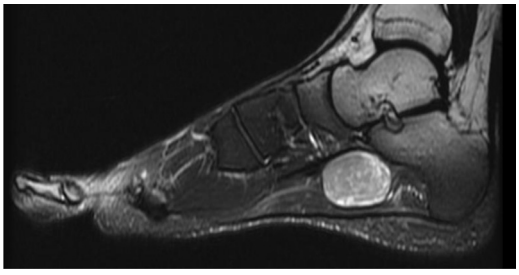

Fig. 3. MRI Coronal view showing the tumour.

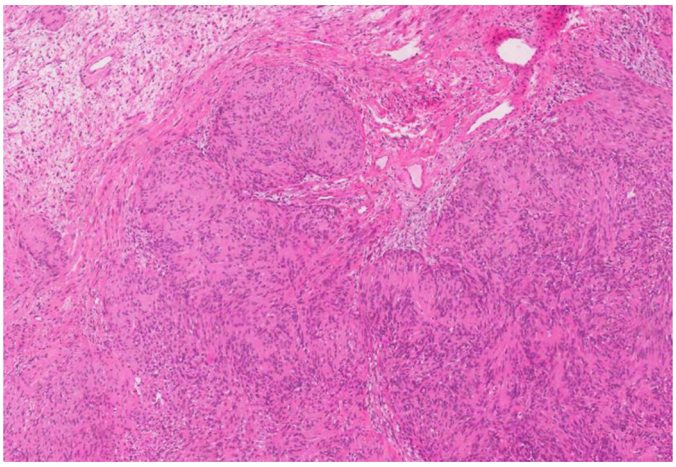

Fig. 4. Photomicrograph of the tumour shows bundles of spindle cells containing dark wavy nuclei and dense eosinophilic cytoplasm, with ill-defined borders and prominent nuclear palisading. These cellular areas alternate with other areas of hypocellular myxoid tissue with hyalinised blood vessels (haematoxylin and eosin stain).

Abductor hallucis was released to expose the giant schwannoma. This was carefully enucleated as a whole, taking care to preserve the medial plantar nerve and adjacent vascular bundle. The wound was closed in layers after tourniquet release and haemostasis.

Postoperatively there was no motor deficit or sensory deficit on the sole of the foot. The patient was able to mobilise with support and was independently ambulant by two weeks. At six weeks patient was able to walk without any discomfort. At four-month review no significant neurological deficit was found apart from mild paraesthesia on the lateral aspect of the great toe. Normal sensation on the sole of the foot returned and there was no evidence of any motor deficit. The patient was able to run and return to sporting activities

Histology showed sheets and nodules of spindle cells with nuclear palisading, with little pleomorphism and no necrosis. Appearances were consistent with a benign schwannoma (Fig. 4).

3. Discussion

Schwannomas are soft tissue tumours of unknown aetiology, however there is a known association with von Recklinghausen's disease (Neurofibromatosis type 1) [12,13]. In such patients it is common to see multiple lesions.

Presentation may vary, but a patient commonly presents with features suggestive of nerve compression in the presence of swelling [14]. In these circumstances malignancy must be ruled out and additional examination of the central nervous system is imperative. Lesions in proximal nerves cause more distal symptoms.

It is also important to carry out a thorough clinical examination. Schwannomas present as painful small lumps along the course of peripheral nerves. They rarely reach large size, especially in confined areas such as the hands and feet. It is extremely unusual to see giant schwannomas in feet.

Plain radiography should be carried out in the first instance, which may identify a rare intra-osseous lesion but results are non-specific. An ultrasound examination can also be a useful investigation. However for large tumours the 'gold standard' for imaging is MRI [15,16], with characteristic bright signal on T1-weighted and heterogenous signal on T2-weighted images. Frequently the lesion

is oval shaped and an associated nerve may be visible with 'split fat sign'.

Biopsy of the lesion should be obtained when possible and should be carried out using ultrasound guidance. Biopsy of such lesions can be quite painful and patients should be appropriately informed. A biopsy may not be required if the radiological appearances are typical of a small benign nerve sheath tumour. However tumours bigger than 5 cm, heterogeneous lesions and rapidly growing lesions warrant an image guided biopsy to confirm diagnosis.

Classically schwannomas have a well-defined fibrous capsule. The histological appearance demonstrates two main regions, Antoni A and Antoni B. The former demonstrates areas consisting of spindle cells and verocay bodies (enclosed eosinophilic areas) [17]. Antoni B areas in contrast are quite acellular areas of connective tissue. Some degree of cellular atypia may be found, however, this does not always indicate malignancy. Small tumours may be clinically monitored if there are no symptoms.

However larger tumours require surgical excision. There is a risk of losing sensory and motor function of the nerve if there is injury and scarring – plantar schwannomas due to walking, jumping and running. If the tumour has been completely excised subsequent recurrence is rare. Great care must be taken to preserve the neural continuity and adjacent vessels.

4. Conclusion

This case report presented an uncommon case of giant schwannoma of the medial plantar nerve which was completely excised, with an excellent post-surgical outcome. This case has been presented to provide information on how to diagnose, investigate and treat such cases. Referral to a sarcoma centre is preferred when dealing with tumours larger than 5 cm according to the NICE guidelines.

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