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Case Reports & Case Series

Schwannoma of the tibial nerve–An unusual case of foot pain

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A B S T R A C T

Schwannomas of the tibial nerve are extremely rare. We present a 45-year-old female with diffuse pain in the left foot who had a tibial nerve neuroma. Diagnosis was delayed for 10 years. She had seen multiple specialists without diagnosis. MRI of the upper calf was eventually performed showing a 4 cm tibial nerve tumour. Surgical excision was performed. Histopathology confirmed Schwannoma. The patient reported complete alleviation of her symptoms. The long delay in diagnosis highlights the importance of MRI imaging in cases of unexplained foot or ankle pain. Scans should be performed not only of the foot, but also the calf as the pathology may be arising more proximally in the limb.

1. Introduction

Schwannomas are the most common benign peripheral nerve tumour, occurring in any area of the body [1]. They are usually benign and slow-growing, but can infrequently show malignant transformation [2].

Only 24% of benign solitary schwannomas are found in the lower extremity [1]. Indeed, tibial nerve schwannomas are extremely rare and constitute only 11% of benign lower extremity lesions in the largest case series to date of 361 (n = 32).

2. Case

This 45-year-old female presented with a 10 yr history of left foot pain. She described the pain diffusely in her left foot, which she described as a “burning” in character. She had been investigated and sequentially diagnosed with plantar fasciitis, neuralgia, subtalar arthritis and complex regional pain syndrome. She had seen multiple specialists, including sports physicians, a podiatrist, psychiatrists and orthopaedic surgeons. An initial MRI scan was performed of her left forefoot/midfoot in 2001 which revealed no significant pathology. It showed mild fluid distension of the bursa at the 2/3 and 3/4 web spaces. There was no Morton's neuroma and there was no plantar plate tear detected. At the time of her diagnosis her medications included Tramadol 100 mg SR twice daily, Celebrex 200 mg daily and Lyrica 275 mg daily. She had multiple injections into the foot in various locations with local anaesthetic and steroid with no benefit. She had been placed in a cast for 6 weeks. She had “shock wave” therapy as well as acupuncture and massage therapy. No therapy had given significant relief. MRI scan of the calf was finally performed 10 years after the development of symptoms showing a tibial nerve neuroma.

Clinical examination was unremarkable. Direct pressure over the posterior aspect of the left calf produced severe (8/10) pain. There was no mass palpable.

Left calf MRI demonstrated a well-defined, solid, intensely enhancing spherical mass that measured 30 × 29 × 30 mm. It was isointense on T1 and hyperintense on T2 weighted imaging. It was contiguous with the tibial nerve located in the deep posterior compartment (Figs. 1 and 2). It was centred 12 cm inferior to the tibial plateau. There was no associated muscle denervation or oedema.

Surgical removal was performed through a 10 cm vertical incision was made between the heads of the gastrocnemius. The sural nerve was identified and preserved, the soleus muscle was split, mobilising and preserving the soleal vein. The Tibialis posterior muscle was split vertically to expose the tumour (Fig. 3). The tumour was firm and encapsulated. Frozen section was consistent with schwannoma [4]. Complete macroscopic excision was achieved with preservation of the tibial nerve (Fig. 4). At the conclusion of the resection the nerve was stimulating with a hand held Medtronic Vari-Stim III NIM stimulator at 0.5 mA (Medtronic Xomed Inc., Florida) [1,3]. Formal histopathology revealed a typical schwannoma with no atypia or evidence of malignancy.

The patient reported complete alleviation of her symptoms. She made an uncomplicated recovery. Surveillance MRI at 12 months shows no residual or recurrent tumour.

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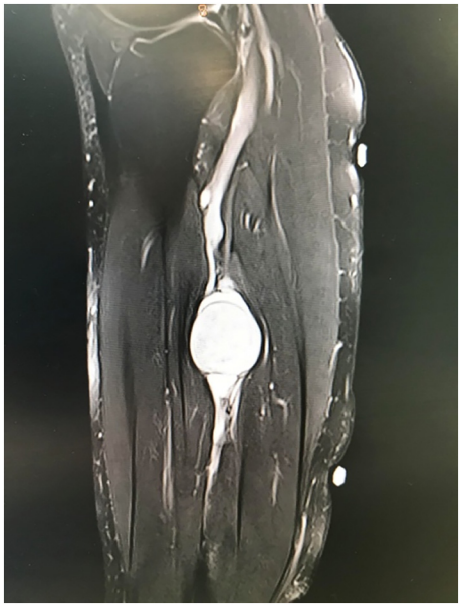

Fig. 1. MRI appearance of a schwannoma of the tibial nerve in the posterior compartment of the calf.

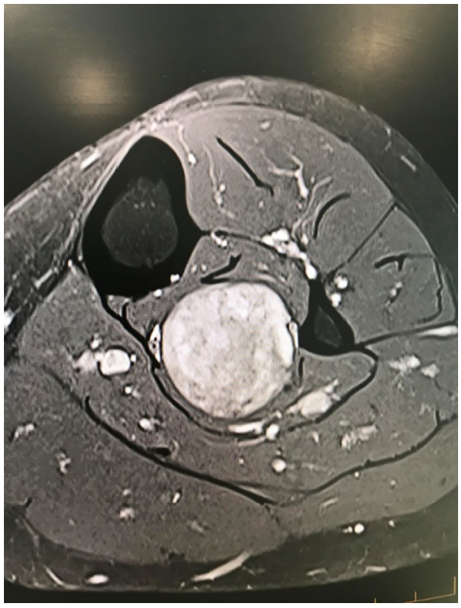

Fig. 2. MRI appearance of a schwannoma of the tibial nerve, noting its relation to the nerve and well-formed capsule.

3. Discussion

Schwannomas most commonly present between the second and fifth decade of life. There is no gender or racial predilection [4]. Schwannomas are solitary encapsulated tumours lying within the perineurium, and can often be resected without neurological sequelae [5]. For this reason, along with removing patient symptoms and reducing the risk of malignancy, the treatment of choice is total surgical resection. Malignancy accounts for 10% of all soft tissue sarcomas [6]. Our patient had total resection of the tumour without neurological compromise and complete alleviation of symptoms.

This case highlights the importance of considering tibial nerve schwannomas or pathology in the calf in cases of unexplained foot pain. Our patient's diagnosis was delayed for more than 10 years, during which time she suffered not only the chronic pain from the pathology,

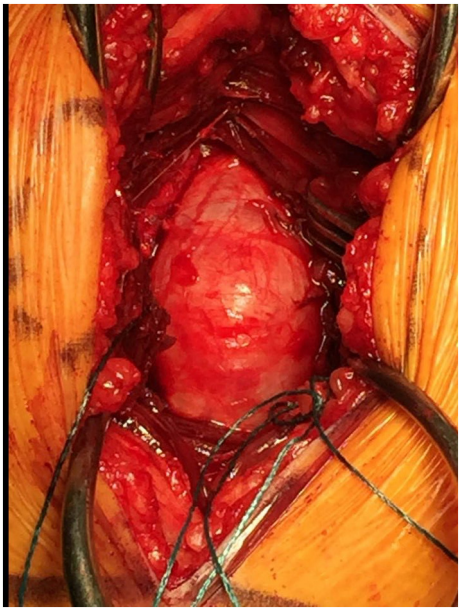

Fig. 3. Photograph of a schwannoma after complete resection.

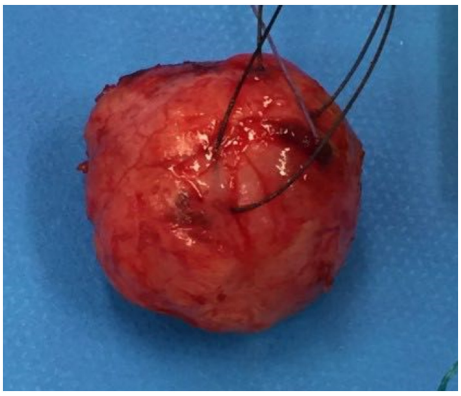

Fig. 4. Photograph of a schwannoma during the operation. Note the characteristic epineural vessels.

but also the associated psychological stress associated with the lack of diagnosis pain, which at various times had the label of psychogenic pain, conversion disorder and complex regional pain syndrome.

The diagnosis of a tibial nerve schwannoma can often be difficult as in the early stage, a mass may not be palpable and symptoms are often non-specific. Hence, the diagnosis of tibial nerve schwannoma is often far down the list of differentials. Alternative diagnoses such as nerve root impingement in the spine or other conditions are common [7]. MRI of the tibial nerve in the calf to elicit the diagnosis and determine the extent, location, size of the tumour and display the relationship to surrounding tissue [8,9,10].

Tibial nerve schwannomas are very rare tumours and most are located at the level of the tarsal sinus which was not the location of our case, where it was located deep in the posterior compartment [7]. In the largest case series of patients found to have benign solitary schwannomas conducted over 30 years, only 32/361 (9%) cases found nerve sheath tumours in the lower extremity [1]. The sciatic nerve was the most common location of benign neural sheath tumours, accounting for 9% (n = 33). In contrast, only 5.5% of the benign neural sheath tumours were located in the tibial nerve (n = 20). Knight et al. concluded that 32.81% of lower limb schwannomas occurred in the tibial nerve (21 out of 64 cases). In both series, most patients presented with local pain and a palpable mass. Other locations in the lower limb included

the peroneal nerve, saphenous nerve and obturator nerve [1,8,9,10].

Nawabi and Sinisi reported 25 patients with schwannoma of the posterior tibial nerve [5]. In all cases, they noted a palpable mass. Most patients had a prolonged period of symptoms prior to diagnosis. The mean time to diagnosis was 86.5 months with a median of 48 months (2 to 360). Only three patients were diagnosed within a year of presentation.

Nawabi and Sinisi postulated two reasons for diagnostic delay. Firstly, deep seated swellings may escape detection by palpation in the thigh or calf. This is almost certainly what occurred in our case as careful examination on multiple occasions failed to detect a palpable mass. It was only when the patient reported calf pain and direct pressure over the area reproduced symptoms, that imaging was performed of the upper calf. Secondly, neuropathic pain presenting in the foot may be misdiagnosed as radiculopathy, entrapment neuropathy or local pathology such as plantar fasciitis.

In all of the cases reported by Nawabi, a palpable mass was present over the course of the tibial nerve. All patients had a positive Tinel's sign. As our patient's tumour was located higher in the calf, a positive Tinel's sign was not found.

MRI imaging is usually definitive in cases of tibial nerve schwannoma. The characteristic appearance is of a uniformly enhancing lesion, occurring over the course of the tibial nerve [11]. Ultrasonography has been reported to aid in the diagnosis but was not in our case due to the unusual location.

Our case was typical in schwannoma pathology. Specimens showed an encapsulated tumour with features of alternating hypercellular and hypocellular areas with Verocay bodies, indicating a myxomatous schwannoma. There was no evidence of atypia or malignancy [11].

Our unique case, in which no mass was palpable, highlights the importance of imaging of the entire length of the tibial nerve when assessing unexplained foot pain. Chronic neuropathic pain in the foot ankle and leg should carry a differential diagnosis of tibial nerve schwannoma and prompt further investigations with MRI. Our patient had complete resolution of symptoms following their surgery, highlighting the benefits of surgical removal of most schwannomas.

4. Conclusion

Our case highlights the importance of imaging, not only of the foot, but in case of unexplained neuropathic foot pain, but also the calf as symptoms may be arising more proximally in the tibial or peroneal nerve.

Author contributions

Mr. Nathan Chalik–Primary writer.
Dr. Ellen Frydenberg–write-up and submission.
Dr. Sonia Henry–write-up.
Dr. Andrew Higgs–original idea and design.
Dr. Timothy Steel–original idea, design, write-up.

Declaration of Competing Interest

None.

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