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Case Report

A Rare Case of a Schwannoma in the Dorsal Aspect of the Foot: A Case Report of an 18-Year-Old Man with an Ankle Mass

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Abstract

Background: Neurilemmomas also called schwannomas are benign tumors originating from the Schwann cells participating in the peripheral nerve sheath and the pathophysiology of the formation of these tumors is not completely understood. Schwannomas are mostly benign with equal incidence rate in men and women. These tumors have been mainly found in the head and neck, upper extremities, and the trunk. Lower extremity schwannomas are extremely rare, specifically in the dorsum of the foot.
Case Report: In this report, we present an 18-year-old man referred to surgery clinic with a painful mass on the anterolateral dorsal aspect of his left ankle with radicular pain and paresthesia to the distal dorsum of the forefoot. After completing all the assessments including ultrasonography and magnetic resonance imaging (MRI), he underwent the surgical resection procedure. The pathology laboratory reported an encapsulated 35 * 20 * 15 mm solitary benign schwannoma.
Conclusion: The dorsal aspect of the foot is an extremely rare site for schwannoma formation, but practitioners should always be aware of rare underlying diseases for neurologic deficits or just a simple pain in the lower extremities.

Keywords: Neurilemmoma; Lower Extremity; Schwann Cells; Soft Tissue Neoplasms

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Background

Schwannomas are benign tumors originating from the Schwann cells participating in the peripheral nerve sheath and formation of the nodes of Ranvier. This tumor has been named differently in various literatures including neurilemoma, neurofibroma, perifibroma, neuroschwannoma, etc. (1, 2). Although the exact pathophysiology of the mass formation is not completely clear, some studies suggest that repetitive nerve compression and micro injuries would result in pathologic continuation of proliferative state in Schwann cells. Others also suggest that loss of function in neurofibromatosis type 2 (NF2) tumor suppressor gene leads to development of different types of nervous system tumors such as schwannomas (1, 3).

A wide age range of onset has been reported for these tumors, but it has been seen commonly in 20- to 50-year-old patients with no obvious sex predilection (2, 4). Schwannoma would mostly occur in the head and neck, upper extremities, and the trunk and it is representative of 5% of all soft tissue masses. The schwannomas of lower extremities are extremely rare, specifically those originating from branches of the common peroneal nerve (1, 5).

Main characteristics of these tumors include that they are mostly solitary, encapsulated, and round or ovoid in terms of their shapes, and also immobile when the force is applied longitudinally. The most common diagnostic modalities are ultrasonographic studies (mostly presenting hypoechoic patterns) and magnetic resonance imaging (MRI) which is much more preferred upon other modalities. On the MRI T1-weighted sequences, these masses would appear hypointense and hyperintensity would be seen in T2-weighted sequences. From the previous studies, there is a chance of recurrence if the tumor is not completely resected, thereby commonly-preferred treatment is complete resection of the mass (6).

In this case report, we are introducing a case of an 18-year-old man referred to us with a schwannoma on the anterolateral dorsal aspect of the foot originating from distal branches of the superficial peroneal nerve which is extremely rare and novel.

Case Report

An 18-year-old man was referred to the clinic with a painful, subcutaneous soft tissue mass located on the anterolateral dorsal aspect of the left ankle. He stated that the mass was felt from three years prior to the start of its pain and the pain started and worsened gradually from six months before the visit. His pain mainly worsened by touching or direct pressure and heavy work activities, and paresthesia and sense of tingling of the distal dorsum of the forefoot was reported by the patient; moreover, all symptoms would completely subside by resting. There was no positive history of a similar pain or swelling in other regions of the body, and also no family history.

In the physical examination, a swelling was obviously visible on the anterolateral aspect of the left ankle in the primary observations and there were no signs of skin redness and warmth to touch in that region. The mass was slightly firm to the touch but also mobile when the force was applied perpendicular to the vertical axis of the foot. All neuromuscular exams of the left foot including motor and sensory functions, painful stimulation and skin prick

test, and vibration and proprioceptive sensation were normal except a positive Tinel's sign in the affected nerve (distal branches of superficial peroneal nerve).

The ultrasound report confirmed that the lesion was a 36 * 21 * 16 mm solid mass with encapsulation and hypoechoic pattern. No calcification and obvious vascular flow were reported (Figure 1).

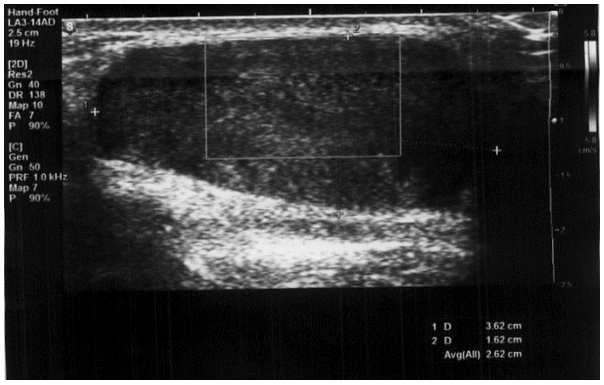

Figure 1. Ultrasound image of the left ankle demonstrating the hypoechoic pattern in the mass

The MRI scan was performed in order to obtain a better understanding of the lesion and its properties. In the MRI study, a 38 * 20 * 18 mm encapsulated subcutaneous mass with hypointensity in the T1-weighted and hyperintensity in the T2-weighted sequences was reported. There were not any signs of a possible malignancy in the MRI results (Figures 2 and 3).

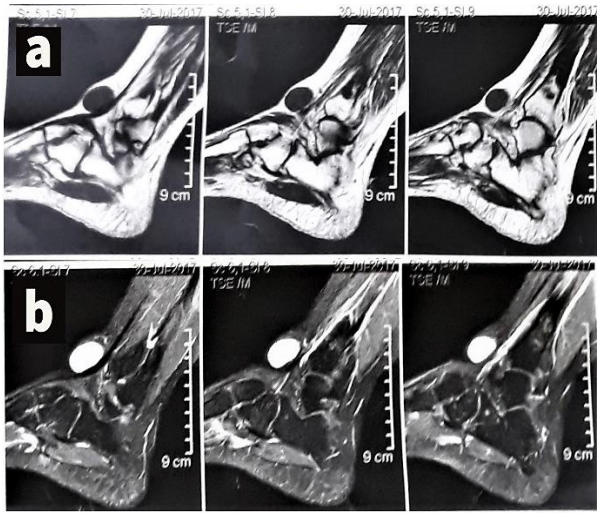

Figure 2. a) Sagittal T1-weighted images of the left ankle soft tissue mass with hypointensity of the lesion; b) Sagittal T2-weighted images with hyperintensity of the mass

After a thorough assessment of the medical status of the patient and a normal blood tests report, the patient was prepared for the mass excision surgery. Spinal anesthesia with regional nerve block was applied for the patient. An incision with an approximate length of 10 cm was made in the lateral border of the lesion and was deepened by blunt and sharp dissection with precisely taking care of neurovascular structures. The mass was dissected with caution from proximal to distal and completely excised and was sent to the pathology laboratory department. There was no need to apply midcalf tourniquet during the operation. The incision site was then reapproximated with proper suturing and dressed with non-adherent dressing. Then the patient was sent to home walking with the assistance of crutches and started bearing weight and walking normally after the sutures were discharged with no complications.

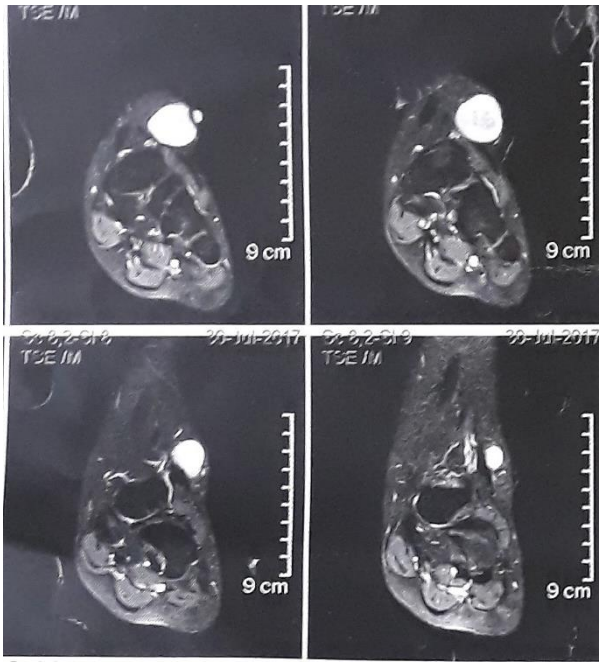

Figure 3. Coronal T2-weighted images of the left ankle mass hyperintense to the surrounding structures

The final results of the pathology lab department were reported three days after the day of the surgery. In the gross description, a 35 * 20 * 15 mm solid firm mass with a yellow-white surface in the transverse cut of the lesion was reported. The encapsulation of the mass was demonstrated obviously in the microscopic examination (Figure 4). A mixture of hypercellular Antony A and hypocellular Antony B regions with slight dilation of the vessels and Verocay bodies was observed in the specimens highly indicating the diagnosis of schwannomas (Figure 5).

The patient was followed up for a 16-month period and no signs of recurrence or neurological deficits were seen during the follow-up.

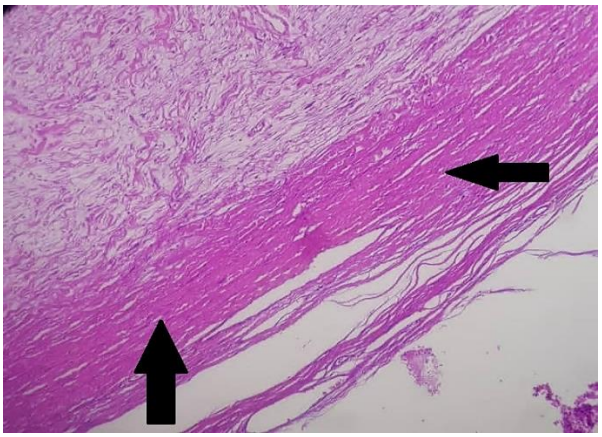

Figure 4. Microscopic image [hematoxylin and eosin (H&E) stain × 10] demonstrating the encapsulation of the mass (the black arrows)

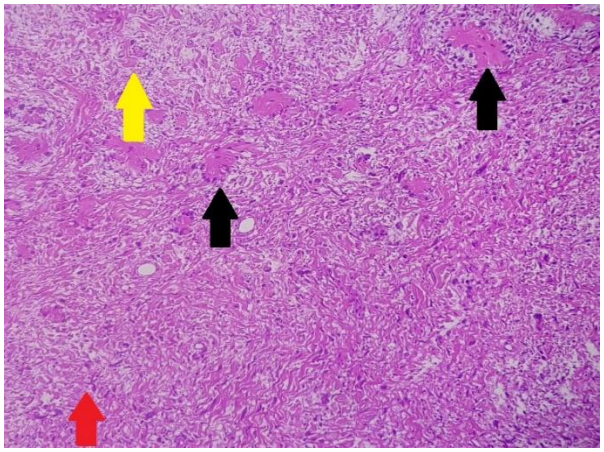

Figure 5. Microscopic image [hematoxylin and eosin (H&E) stain × 40] demonstrating 2 patterns of hypercellular (Antoni A, the yellow arrow) and hypocellular (Antoni B, the red arrow) regions of the mass and the Verocay bodies (the black arrows) highly indicative of the schwannomas

Discussion

This study was presenting a rare and novel case of a schwannoma of the lower extremity, specifically the anterolateral aspect of the ankle. These tumors arise from the Schwann cells which contribute in myelinating of the peripheral nerves and formation of nodes of Ranvier (4). These tumors could be found mostly in the upper portion of the body in the major trunks of the nerves and the risk of becoming malignant is less than 1% (7). These soft tissue tumors could be a part of a possible disorder called schwannomatosis. There could be a chance of multiple schwannomas in different sites of the body; therefore, all practitioners should perform a thorough physical examination (4). Besides, it is necessary for each practitioner to assume space occupying lesions as a probable underlying reason for neuropathies, even when the presentation of the pathology is not common in that specific site (8).

The dorsum of the foot is an extremely rare site for schwannomas. There are only three reports of solitary benign schwannoma available in the records. In 1993, Jacobson and Edwards reported a schwannoma in the dorsal aspect of the foot presenting only with neurologic deficits (9). In a French literature in 2017, Nkaoui and Sasbou reported a schwannoma on the anterolateral dorsal aspect of the ankle with superficial peroneal nerve entrapment and neural deficits (10). In 2021, Tiwari et al. surgically resected a solitary mass in the dorsum of the foot masquerading as a ganglion cyst. After pathologic studies, the diagnosis of the benign schwannoma was reported (11).

Conclusion

Pain and neurologic deficits of the dorsal aspect of the foot could be the results of a rare disease, in this case, a benign solitary schwannoma. There is always a chance that these soft tissue tumors are part of a schwannomatosis. Thereby, all practitioners should be cautious and perform a complete medical assessment in order to roll out a potential existence of multiple masses.

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national) and with the 1975 Declaration of Helsinki, as revised in 2013.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgements

None.

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