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Case Report

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Sural Nerve Schwannoma: A Case Report and Review of the Literature

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Abstract

Peripheral nerve sheet tumors (PNSTs) are exceedingly rare with the most tumors being benign. Schwannomas are one of the two types of PNSTs and have been classified as a slow-growing, benign neurogenic tumor composed of Schwann cells. Schwannomas have been shown to occur primarily in middle-aged patients with no gender prevalence. The variable clinical presentation of this tumor makes it a difficult diagnosis with symptoms being based on their location. Magnetic resonance imaging (MRI) is used to reveals the location, size, texture, and relationships with surrounding neuromuscular structures, with surgical excision being the primary treatment option with excellent outcomes. Our patient presented to the clinic due to left leg pain. MRI was utilized to diagnosis the tumor was a sural nerve tumor. The tumor was tan-pink in color and measured 6 cm in length and ranging from 0.4 cm to a central bulging aspect up to 2.5 cm for 3 cm with positive markers for S100. This case report explores patients' clinical manifestations of a lower extremity schwannoma.

Keywords: Schwannoma, Tumor, Peripheral Nerve, Benign

ABBREVIATION

Peripheral nerve sheet tumors (PNSTs), magnetic resonance imaging (MRI)

INTRODUCTION

Tumors of the peripheral nerve are rare, with the most common tumors being benign peripheral nerve sheet tumors (PNSTs) which include schwannomas and neurofibromas (1). Schwannomas have been classified as a slow-growing, benign neurogenic tumor composed of Schwann cells (2, 3). In the English literature, cases of ~~focal~~ schwannoma originating from the sural nerve are limited (4-6). Schwannomas have been shown to occur primarily in middle-aged patients (7) with no known gender-based risk factor for disease prevalence or severity (3).

Additionally, estimates of the prevalence of schwannomas in the lower extremity have been estimated to be less than 3%, highlighting the paucity of literature on this pathological finding (8). Schwannomas are benign, indeed encapsulated neoplasms that arise in peripheral nerve sheaths. Schwannomas have a variable clinical presentation based on their location. These include incongruous nodules, dysphagia, dysarthria, compromised airway, and swelling (9). Tumors of large nerves typically present as eccentric masses that dislocate the nerve fibers (10), as clearly depicted in the schema reported in Rosai and Ackerman's Surgical Pathology (11). As a result, they are generally easily resected with a minimal neural deficit by sparing most or all of the nerve bundles.

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CASE PRESENTATION

An African American female, 61-years-old, presented to the clinic with chronic posterior and lateral left leg pain. The pain onset was said to be roughly three weeks, with the patient describing the pain as dull and achy. On a scale of 1-10, with 1 being practically no pain and 10 being the worst pain of one's life, the patient reported a 5 out of 10 consistently throughout the day. The patient reports an 8 out of 10 when laid on or when standing for an extended period of time. Physical examination and further assessment with magnetic resonance imaging (MRI) disclosed a potential enfolded painful mass in the sural nerve. After surgical excision of the mass and pathology investigation, the diagnosis was confirmed to be a sural nerve schwannoma. The gross image of the schwannoma dissected out from the posterior compartment of our patient's left leg is seen in Figure-1A. The tumor was tan-pink in color and measured 6 cm in length and ranging from 0.4 cm to a central bulging aspect up to 2.5 cm for 3 cm. Pathologic microscopic examination showed classical histomorphologic features of schwannoma including proliferation of spindle-shaped cells arranged in interlacing fascicles in mostly Antoni A areas, with scattered areas of edematous, hypocellular Antoni B areas. No significant atypia, abnormal mitosis or necrosis were detected. Features displayed in Figure-1B. Schwannoma cells were positive for S100 and negative for SMA, Desmin, and cD117, with appropriate controls. Sectioning of the well circumscribed

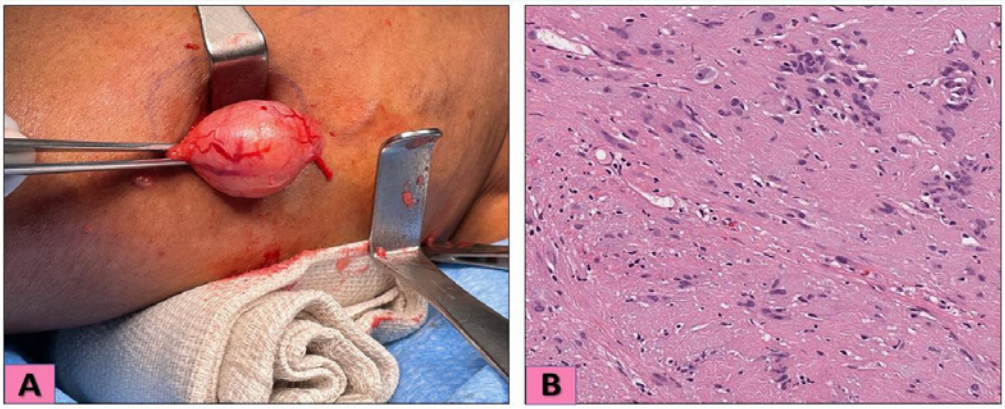

Figure 1 Gross and pathological examination of the excised mass. **1A**: The excised schwannoma dissected from the left leg's posterior compartment. The tumor was tan-pink, measuring 6 cm in length and ranging from 0.4 cm to a central bulging aspect up to 2.5 cm for 3 cm. **1B**: The tumor shows classical histomorphologic features of schwannoma including proliferation of spindle-shaped cells arranged in interlacing fascicles in mostly Antoni A areas, with scattered areas of edematous, hypocellular Antoni B areas (H&E stain X40).

bulging tumor revealed a tan glistening homogenous cut surface. The postoperative course was uneventful.

DISCUSSION

Schwannomas may originate from any peripheral nerve containing Schwann cells. However, schwannomas of the sural nerve are sporadic and exceedingly rare. The development of a schwannoma within the sural nerve is the primary focus of this case study. The function of the sural nerve is to supply sensory input to the lateral ankle and foot. It comprises two parts, the medial and lateral components from the tibial and common peroneal nerve, respectively. In locating the sural nerve, one could use the small saphenous vein for reference due to its proximity (12). Schwannoma of the foot and ankle can cause pain and swelling depending on their location. Many schwannomas consist of thick-walled vessels with changes in fibrinoid and hyaline adaptations (3). The position, scale, texture, and relationships surrounding neuromuscular structures are exposed using magnetic resonance imaging. Patients typically have a slow rising mass on the upper and lower extremities of the head, neck, and bending surfaces (3). The primary treatment choice is surgical excision, which has a high success rate (13).

Kim et al. reported a 30-year study out of Louisiana State University Health Sciences Center of 397 peripheral neural sheath tumors and found that roughly 91% of the tumors were benign. Of these benign peripheral neural sheath tumors, only one was found to be located on the sural nerve, which further stresses its rarity (5). Malignant peripheral nerve sheath tumors are a rare type of sarcoma found most often in deep soft tissues of the body. A unique case of malignant peripheral nerve sheath tumor associated with the sural nerve has also been reported. The tumor was removed surgically and sent to pathology for study. Despite multiple attempts to contact the patient, he refused further follow-up care and eventually refused to be seen at an oncologist (14).

Few case reports of similar sural nerve schwannomas have been reported in the literature. A recent case report of pain in the lateral ankle in a 54-year-old female was found to be a sural nerve schwannoma. Surgical excision was completed in the diagnosis and treatment of the tumor (15). In a similar review, a solitary Schwannoma was reported in a 42-year-old male emerging from the sural nerve. On physical examination, a hard 3cm mobile and non-tender mass was noted. Magnetic resonance imaging showed an oval-shape subcutaneous mass with iso-signal intensity compared with normal skeletal muscle in T1- weighted sequences. In T2-weighted spectral presaturation, higher signal intensity was discovered peripherally, and less signal intensity was observed centrally representing a target sign. Contrast-enhanced T1-weighted lines demonstrated a marked increase in the mass. The tumor was completely removed using an intracapsular biopsy technique. The histological examination determined that the patient had a schwannoma, with Antoni A tissue being a significant element. The patient has had no evidence of relapsing or residual symptoms, and they appear to be asymptomatic. Although rare, schwannoma should be considered when a well-defined, oval, subcutaneous mass in the lower leg is present (7).

Historically, the diagnostic imaging of choice is magnetic resonance imaging. Benign peripheral nerve tumors appear as well-defined masses inside the nerve, which are isointense to T1 image musculature and hyperintense to T2 image musculature (16, 17). As for the radiologic findings, sonography of ordinary schwannomas shows a well-defined hypo-echoic mass located along a nerve and eccentric to the nerve axis (18).

Although malignant tumors of the peripheral nerve sheath are not commonly seen, Rodriguez emphasized their diagnostic challenge and the importance of involving a multidisciplinary team of experienced pathologists to improve effective diagnosis and treatment (19). The surgical techniques and adjunctive therapies are presented, the tumors are classified with respect to type and prevalence at each neuroanatomical location, and the management of malignant PNSTs is reviewed. Surgical excision

confirmed the diagnosis of a sural nerve schwannoma. Tumors were removed from 32 individuals (38 %). Of the ten nerve lesions, nine were found in the sciatic nerve and 1 in the tibial nerve. Eight of the ten sciatic nerve tumors were in the thigh region, and two were in the buttocks (5).

CONCLUSION

This case report explores patients' clinical manifestations of a lower extremity schwannoma. Though rare, in patients with increasing lateral leg pain with a found tumor, a sural nerve tumor should be on the physician's differential. Although they account for only a tiny proportion of the rare tumor group, they are still an important diagnosis that should be considered. Magnetic resonance imaging reveals the location, size, texture, and relationships with surrounding neuromuscular structures, with surgical excision being the primary treatment option with excellent outcomes (13).

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