

# Superficial Peroneal Nerve Schwannoma

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**Summary:** Schwannomas are benign tumors of the nerve sheath that arise from the proliferation of active peripheral Schwann cells. Although schwannomas are the most common benign peripheral nerve sheath tumors, superficial peroneal nerve schwannomas are rare in published works of literature. We report a 45-year-old woman with a 4-year history of progressively worsening dull aching pain and paresthesia over the right lateral leg. Physical examination revealed a 4×3 cm firm palpable mass and a decreased touch and pain sensation over the lateral aspect of the right calf and dorsum of the foot. She also had an electric shock-like pain on palpation and percussion of the mass. Magnetic resonance imaging demonstrated a well-defined, oval, smooth-walled heterogeneous lesion beneath the peroneus muscle with avid postcontrast enhancement and a split fat sign. Fine needle aspiration cytology also suggested the diagnosis of schwannoma. Based on clinical findings of a mass, decreased sensation, and a positive Tinel sign on the dermatome of superficial peroneal nerve, surgical management was decided. Upon surgical exploration, a firm, glistening mass arising from the superficial peroneal nerve was identified, carefully dissected, and shelled out while maintaining continuity of the nerve. At the 5-month follow-up, the patient reported complete resolution of the pain and paresthesia. Physical examination revealed intact sensation in the lower lateral aspect of the right calf and dorsum of the foot. Therefore, surgical excision should be considered a reasonable option in the management of this rare condition, with most patients achieving good to excellent results. (*Plast Reconstr Surg Glob Open* 2023; 11:e4950; doi: [10.1097/GOX.0000000000004950](https://doi.org/10.1097/GOX.0000000000004950); Published online 24 April 2023.)

**A** 45-year-old woman presented with a 4-year history of dull aching pain and paresthesia over the lateral aspect of her right leg. The paresthesia and pain progressively worsened, and a barely palpable mass showed significant growth over the subsequent years. There was no history of hyperpigmented areas on the skin, trauma, fracture, surgery, lower back pain, or weakness over the same leg. On physical examination, there was a 4×3 cm firm deep-seated tender mass on the lateral aspect of the right leg approximately 2 cm below the knee joint with a positive Tinel sign on the lateral calf and dorsum of the foot upon percussion. There was a decreased light touch and pain sensation over the lateral lower one-third of the calf and dorsum of the foot that spared the first web space, but the reflexes and motor function of all dorsi-flexors and

evertors of the ankle and extensors of the toes were intact (Medical Research Council grading of 5/5). Magnetic resonance imaging showed a 4.5×2.5×2.3 cm well-defined, oval, smooth-walled heterogeneous lesion on the right proximal anterolateral leg beneath the peroneus muscle abutting the fibula. The lesion was hypointense on T1-weighted images and hyperintense on T2-weighted images with avid post-contrast enhancement. A split fat sign (which refers to the presence of fat at the upper and lower poles of a lesion that is suggestive of the intermuscular location of the lesion) was demonstrated in line with a likely diagnosis of a nerve sheath tumor of the peroneal nerve (Fig. 1). Fine needle aspiration cytology done at the referring hospital was also suggestive of schwannoma. The size of the mass was substantial and increasing along with symptom worsening despite the use of acetaminophen, NSAIDs, and gabapentin, which led to the decision for surgical excision. Under spinal anesthesia, the mass was approached through a longitudinal incision using a tourniquet and loupe magnification. After opening the fascial layer and retracting the peroneus

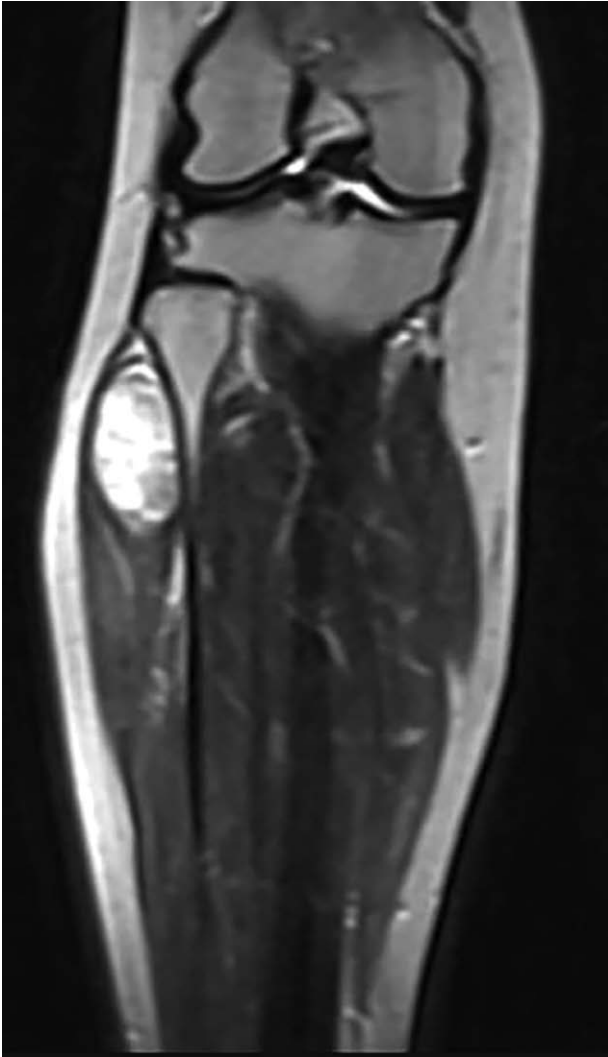
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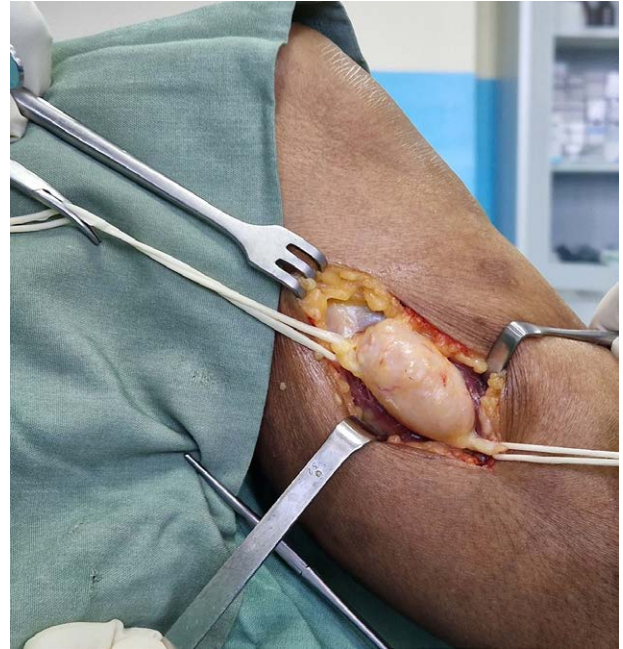
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**Fig. 1.** Magnetic resonance images of the right lower extremity depicting a well-defined, oval, smooth-walled heterogeneous lesion in the anterolateral leg abutting the fibula.

longus muscle (Fig. 2), a 4×2.5 cm firm, yellowish, encapsulated glistening mass arising from the superficial peroneal nerve was identified. The mass was dissected off from the nerve and removed en bloc using careful sharp dissection while preserving the superficial peroneal nerve fascicles (Fig. 3A). The patient was discharged on the second postoperative day. Histopathology examination showed encapsulated tissue with the palisading nuclear architecture of hypercellular Antoni A regions with adjacent hypocellular Antoni B areas, Verocay bodies, and spindle cell proliferation that correlate with the diagnosis of schwannoma. (See table, Supplemental Digital Content 1, which shows summary table of published literature on superficial peroneal nerve schwannomas. <http://links.lww.com/PRSGO/C514>.) At the fifth-month postoperative follow-up visit, the patient reported complete resolution of the pain, paresthesia, and numbness. Physical examination demonstrated a healed scar over the incision site (Fig. 3B), and Medical Research Council grading of ankle dorsiflexors and evertors



**Fig. 2.** Peroneal schwannoma identified with careful dissection below the retracted peroneus longus muscle.

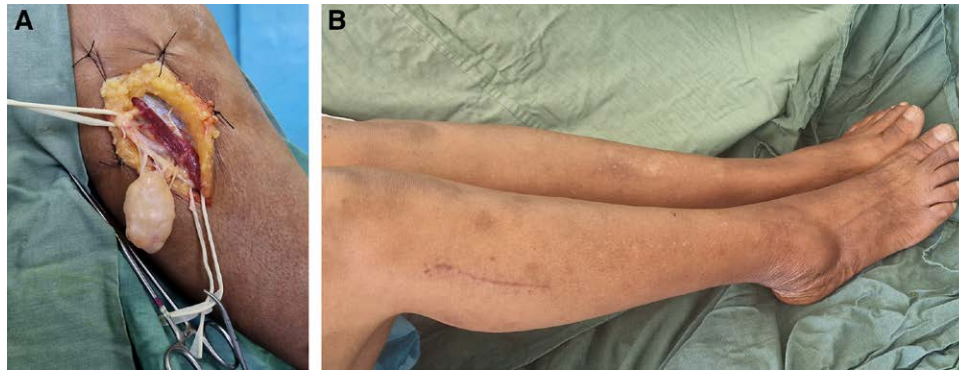
remained 5 of 5 with normal tone and a full range of motion. The light touch and pain sensation in the lower lateral aspect of the calf of the right leg and dorsum of the foot was normal ruling out any neurologic deficit.

## DISCUSSION

Schwannomas (also known as neurinomas “of Verocay” and neurilemmomas), which were first described by Verocay in 1908, are benign, well-encapsulated, and slow-growing nerve sheath tumors that are composed exclusively of abnormal Schwann cell proliferation. The tumor can originate from any myelinated cranial or peripheral nerve with Schwann cells. Schwannomas are solitary in 90% of the cases, and 60% of benign schwannomas are vestibular schwannomas.<sup>1,2</sup> Schwannomas are the most common benign peripheral nerve sheath tumors and are frequently seen between the third and sixth decades and exhibit no gender and ethnicity preponderance. Still, cases of common peroneal nerve schwannomas are very rare in the literature, and specific involvement of the superficial peroneal nerve is exceedingly rare.<sup>3-5</sup>

Schwannomas grow along the nerve sheath itself and cause symptoms of localized swelling, intermittent pain, and paresthesia through mechanical compression of the nerve and the surrounding structures with alteration of intracompartmental pressure. Schwannomas are usually slow growing, and only 1% undergo malignant transformation to become a neurofibrosarcoma.<sup>2,4,6</sup>

On gross examination, these lesions will usually have an internal homogeneous structure and a peripheral capsule separating them from the surrounding tissues and the nerve with no tendency to infiltrate the nearby structures. On histopathology examination, they will show a pattern



**Fig. 3.** Intraoperative and postoperative photographs of superficial peroneal nerve schwannoma of the right leg. A, Peroneal nerve schwannoma isolated to the superficial branch of the peroneal nerve. B, Postoperative photograph of the wound at 5 months follow-up.

with Antoni A and B areas. Antoni A areas have highly organized spindle cells, short parallel fascicles, and less onion-like or swirl arrangement while Antoni B domains are less cellular with myxoid tissue predominance and water-like fluid-filling abundance in cytosols and extracellular space.<sup>2,7</sup>

In the management of schwannomas, complete surgical excision is a generally curative, reliable, and relatively safe therapeutic option with a majority of published case reports showing favorable outcomes. (See figure, **Supplemental Digital Content 2**, which shows palisading nuclear architecture of Antoni A region with hypocellular Antoni B areas. <http://links.lww.com/PRSGO/C515>.) As demonstrated in our case and the reviewed literature, careful incision, dissection, and shelling out of the tumor while maintaining the structural integrity and continuity of the nerve is recommended to avoid any neurologic dysfunction, decompress the affected nerve, and give symptomatic relief. The use of proper magnification and intraoperative nerve monitoring and mapping may also enhance the chances of achieving favorable outcome.<sup>2,3,7,8</sup>

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#### DISCLOSURE

*The authors have no financial interests to declare in relation to the content of this article.*

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