

# A Rare Case Report on Neurilemmoma of the Superficial Peroneal Nerve and a Review of the Literature

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## Abstract

Neurilemmoma is a form of nerve tumor that develops from the nerve sheaths. It is a slow-growing tumor with a rare malignant transformation. It has an incidence rate of less than 1% in lower limbs and its origin in the superficial peroneal nerve is an extremely rare occurrence. In this report, we present a case of neurilemmoma of the superficial peroneal nerve in a 67-year-old male who presented with complaints of pain and swelling at the lateral aspect of the leg. The swelling was enucleated while preserving the main nerve trunk. The patient was found to be asymptomatic after a two-year postoperative period.

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**Categories:** General Surgery, Oncology, Orthopedics

**Keywords:** rare cancer, oncosurgery, peripheral schwannoma, nerve root preserving, musculoskeletal tumor

## Introduction

A neurilemmoma is a tumor that arises from a single nerve bundle (fascicle) and disrupts the remaining part of the nerve. It may be benign, or malignant in rare cases [1-3]. More fascicles are damaged when a neurilemmoma becomes bigger, making excision more difficult. A neurilemmoma develops over time and if a person develops this tumor, they may notice a painless lump in either the arms or legs. Although neurilemmomas are rarely malignant, they may lead to nerve damage and muscular weakness.

A patient with a suspected pathologic nerve disease is usually evaluated using a combination of physical examination, history, and investigations such as ultrasonography (USG) and MRI. USG can be used for screening a soft tissue mass. MR neurography may reveal a peripheral nerve tumor in more detail, but it is available only at a few centers and is a costly procedure. Additional diagnostic techniques, such as electromyography (EMG) and nerve conduction studies (NCS), measure neuromuscular function to determine if there is denervation, motor unit preservation, or conduction loss. Although neurilemmoma is a rare condition, it has been diagnosed in a variety of locations in the body including the brachial plexus as reported by Lee et al., and it can also affect the legs, ankles, or feet in rare cases [4-6].

## Case Presentation

A 67-year-old man with no medical history presented to the Orthopaedic Department with a painful bulge on the lateral side of his left leg (Figure 1). He denied any kind of trauma prior to the onset of the symptoms. There was no swelling palpable elsewhere in the body and there was no significant past history or family history. Three years ago, he had discovered this bulge on the lateral side of his left leg, which had been painless. However, six months back, the patient had developed leg pain and noticed that the bulge had been growing slowly. There had been no aggravating or relieving factors linked to it. Initially, the patient had visited a private hospital in a remote area, where an incision had been given under local anesthesia, considering the swelling to be an abscess. However, when the operating surgeon had become doubtful, he had stitched the wound and referred the patient to our institute.

### How to cite this article

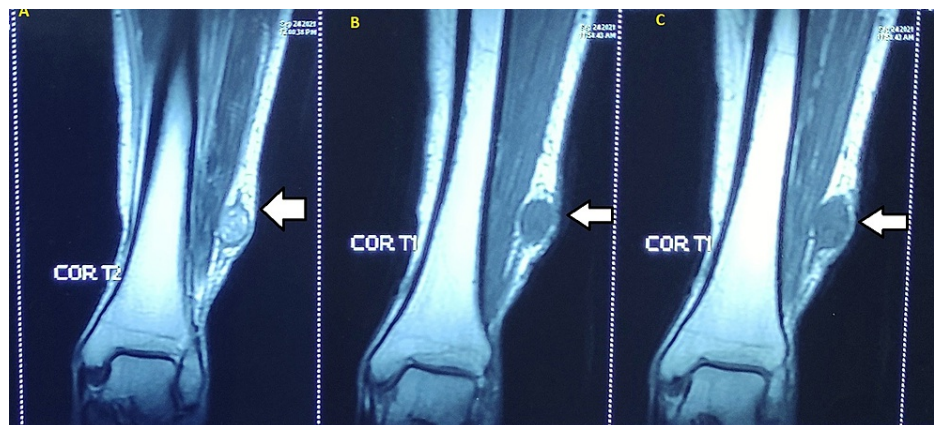
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**FIGURE 1: Painful bulge on the lateral aspect of the patient's left leg along with previous surgical scar mark**

When the patient was examined in the outpatient clinic, a lump measuring 2.3 x 1.9 cm in the subcutaneous plane along with stitched skin margins in the lateral distal portion of the patient's left leg was observed. The patient had moderate tenderness over the lump. On examination of the foot, with both passive and active dorsiflexion, he reported experiencing some discomfort. Deep and superficial peroneal nerve motor functions were both normal. The patient reported mild discomfort and sensory discomfort with active foot inversion (both with and without effort).

MRI (Figure 2) revealed a round-to-oval lesion; a T2 hyperintense lesion measuring approximately 2.3 x 1.9 x 1.5 cm with internal tiny cystic changes was seen arising from the left superficial peroneal nerve on the lateral aspect of the left lower leg in the subcutaneous tissue plane, with mild surrounding edema and without any infiltration into the muscle plane, suggesting a benign peripheral nerve sheath tumor.



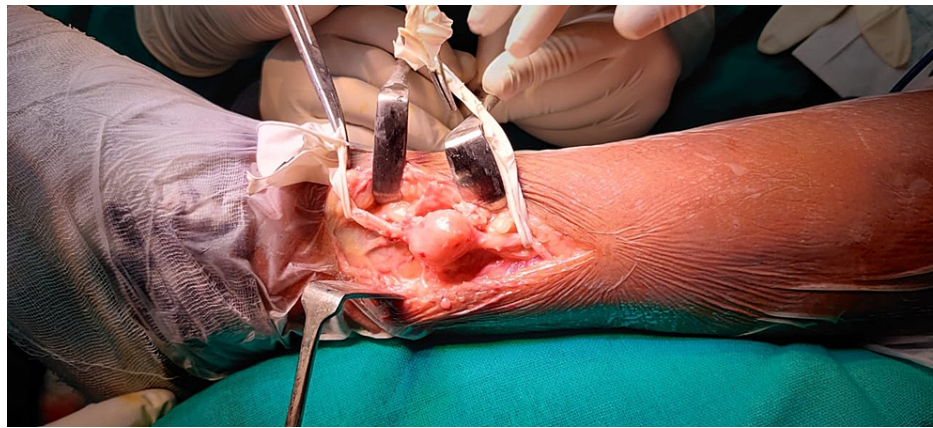
**FIGURE 2: MRI images**

The images show a lesion measuring approximately 2.3 x 1.9 x 1.5 cm with internal tiny cystic changes seen arising from the left superficial peroneal nerve on the lateral aspect of the left lower leg: (A) T2 images show the hyperintense lesion while hypointensity is seen in T1 images (B, C)

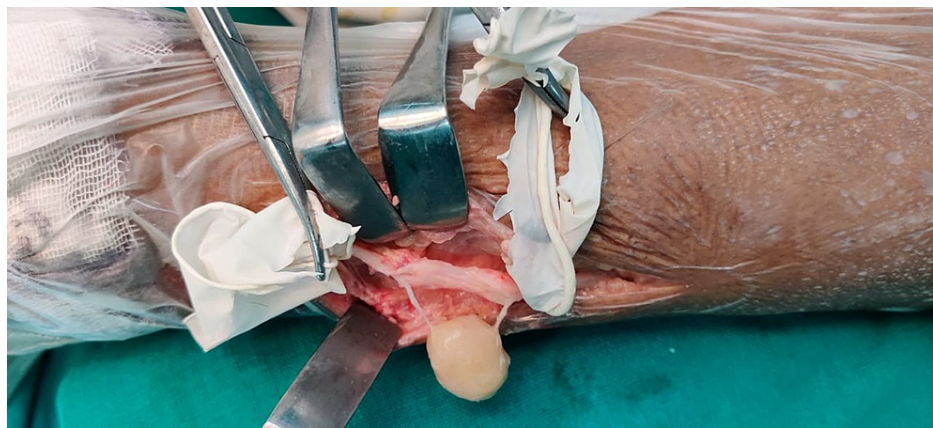
MRI: magnetic resonance imaging

The patient was anesthetized and a lateral incision was given over the distal fibula; soft tissue was dissected and a tumor was identified arising from the peroneal nerve. Dissection was done around the peroneal nerve and the nerve was separated from the surrounding tissue (Figure 3). The tumor was found to be arising from a single nerve bundle fascicle. An intralesional excision (enucleation) was done and the remaining peroneal nerve was preserved (Figures 4, 5). Histological examination of the removed tumor revealed it to be a benign neurilemmoma.

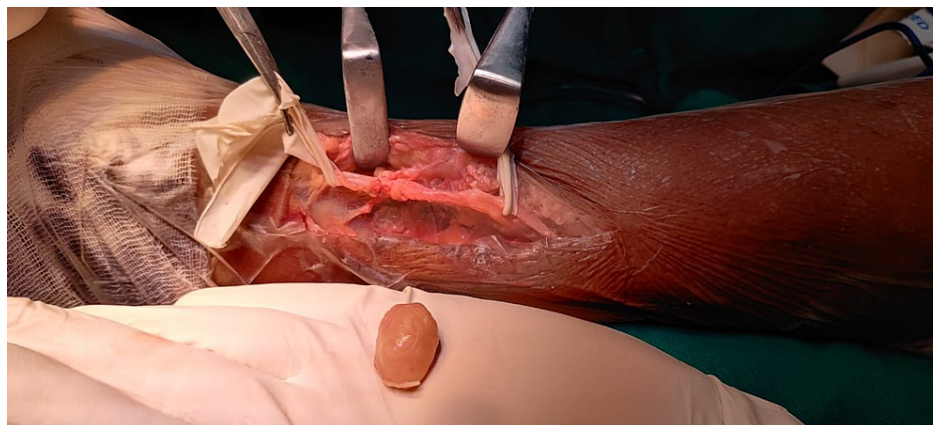
The postoperative phase went well, and the patient's symptoms significantly improved. He was able to walk unassisted and pain-free.



**FIGURE 3: Tumor margins arising from peroneal nerve trunk**



**FIGURE 4: Enucleated tumor mass along single nerve fibers**



**FIGURE 5: Completely excised tumor mass with preserved nerve root**

## Discussion

Neurilemmoma is most commonly found in the age group of 40-50 years, and it predominantly affects females (female-to-male ratio: 1.6:1). It is a rare condition that affects the legs, feet, and ankles, but it is also found in the brachial plexus and sciatic nerve in rare cases [7,8]. Finding the tumor in the peroneal nerve is a rare occurrence, and there is no data available in the literature on the incidence of this occurrence.

Neurilemmomas may appear in a variety of places. They can be asymptomatic, and may also present with



mild symptoms or severe symptoms, mostly affecting the nerves. Benign tumors of the tibial and peroneal nerves, especially neurilemmoma, should be investigated in the diagnostic process of non-arthritis and/or non-traumatic toe and foot discomfort.

The diagnosis is based on clinical findings as well as USG and MRI findings. Various signs have been reported in the literature pertaining to peripheral nerve sheath tumors, such as the entering or exiting nerve sign, the target sign, fascicular sign, and split fat sign. However, differentiation between benign and malignant lesions on MRI still remains a challenge [9].

Treatment with excision may relieve symptoms while preserving the function. Neurilemmoma can be solid or cystic in nature, and they have distinct patterns: cellular neurilemmoma have a high cell density and nuclear atypia, but have fewer mitotic figures when compared to malignant neurilemmoma as described by Rodriguez et al. [10,11]. Malignant transformation of a schwannoma (neurilemmoma) is an exceedingly rare event. The prognosis for patients with schwannomas undergoing malignant change is poor. No significant signs of malignant transformation were seen in our case at the one-year follow-up.

Since neurilemmomas never traverse through the nerve but remain in the sheath by lying on top of it, they are usually clinically silent. A clear understanding of the nerve structure and the peripheral nervous system can aid in the diagnostic and therapeutic approaches to patients with peripheral nerve pathological conditions. As suggested in the literature, neurilemmoma of cutaneous sensory nerves may be treated with gentle enucleation with a minimal risk of nerve trunk damage as advocated by Lai et al. [8]. However, nerve sheath tumors of motor nerves may require excision, leading to postoperative deficits.

## Conclusions

When encountering cases of lower limb swelling, benign neural sheath neoplasm should always be considered in the differentials, especially in swellings of a non-traumatic origin. Imaging studies, especially MRI, are the most effective investigations for delineating the anatomy and location of the tumor. Enucleation remains the mainstay of treatment while preserving nerve functions.

## Additional Information

### Disclosures

**Human subjects:** Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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