

CASE REPORT

SOLITARY PEDUNCULATED CUTANEOUS NEUROFIBROMA OF THE LOWER LEG A CASE REPORT

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CLINICAL PRESENTATION

Solitary pedunculated lesion
Lower leg near the ankle

MULTIMODAL IMAGING

Radiography, ultrasound
and MRI

HISTOPATHOLOGY

Spindle-cell morphology
Cutaneous neurofibroma

FOLLOW-UP

Complete surgical excision
No recurrence at six months

Solitary Pedunculated Cutaneous Neurofibroma of the Lower Leg: A Case Report

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Abstract

Cutaneous neurofibromas are benign peripheral nerve sheath tumors confined to the dermis and are commonly encountered either in association with neurofibromatosis type 1 or as solitary sporadic lesions. They demonstrate considerable clinical polymorphism and may present as sessile, globular, or pedunculated lesions. We report a 47-year-old man who presented with a painless, progressively enlarging pedunculated mass over the posterior aspect of the left leg for two years. There were no clinically evident features suggestive of neurofibromatosis type 1. Imaging revealed a well-defined superficial soft-tissue lesion with a discrete vascular stalk and no deep extension. Complete surgical excision was performed. Histopathological examination demonstrated an unencapsulated dermal tumor composed of spindle-shaped cells with elongated, wavy nuclei embedded in a mildly myxoid stroma, consistent with cutaneous neurofibroma. This case illustrates a solitary pedunculated presentation of localized cutaneous neurofibroma in the lower limb and highlights the value of multimodal imaging and histopathological correlation in the evaluation of superficial polypoid lesions. Complete excision is generally definitive treatment, with no recurrence observed at six-month follow-up in the present case.

Keywords: cutaneous neurofibroma; superficial soft tissue lesion; magnetic resonance imaging; ultrasonography; histopathology; case report

Introduction

Cutaneous neurofibromas (cNFs) are benign peripheral nerve sheath tumors confined to the dermis and composed of Schwann cells, fibroblasts, perineurial cells, mast cells, and axonal elements [1,2]. Although frequently associated with neurofibromatosis type 1 (NF1), solitary sporadic lesions are common and generally lack systemic implications [1].

Clinically, cNFs demonstrate marked morphological variability and may present as flat, sessile, globular, or pedunculated lesions [1]. The pedunculated subtype is characterized by a narrow stalk supporting a superficial polypoid mass. This exophytic architecture may diverge from the classical nodular appearance of neurofibroma and create diagnostic uncertainty.

We report a solitary pedunculated cutaneous neurofibroma of the lower limb in a patient without clinical features suggestive of NF1 and discuss its clinicopathological characteristics, multimodal imaging findings, and diagnostic considerations.

Case Presentation

A 47-year-old man presented with a slowly enlarging mass over the posterior aspect of the left leg for two years. The lesion was painless and had progressively increased in size. The patient sought evaluation due to cosmetic concern and occasional friction-related discomfort. There was no history of trauma, constitutional symptoms, or similar lesions elsewhere. Clinical examination revealed no café-au-lait macules, axillary freckling, or other clinically evident cutaneous features suggestive of NF1. Family history was unremarkable.

On physical examination, a soft, skin-colored, pedunculated mass was observed arising from the posterolateral aspect of the left leg [Figure 1]. The lesion was attached by a narrow stalk and had a smooth surface without visible ulceration. It was non-tender and mobile over deeper structures. No regional lymphadenopathy was present.

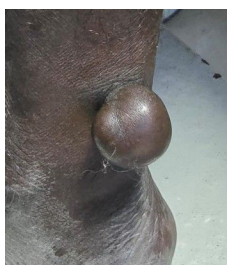


Figure 1. Clinical photograph of the pedunculated lesion on the left leg. A skin-colored, pedunculated mass arising from the posterolateral aspect of the left leg, with a smooth surface and no visible ulceration.

Plain radiography demonstrated a well-defined homogeneous soft-tissue opacity without calcification or osseous involvement [Figure 2].



Figure 2. Plain radiographs of the left leg. (A) Anteroposterior and (B) lateral radiographs demonstrate a well-defined, homogeneous soft-tissue opacity along the posterior aspect of the distal leg (arrows). No internal calcifications or adjacent tibial or fibular abnormalities are seen.

Ultrasonography performed using a 4–10 MHz linear transducer demonstrated a well-circumscribed, heterogeneously hypoechoic superficial pedunculated lesion measuring $1.69 \times 2.42 \times 2.20$ cm with a discrete vascular stalk appearing to arise from the superficial subcutaneous plane [Figure 3]. No extension into the deeper soft tissues was identified. The lesion was non-compressible and demonstrated no posterior acoustic alteration, posterior enhancement, or posterior shadowing. Doppler examination demonstrated arterial vascularity within the stalk.

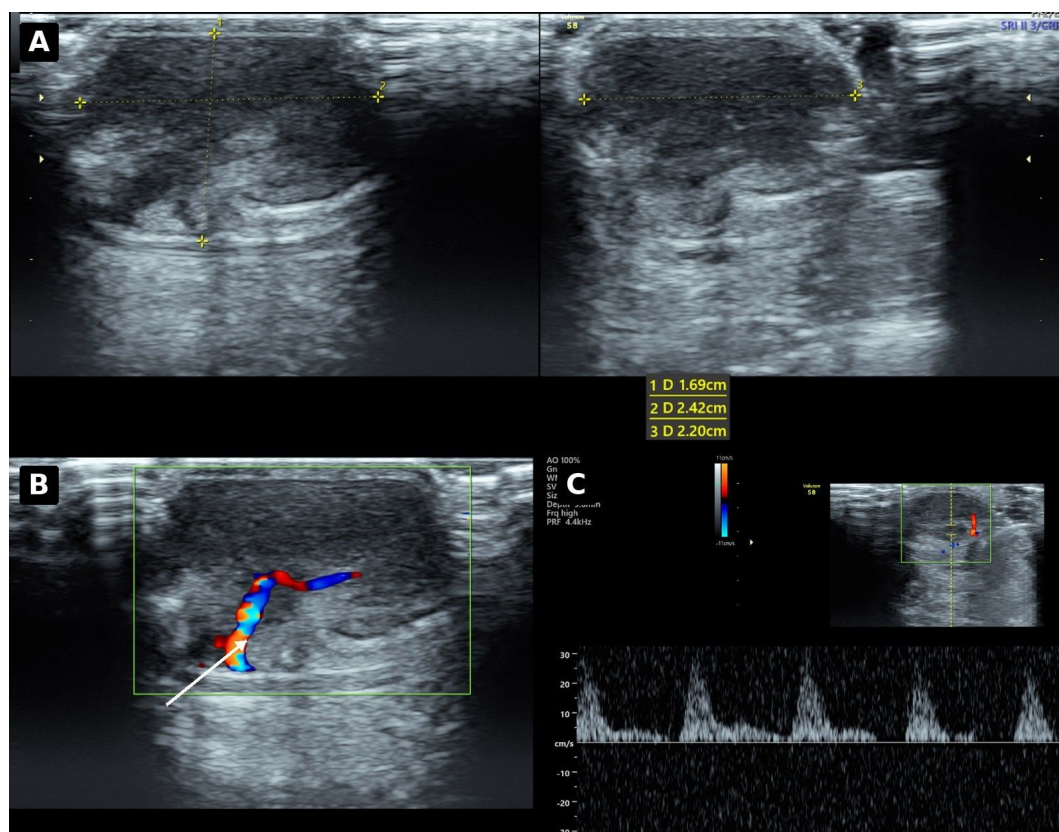


Figure 3. Ultrasonographic evaluation of the lesion. (A) Gray-scale ultrasound demonstrating a well-circumscribed, heterogeneously hypoechoic superficial pedunculated lesion. (B) Color Doppler demonstrates arterial vascularity within a narrow vascular stalk supplying the lesion (arrow). (C) Spectral Doppler demonstrates a pulsatile arterial waveform within the vascular stalk. Ultrasound was performed using a 4–10 MHz linear transducer.

Magnetic resonance imaging (MRI) was performed on a 1.5-T system and demonstrated a well-defined superficial pedunculated soft-tissue mass measuring $2.3 \times 2 \times 2.6$ cm, appearing isointense to muscle on T1-weighted images and relatively hyperintense on T2-weighted images [Figure 4]. A narrow stalk was seen extending from the lesion into the superficial subcutaneous tissues. There was no extension into the deep fascia or underlying musculature. No intravenous gadolinium-based contrast agent was administered. The GRE sequence demonstrated no appreciable susceptibility blooming to suggest macroscopic hemorrhagic products.

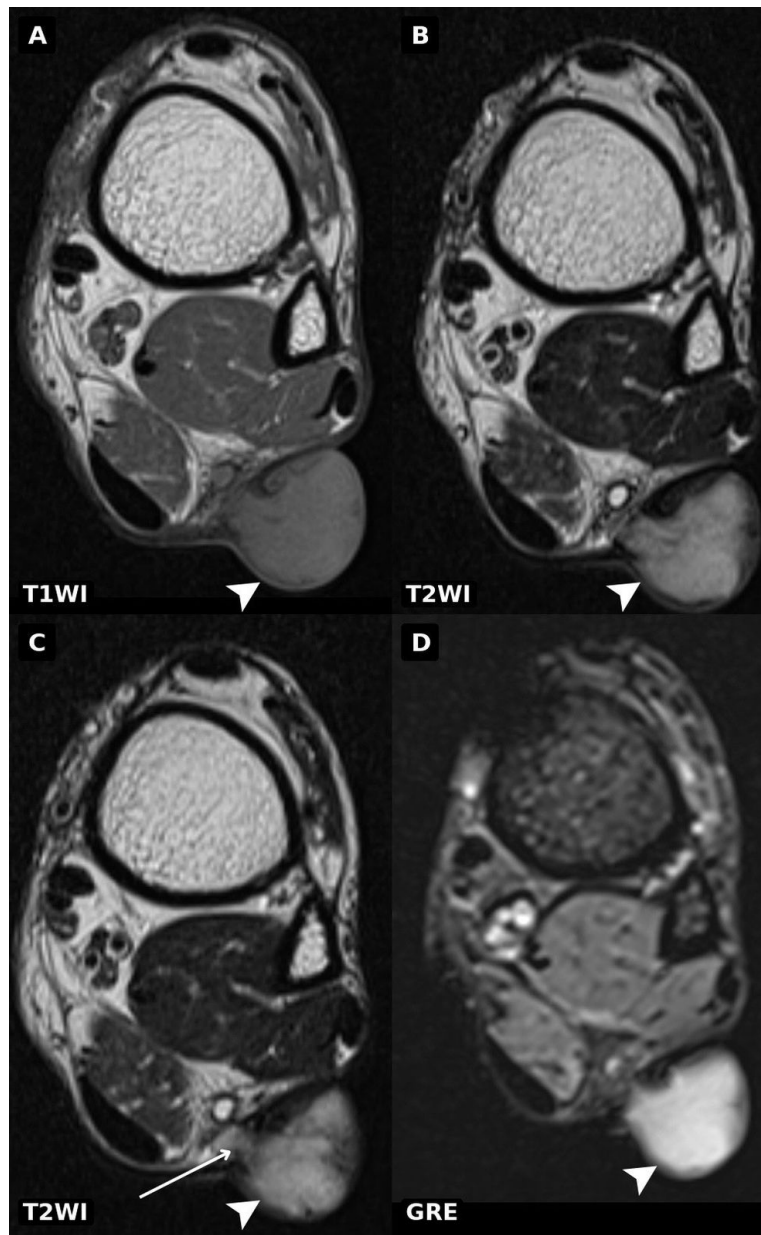


Figure 4. Magnetic resonance imaging (MRI) of the lesion. (A) Axial T1-weighted image (T1WI) demonstrating a well-defined superficial pedunculated soft-tissue mass, appearing isointense to adjacent muscle (arrowhead). (B) Axial T2WI demonstrating relatively high signal intensity of the lesion (arrowhead). (C) Axial T2WI demonstrating the narrow stalk extending from the lesion into the superficial subcutaneous tissues (arrow). (D) Axial gradient-recalled echo (GRE) image demonstrating no appreciable susceptibility blooming to suggest macroscopic hemorrhagic products (arrowhead). No extension into the deep fascia or underlying musculature is identified. MRI was performed on a 1.5-T system without intravenous gadolinium contrast.

Based on the clinical examination and nonspecific imaging appearance of a superficial pedunculated soft-tissue lesion, fibrolipoma and dermatofibroma were considered as provisional differentials. The pedunculated morphology and superficial location contributed to consideration of these benign soft-tissue lesions; however, the absence of macroscopic fat on T1-weighted MRI was not typical of fibrolipoma. The lesion's size and relatively high T2 signal also made a typical small, predominantly fibrous dermatofibroma less characteristic. Neurofibroma was not included in the preoperative differential.

Gross examination revealed a skin-covered polypoid mass without hemorrhage or necrosis. Histopathological evaluation demonstrated an unencapsulated dermal tumor composed of loosely arranged spindle cells embedded in a mildly myxoid stroma [Figure 5]. The tumor cells exhibited elongated, wavy nuclei with inconspicuous cytoplasm. Occasional pseudo-Meissnerian corpuscles were identified. No cytologic atypia, increased mitotic activity, or necrosis was observed. The overall histomorphological features were consistent with cutaneous neurofibroma. Immunohistochemical staining was not performed, as the characteristic histomorphological features were considered sufficient for diagnosis.

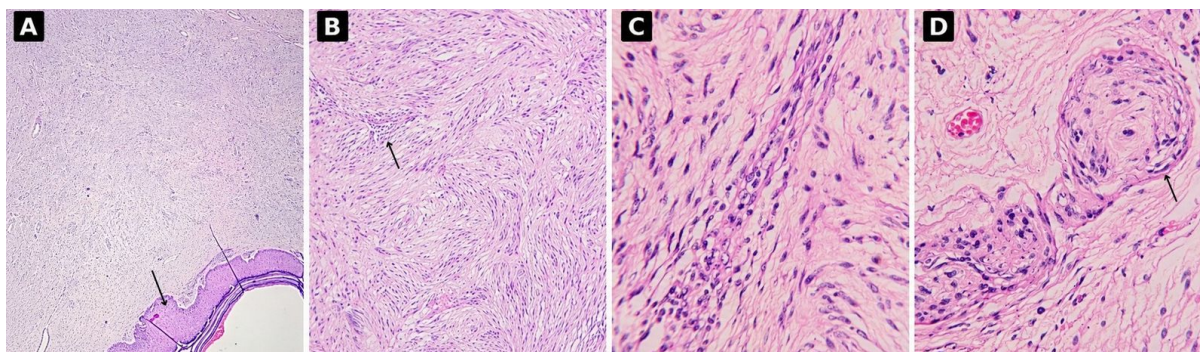


Figure 5. Histopathology of the excised lesion (hematoxylin and eosin stain). (A) Low-power (4×) view demonstrating an unencapsulated spindle-cell lesion within the dermis, immediately beneath the overlying skin (arrow). (B) Intermediate-power (10×) view demonstrating the spindle-cell proliferation with interlacing fascicles and a mildly myxoid stroma (arrow). (C) High-power (40×) view demonstrating elongated spindle cells with characteristic wavy nuclei. (D) High-power (40×) view demonstrating a pseudo-Meissnerian corpuscle (arrow).

The postoperative course was uneventful. The six-month postoperative assessment was performed in the outpatient surgery department; no recurrence was observed.

Clinical timeline

Approximately two years before presentation: the patient noticed the lesion, which gradually enlarged.

At presentation: clinical examination, radiography, ultrasound, and MRI were used to assess the superficial mass.

Subsequently: surgical excision and histopathological examination established the reported diagnosis.

Six months after excision: assessment in the outpatient surgery department showed no recurrence.

Discussion

Cutaneous neurofibromas are benign peripheral nerve sheath tumors and are typically confined to the dermis [1,2]. The localized subtype, as observed in our case, represents the most frequent presentation and is usually sporadic, occurring in patients without features of neurofibromatosis type 1 (NF1). Solitary lesions are well recognized and generally demonstrate benign behavior. Malignant transformation is not considered a characteristic feature of conventional cutaneous neurofibromas [1]. This behavior should not be extrapolated to plexiform or deep neurofibromas, which constitute different clinicopathological settings [1].

Although cutaneous neurofibromas most often present as sessile or globular nodules, they exhibit considerable clinical polymorphism. Among the described morphological patterns, the pedunculated subtype is characterized by a superficial polypoid mass attached to the skin by a narrow stalk [1]. The exophytic architecture can diverge substantially from the classical nodular appearance of neurofibroma, contributing to diagnostic uncertainty [1,4].

Pedunculated growth requires vascular support within the stalk, which may facilitate continued outward growth of the lesion. This structural configuration may produce a mushroom-like or fleshy projection from the skin surface [4]. In cutaneous neurofibroma, the interplay of Schwann cells, fibroblasts, mast cells, and extracellular matrix results in variable stromal composition [1,2,5]. Differences in myxoid content, collagen deposition, and vascularity may determine the gross appearance, resulting in a softer polypoid mass that is not a typical nodular neurofibroma [5].

Pedunculated cutaneous neurofibromas have previously been reported. Hoang et al. [6] described a pedunculated neurofibroma of the left thigh in an adult woman. The present case concerns a solitary lesion of the posterolateral lower leg in a 47-year-old man, with ultrasound and MRI characterization and histopathological correlation. Its educational value lies in the diagnostic assessment of an unusual clinical appearance rather than the identification of a new tumor entity.

The differential diagnosis of a solitary pedunculated cutaneous lesion includes benign entities with overlapping clinical appearances. In this case, fibrolipoma and dermatofibroma were provisional clinical diagnoses. The absence of macroscopic fat made a lipomatous diagnosis less typical [7]. A fibroepithelial polyp is another relevant benign polypoid mimic [8]. These entities require correlation with histopathology; imaging alone did not establish a specific diagnosis. Their principal distinguishing features are summarized in Table 1.

Radiologic assessment primarily aids in evaluating lesion depth and excluding infiltrative or deep-seated components [3,6]. Superficial neurofibromas may demonstrate homogeneous or heterogeneous T2 hyperintensity and less frequently exhibit the characteristic 'target sign' associated with deeper nerve sheath tumors [3]. Therefore, imaging findings are often nonspecific and should be interpreted cautiously. In our case, radiological examination demonstrated only superficial involvement without deep extension and did not establish a specific diagnosis.

Histopathological examination remains essential for definitive diagnosis [1,5,6]. Cutaneous neurofibromas are unencapsulated dermal tumors composed of spindle-shaped Schwann cells with elongated, wavy nuclei arranged within a myxoid or collagenous extracellular matrix. Mast cells and small neural elements may be present and pseudo-Meissnerian corpuscles can occasionally be identified. Pseudo-Meissnerian corpuscles are supportive morphological findings and are not independently diagnostic [1,2,5]. The absence of cytologic atypia, increased mitotic activity, or necrosis supports a benign histomorphological appearance. Relevant pathological mimics include dermatofibroma, dermatofibrosarcoma protuberans, fibroepithelial polyp, and superficial angiomyxoma; distinction depends on the

complete morphology and, where necessary, targeted immunohistochemistry [5]. In the present case, the characteristic histomorphological features were considered sufficient for diagnosis, and immunohistochemical studies were not performed.

Ultrasound and MRI demonstrated a narrow stalk involving the superficial subcutaneous plane, whereas the reported histology localized the sampled tumor to the dermis. These observations concern different levels of anatomical assessment and do not by themselves establish whether the stalk contained subcutaneous tumor. A dermal tumor with a superficially coursing vascular stalk is one possible explanation. The classification as cutaneous neurofibroma should therefore be correlated with the sampled stalk and base. Imaging showed no extension into the deep fascia or muscle.

Preoperative imaging helps define lesion depth and the planned surgical plane. Identification of a vascular stalk may assist operative planning [4,6]. Complete local excision is generally definitive treatment; no recurrence was observed over six months in this case. The reported clinical completeness of excision should be distinguished from microscopically documented clear margins. Recognition of pedunculated morphology is useful because clinical appearance alone may not reveal neural origin.

Conclusion

Pedunculated cutaneous neurofibroma is a recognized polypoid variant of localized cNF that may diverge from the classical nodular presentation. Awareness of this morphology is important for accurate clinical assessment of superficial pedunculated lesions. Histopathological examination remains essential for definitive diagnosis. Careful preoperative assessment helps define lesion extent, while complete local excision is generally definitive treatment; no recurrence was observed during the six-month follow-up period in this case.

Declarations

Ethics and Declaration of Helsinki: This case was managed at Madha Medical College and Research Institute, Chennai, Tamil Nadu, India. The authors state that the report was prepared in accordance with the ethical principles of the World Medical Association Declaration of Helsinki and applicable local and institutional requirements.

Author contributions: All authors contributed equally to this work.

Artificial intelligence: The authors declare that no AI was used.

ICMJE statement: The authors state that they meet the applicable authorship criteria of the International Committee of Medical Journal Editors (ICMJE), approved the final version for publication, and agree to be accountable for all aspects of the work, including the accuracy and integrity of its content.

Consent for publication: Written informed consent was obtained for publication of all clinical information and images included in this case report. Patient anonymity has been protected.

Competing interests: The authors declare no competing interests.

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Data availability: The clinical and imaging findings relevant to this case are described in the article. No separate research dataset was generated.

Table 1. Differential diagnoses of a solitary pedunculated cutaneous lesion.

Differential diagnosis	Clinical features	Imaging features	Histopathological distinction
Cutaneous neurofibroma	Benign cutaneous nerve sheath tumor; may present as a solitary, sessile, globular, or pedunculated lesion	Well-defined superficial lesion; variable T2 signal; may demonstrate a narrow vascular stalk	Unencapsulated dermal spindle-cell proliferation with elongated, wavy nuclei in a myxoid stroma; pseudo-Meissnerian corpuscles may be present
Fibrolipoma	Benign lipomatous lesion that may present as a slow-growing superficial mass	Presence of macroscopic fat; typically demonstrates high T1 signal with fat suppression on appropriate sequences	Mature adipose tissue admixed with abundant fibrous tissue
Dermatofibroma	Common benign cutaneous fibrohistiocytic lesion; generally smaller and firm	Usually a small superficial lesion; imaging is not diagnostic.	Fibrohistiocytic proliferation with characteristic collagen entrapment and variable epidermal hyperplasia
Fibroepithelial polyp	Benign polypoid or pedunculated cutaneous lesion	Superficial polypoid morphology without specific characteristic imaging findings	Polypoid lesion composed of fibrovascular stroma covered by squamous epithelium

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