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Fibular infected pseudarthrosis mimicking a bone tumor: A diagnostic pitfall

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Abstract

Introduction: Pseudotumors are non-neoplastic lesions that clinically and radiologically mimic true tumors. They often arise from chronic inflammatory or infectious processes, posing significant diagnostic challenges.

Case Presentation: A 48-year-old male with a remote history of a motor vehicle accident in 1996 resulting in a left leg fracture and sciatic nerve injury after hip dislocation was referred for evaluation of a progressive swelling in the left leg. He had previously undergone tibial intramedullary nailing and developed an asymptomatic fibular nonunion. In 2022, an apparent cystic lesion at the site of fibular pseudarthrosis was excised elsewhere. Subsequently, the patient presented with recurrent pain and progressive deep swelling, raising suspicion of a soft tissue or bone tumor. Multidisciplinary evaluation suggested a pseudotumoral lesion. Microbiological culture revealed *Streptococcus viridans*, and histopathology excluded malignancy. Surgical en bloc resection of the pseudotumor with segmental fibular resection confirmed infection with *Staphylococcus capitis*, without neoplastic cells. The patient completed 6 weeks of doxycycline and remains asymptomatic with no radiological recurrence.

Conclusion: This case highlights the diagnostic and therapeutic complexity of infected pseudarthrosis mimicking neoplasia and reinforces the need for multidisciplinary management and preoperative biopsy in suspicious musculoskeletal lesions.

Keywords: Pseudotumor, fibula, infected nonunion, bone infection, orthopedic surgery

Introduction

A pseudotumor is a lesion that mimics a neoplastic process both clinically and radiologically, despite lacking malignant histological features^[1, 2]. These lesions may result from chronic infection, inflammation, or foreign body reaction and can arise in bone or soft tissues. Differentiating between a true neoplasm and a pseudotumor is critical, as misdiagnosis can lead to inappropriate surgical management or delayed treatment^[3].

In orthopedic practice, pseudotumors have been reported in association with prosthetic debris, chronic osteomyelitis, and nonunions^[4, 5]. An infected nonunion particularly of the fibula may produce mass-like changes that closely resemble a tumor radiographically, creating a diagnostic dilemma^[6]. Here, we report a rare case of infected fibular pseudarthrosis presenting as a pseudotumoral lesion, emphasizing the role of multidisciplinary evaluation and accurate diagnostic workup.

Case Report

A 48-year-old man was referred for evaluation of a progressive swelling in the left leg. His medical history included a motor vehicle accident in 1996 that resulted in a diaphyseal fracture of the left tibia and fibula, treated with tibial intramedullary nailing. The patient subsequently developed an asymptomatic fibular nonunion and sciatic nerve injury secondary to a hip dislocation. In 2021, the patient underwent a left total hip arthroplasty, which was complicated by an acute postoperative infection. He was treated with a DAIR (Debridement, Antibiotics, and Implant Retention) procedure, and three microorganisms were identified; however, specific microbiological data were unavailable as the procedure had been performed at another institution.

In 2022, a cystic lesion at the fibular nonunion site was interpreted as a benign bone cyst and excised at another institution. The patient was referred to our hospital due to swelling in the deep tissues associated with pain and functional limitation in the left leg 1 year after the intervention. On physical examination, a firm, immobile, posterolateral swelling of the left leg was observed, tender to palpation but without erythema, warmth, or other inflammatory signs.

Computed tomography (CT) revealed a heterogeneous lesion at the pseudarthrosis site with calcified margins, raising suspicion of a soft tissue or bone neoplasm. The case was referred to a specialized multidisciplinary musculoskeletal oncology team. Initial assessment favored a pseudotumoral lesion secondary to chronic infection rather than malignancy. Laboratory results were unremarkable. A biopsy was performed, showing chronic inflammatory tissue without neoplastic cells. Microbiological cultures revealed *Streptococcus viridans*, sensitive to beta-lactams, which was considered a likely contaminant rather than a clinically

significant isolate. The patient underwent en bloc resection of the pseudotumoral lesion with segmental diaphyseal fibular resection, including adjacent synostosis and calcified soft tissue. No tibial endomedullary communication was observed. Postoperative cultures grew *Staphylococcus capitis*, susceptible to doxycycline. Histopathology confirmed chronic osteomyelitis, without malignancy. He completed 6 weeks of doxycycline therapy with complete clinical recovery. At 12-month follow-up, he remains asymptomatic and radiologically free of recurrence.



Fig 1: Full-length, anteroposterior and lateral radiographs demonstrating a consolidated tibial fracture stabilized with an intramedullary nail, a pseudarthrosis of the left fibular diaphysis with a volumous lesion.

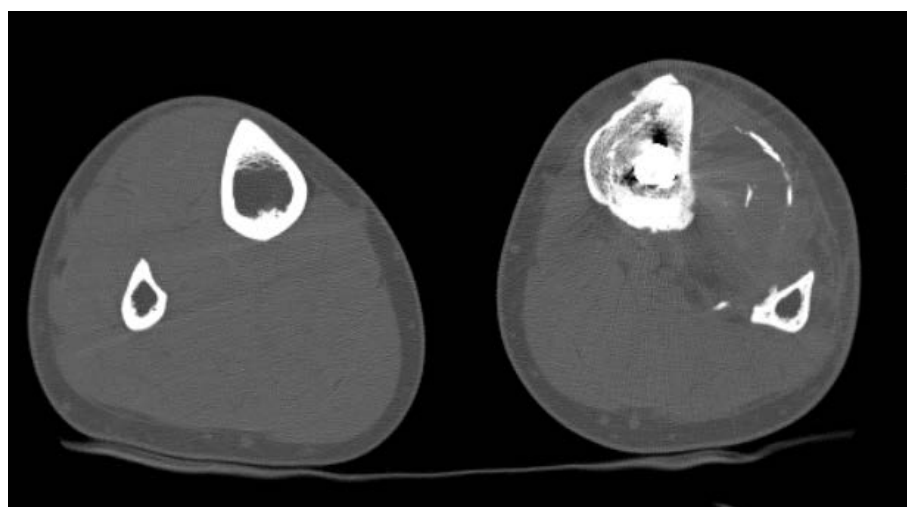




Fig 2: Computed tomography revealed a heterogeneous lesion at the pseudarthrosis site with calcified margins, raising suspicion of a soft tissue or bone neoplasm (4,2x2.5x6.2cm).



Fig 3: Postoperative anteroposterior and lateral radiographs following resection of the pseudotumoral lesion with segmental diaphyseal fibular resection, including adjacent synostosis and calcified soft tissue.

Discussion

This case illustrates the diagnostic complexity of pseudotumoral presentations of infected nonunion. The distinction between infection and malignancy is often challenging because of overlapping clinical and imaging features [7]. Infected pseudarthrosis may present with swelling, pain, and radiological findings such as sclerosis, cortical thickening, or lytic areas that can closely resemble primary bone tumors, including osteosarcoma or Ewing sarcoma [8]. For this reason, early multidisciplinary evaluation involving orthopedic oncologists, radiologists, and infectious disease specialists is essential to achieve an accurate diagnosis and avoid inappropriate management.

In this patient, the infection may have originated secondarily after the acute infection following total hip arthroplasty in 2021, despite successful local management at that time. Hematogenous spread or contiguous extension from the same limb cannot be excluded and has been described as a potential mechanism in chronic musculoskeletal infections [9, 10]. This hypothesis reinforces the importance of considering prior orthopedic infections when evaluating new lesions in the same limb.

Preoperative biopsy remains the cornerstone of diagnosis in all suspected bone tumors [11]. In the present case, the absence of a prior biopsy before the initial excision likely contributed to diagnostic uncertainty and subsequent infection. As highlighted in previous reports, early histopathological and microbiological sampling is critical to prevent inadequate or overly aggressive surgical procedures [12, 13].

Staphylococcus capitis, identified in this case, is an uncommon pathogen in long-bone infections but has been increasingly recognized in chronic osteomyelitis and implant-associated infections [14]. Its indolent nature may lead to subtle clinical manifestations, thereby mimicking neoplastic disease both clinically and radiographically. This further underscores the need for meticulous microbiological evaluation in pseudotumoral lesions.

From a surgical standpoint, successful management of infected pseudarthrosis requires complete excision of necrotic tissue and infected bone, followed by pathogen-specific antibiotic therapy. In this case, segmental fibular resection provided a definitive cure without functional deficit, consistent with previously reported outcomes for localized pseudotumoral bone infections [15, 16].

Ultimately, this case reinforces the crucial importance of referring patients with suspected musculoskeletal tumors or complex infections to specialized centers. Early multidisciplinary evaluation optimizes diagnostic accuracy, limits morbidity, and prevents unnecessary or inappropriate interventions [17].

Conclusion

Infected pseudarthrosis can present as a pseudotumoral lesion, leading to diagnostic confusion with neoplasia. Comprehensive evaluation, including histology and microbiology, is crucial before surgical intervention. This case underscores the value of multidisciplinary collaboration in the diagnosis and management of complex musculoskeletal infections mimicking tumors.

Declarations

Funding

No financial support was received for the completion of this study.

Conflict of interest

The authors declare that they have no conflicts of interest.

Ethical approval

Our institution does not require ethical approval for reporting individual cases.

Consent for Publication

Written informed consent was obtained from the patient for publication of this case and accompanying images.

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