

Not All Red Flags Indicate Malignancy: A Case Report of a Benign Lipoma Mimicking Soft-tissue Sarcoma

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Learning Point of the Article:

Large and painful soft-tissue masses with concerning malignant features may still represent benign pathology, highlighting the importance of appropriate imaging and histopathological evaluation for accurate diagnosis.

Abstract

Introduction: Soft-tissue sarcomas are uncommon malignant tumors that may present with enlarging, painful soft-tissue masses. However, certain benign lesions may occasionally demonstrate overlapping clinical features, creating diagnostic uncertainty. We report a case of a large lower limb lipoma that clinically mimicked soft-tissue sarcoma.

Case Report: A 30-year-old woman presented with a progressively enlarging right calf swelling associated with nocturnal pain for 3 years. Physical examination demonstrated a large tender mass with poorly defined margins measuring approximately 20 cm × 15 cm. Due to concerning clinical features suggestive of malignancy, further evaluation was performed. Plain radiography showed no bony involvement, while ultrasound did not demonstrate a definite soft-tissue mass or vascular malformation. Magnetic resonance imaging revealed diffuse thickening of subcutaneous fat with homogeneous signal intensity similar to adjacent fat tissue, favoring a benign lipomatous lesion. The patient subsequently underwent surgical excision. Histopathological examination demonstrated mature adipocytes without atypia or lipoblasts, confirming a benign lipoma.

Conclusion: This case highlights the diagnostic challenges in differentiating benign lipomatous lesions from soft-tissue sarcomas based solely on clinical presentation. Appropriate imaging evaluation and histopathological confirmation remain essential for accurate diagnosis and optimal management of suspicious soft-tissue masses.

Keywords: Lipoma, lower limb swelling, magnetic resonance imaging, soft-tissue sarcoma, soft-tissue tumor.

Introduction

Soft-tissue sarcomas are malignant tumors arising from mesenchymal tissue and may present as enlarging soft-tissue masses with aggressive behavior and metastatic potential [1]. In contrast, lipomatous tumors are among the most common soft-tissue tumors, with lipomas representing the majority of benign adipocytic lesions [2]. Lipomas are the most common soft-tissue masses in adults and typically occur between 40 and 60 years of

age [3,4].

Several clinical features may help differentiate benign from malignant soft-tissue lesions, including lesion size, rapid progression, pain, and anatomical location [1,3,5]. However, overlap in clinical presentation between benign and malignant lesions may create significant diagnostic uncertainty. This distinction is clinically important as both conditions differ considerably in prognosis and management.

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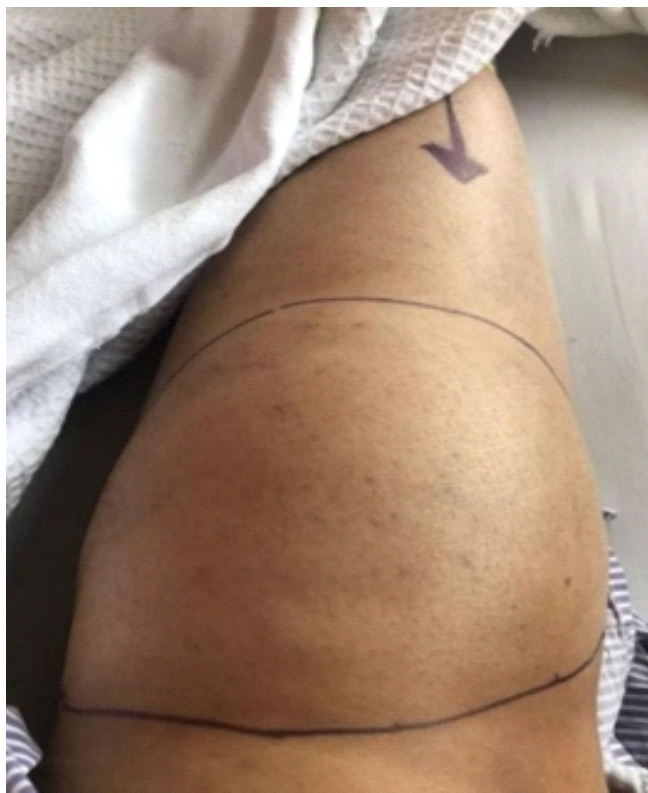


Figure 1: Pre-operative image showing a large, well-defined swelling over the proximal right calf (outlined), measuring approximately 20 cm × 15 cm. The mass appears smooth with no overlying skin changes, visible pulsation, or ulceration.

We report a case of a large lower limb lipoma presenting with multiple red flag features suggestive of soft-tissue sarcoma. Despite concerning clinical findings, further radiological and histopathological evaluation confirmed a benign lipoma. This case highlights the importance of a structured diagnostic approach when evaluating suspicious soft-tissue masses.

Case Report

A 30-year-old woman presented with a 3-year history of progressively enlarging right calf swelling associated with nocturnal pain requiring analgesia. She reported a prior history of soft-tissue contusion following a motor vehicle accident before the onset of swelling. There were no constitutional symptoms or family history of malignancy.

Examination revealed a large, tender cystic mass over the proximal right calf measuring approximately 20 cm × 15 cm with poorly defined margins. The overlying skin was unremarkable without pulsation, bruising, or punctum (Fig. 1). Distal pulses and lower limb

joint movements were preserved.

Plain radiography demonstrated no bony involvement or lytic lesions, while ultrasound showed no significant soft-tissue collection, vascular malformation, or definite mass. Due to concerning clinical features, including progressive enlargement, pain, large size, and poorly defined margins, contrast-enhanced magnetic resonance imaging (MRI) was performed. MRI revealed diffuse thickening of the subcutaneous fat at the anteromedial proximal right leg without a definite capsule. The lesion demonstrated homogeneous signal intensity similar to adjacent fat tissue without aggressive soft-tissue features, favoring a benign lipomatous lesion (Fig. 2). The patient subsequently underwent complete surgical excision for diagnostic and therapeutic purposes. Intraoperatively, a poorly demarcated 25 cm × 15 cm mass with multiple internal seromas was identified within the subcutaneous tissue of the proximal right leg and excised completely. Histopathological examination demonstrated mature adipocytes without atypia, lipoblasts, necrosis, or increased mitotic activity, consistent with benign lipoma. The patient had an uneventful post-operative recovery with satisfactory wound healing (Fig. 3). No further oncological treatment was required following orthopedic oncology review.

Discussion

Lumps in the body can range from benign to malignant conditions. Soft-tissue sarcomas are a group of malignant tumors that are relatively rare but important not to miss. These tumors can arise from muscles, fat, tendons, or blood vessels



Figure 2: Magnetic resonance imaging of the right lower limb demonstrating diffuse thickening of the subcutaneous tissue at the anteromedial aspect of the proximal calf. The lesion shows homogeneous signal intensity similar to adjacent subcutaneous fat and lacks a well-defined capsule. There is no evidence of deep fascial invasion, bony involvement, or significant heterogeneous enhancement. These imaging features are suggestive of a benign lipomatous lesion.



Figure 3: Demonstrating the surgical incision over the anteromedial aspect of the proximal right leg following excision of the mass. The wound is closed with sutures, and a drain is in situ.

[6]. They tend to grow rapidly and may metastasize to other parts of the body. Lipomas, on the other hand, are benign growths and account for the majority of soft-tissue swellings [7]. They arise from mesenchymal tissue, consist of mature adipocytes, and are usually enclosed by a thin fibrous capsule [7]. Lipomas are typically slow-growing and localized. Although sarcomas can occur at any age, they are more common in children and young adults. A history of underlying conditions or genetic syndromes such as neurofibromatosis and Li-Fraumeni syndrome may also predispose individuals to soft-tissue sarcomas [1,5,8].

Differentiating benign from malignant soft-tissue masses may occasionally be challenging due to overlapping clinical features. Although lipomas are considerably more common than soft-tissue sarcomas, the presence of red flag features such as progressive enlargement, pain, large lesion size, and poorly defined margins may increase suspicion for malignancy [1,5]. In the present case, the lesion demonstrated several concerning clinical features commonly associated with soft-tissue sarcoma despite ultimately representing benign pathology. This overlap may create significant diagnostic uncertainty, particularly in the primary care setting.

MRI plays an important role in the evaluation of suspicious soft-tissue lesions due to its superior soft-tissue characterization and

multiplanar capability [1,4,9]. MRI assists in determining lesion extent, relationship with surrounding structures, and features suggestive of benign or malignant pathology. In general, lesions with homogeneous signal intensity and smooth margins are more suggestive of benign lesions, whereas heterogeneous lesions with irregular borders may indicate malignancy [4]. In this case, MRI demonstrated homogeneous signal intensity similar to adjacent fat tissue without aggressive soft-tissue features, favoring a benign lipomatous lesion despite concerning clinical findings.

Histopathological examination remains the gold standard for definitive diagnosis. Although biopsy is commonly recommended before definitive management of suspicious soft-tissue tumors, combined diagnostic and therapeutic excision may be considered in selected cases when clinical and radiological findings are sufficiently informative [1]. Histopathological analysis in the present case demonstrated mature adipocytes without atypia or lipoblasts, confirming the diagnosis of benign lipoma.

Benign lipomas are usually adequately treated with complete surgical excision alone [10], whereas soft-tissue sarcomas often require multidisciplinary management involving surgery with or without adjuvant therapy [1]. In terms of prognosis, soft-tissue sarcomas can be life-threatening if not detected and treated early. Tumor type and the presence of metastasis are key determinants of prognosis [5].

This case highlights the importance of maintaining a high index of suspicion when evaluating enlarging soft-tissue masses. Early referral and appropriate imaging are essential to facilitate accurate diagnosis and timely management while minimizing delays in identifying malignant disease.

Conclusion

This case demonstrates that benign lipomatous lesions may occasionally present with clinical features concerning for soft-tissue sarcoma, creating significant diagnostic uncertainty. Careful clinical assessment combined with appropriate imaging and histopathological evaluation remains essential for accurate diagnosis of suspicious soft-tissue masses. Early referral is important to facilitate timely management while avoiding delayed diagnosis of malignancy and unnecessary overtreatment of benign conditions.

Clinical Message

Benign lipomas may occasionally mimic soft-tissue sarcoma clinically; therefore, enlarging painful soft-tissue masses should undergo appropriate imaging and histopathological evaluation to establish an accurate diagnosis.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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