



RESEARCH ARTICLE

FROM "BENIGN" LIPOMAS TO WELL DIFFERENTIATED LIPOSARCOMA: A RECURRENT ATYPICAL LIPOMATOUS TUMOR OF THE THIGH AND POPLITEAL FOSSA POSING MAJOR DIAGNOSTIC AND SURGICAL CHALLENGES

¹Dr. Ananta Kulkarni, ²Dr. Tushar Jadhav, ³Dr. Dhanashree Kamble, ⁴Dr. Shubham Kalbande, ⁵Dr. Amogh Pathak, ⁶Dr. Rahul Kumar Sah, ⁷Dr. Apurva Mayekar, ⁸Dr. Aditya Kashid, ⁹Dr. Aishwarya Bhujbal and ¹⁰Dr. Vaibhav Doiphode

¹PROF & HOD, Dept of General Surgery, BAVMC & KNH; ²Associate Professor, Dept of General Surgery, BAVMC & KNH; ^{3,4,5}Assistant Professor, Dept of General Surgery, BAVMC & KNH, PUNE; ^{6,7,8,9}Junior Resident, Dept of General Surgery, BAVMC & KNH; ¹⁰Intern, Dept of General Surgery, BAVMC & KNH

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*Corresponding author:
Yacouba TENGUERI

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INTRODUCTION

When a 'Lipoma' Is Not Just a Lipoma

Adipocytic tumors are among the most common soft tissue neoplasms, ranging from benign lipomas to malignant liposarcomas. Atypical lipomatous tumor, synonymous with well-differentiated liposarcoma in surgically amenable sites, represents an intermediate malignant entity characterized by local aggressiveness and high recurrence rates but low metastatic potential. Differentiation from benign lipoma is often challenging due to overlapping clinical, radiological, and histopathological features, particularly in recurrent cases.

Deep-seated tumors of the thigh and popliteal fossa pose additional diagnostic and therapeutic challenges because of proximity to major neurovascular structures. We present a rare and complex case of recurrent ALT/WDL initially misdiagnosed as benign lipomatosis, emphasizing the evolving diagnostic pathway and surgical intricacies.

Case Presentation

A Slowly Evolving Malignancy Disguised as Benign Disease: A 49-year-old female with no known comorbidities presented with a gradually progressive swelling over the posterior aspect of the right thigh for two years. She had a prior surgical history in 2016 for a similar swelling at the same

site, where excision of multiple fibrofatty masses was performed. The largest mass measured 20 × 12 cm.

Previous Histopathology (2016): Histopathological examination revealed an unencapsulated tumor composed of mature adipocytes separated by delicate fibrovascular stroma with foci of dystrophic calcification. No cellular atypia or malignancy was identified, and a diagnosis of multiple lipomas was rendered.

Current Presentation: Over the last two years, the patient noticed recurrence at the same site with progressive enlargement, extending from the posterior aspect of the knee joint and proximal leg to the upper posterior thigh associated with pain mild intermittent tingling sensation in leg & foot.

Diagnostic Odyssey: Imaging–Pathology Discordance

Initial Imaging: False Reassurance on Ultrasonography and Doppler (14/11/25): Imaging demonstrated a hyperechoic lesion in the subcutaneous plane suggestive of benign etiology, likely lipoma, with minimal increased vascularity on color Doppler.

First Tissue Diagnosis: An Indeterminate Trucut Biopsy: Core biopsy revealed mature adipocytes with clear cytoplasm and eccentrically placed nuclei, along with scattered atypical adipocytes showing hyperchromatic nuclei. Intervening lymphoid aggregates and areas of sclerosis were noted. The pathologist reported that malignancy could not be ruled out, recommending further evaluation.

PET-CECT: The Turning Point (04/12/25): PET-CECT showed multiple lobulated and separated lipid-density lesions in the subcutaneous tissue of the posterior distal two-thirds of the thigh and proximal leg. These lesions exhibited metabolically active peripheries with internal septations, features highly suggestive of liposarcoma. Additionally, right inguinal lymph nodes demonstrated low-grade metabolic activity, raising suspicion for nodal involvement.

Repeat Biopsy and Nodal Evaluation: Clarifying the Diagnosis (11/12/25): A repeat core biopsy from the thigh mass was suggestive of atypical lipomatous tumor. Excisional biopsy of the right inguinal lymph node revealed reactive lymphoid hyperplasia without evidence of metastasis.

Multidisciplinary Tumor Board Decision (17/12/25): The case was discussed at the multidisciplinary tumor board at Surya Sayadri Hospital. Based on clinical, radiological, and histopathological findings, a final diagnosis of Well-Differentiated liposarcoma (Atypical lipomatous tumor) was made.

Surgical Management: Complex Limb-Salvage Excision: The patient was planned for wide local excision of the tumor for definitive histopathological correlation and planning of further adjuvant treatment. Surgery was performed on 23/12/25 under spinal anesthesia.



Intra-operative Findings and Surgical Strategy: A large swelling involving the upper two-thirds of the posterior thigh was noted, along with a separate mass in the popliteal fossa extending into the proximal leg.

Popliteal Fossa Tumor: A horizontal incision was made over the popliteal fossa. The tumor was found to be deep-seated, extending into the proximal leg and closely abutting major neurovascular structures. Careful dissection allowed complete excision while preserving the vessels and nerves.



Posterior Thigh Tumor: An elliptical incision was taken over the posterior thigh. A large, lobulated tumor was dissected out from its capsule. The mass was traced distally to its origin near the upper popliteal fossa and proximally up to the upper thigh, maintaining meticulous hemostasis due to proximity to major vessels.



Intramuscular Component: An additional intramuscular tumor was identified within the biceps femoris muscle and excised completely. A 14-number negative suction drain was placed, and the wound was closed in layers. All excised specimens were sent for histopathological examination.



DISCUSSION

Lessons from a Recurrent and Deceptive Adipocytic Tumor

ALT/WDL commonly affects adults in the fifth to seventh decades and frequently involves the thigh. Despite its low metastatic potential, the tumor is notorious for local recurrence, particularly when excision margins are inadequate or when tumors are deep-seated.

This case underscores several important points:

- **Diagnostic Pitfall:** Initial histology consistent with benign lipoma may represent sampling error, especially in large or multifocal adipocytic tumors.
- **Role of Imaging:** PET-CECT was instrumental in raising suspicion of malignancy when ultrasonography and Doppler findings were equivocal.
- **Histopathological Evolution:** Repeated biopsies demonstrated increasing atypia, ultimately confirming ALT/WDL.
- **Multidisciplinary Approach:** Tumor board discussion was pivotal in final diagnosis and management planning.
- **Surgical Complexity:** Tumors involving the popliteal fossa require meticulous surgical technique due to proximity to vital neurovascular structures.

Wide local excision with negative margins remains the cornerstone of treatment. Adjuvant radiotherapy may be considered in recurrent or marginally excised tumors to reduce the risk of further recurrence.

Histopathological Findings: Sections show a lipomatous neoplasm composed predominantly of mature adipocytes exhibiting variation in cell size and shape. Scattered atypical hyperchromatic stromal cells are present within fibrous septa, with focal stromal fibrosis. Occasional lipoblasts are identified. No significant tumor necrosis, increased mitotic activity, or dedifferentiated component is seen. The histomorphological features are consistent with Atypical Lipomatous Tumor/Well-Differentiated Liposarcoma (ALT/WDL). In the clinical setting of a recurrent lesion arising from the posterior thigh, the findings are in keeping with recurrent ALT/WDL (well-differentiated liposarcoma). Following receipt of the histopathology report, the patient was referred to the Department of Radiation Oncology and subsequently underwent adjuvant radiotherapy in view of the recurrent nature of the disease. The patient continues to be on regular follow-up for surveillance of local recurrence and disease progression.

CONCLUSION

Key Clinical Takeaways

Recurrent adipocytic tumors of the thigh should raise suspicion for atypical lipomatous tumor, even when initial histopathology suggests benign lipoma. A high index of suspicion, repeated biopsies, advanced imaging, and multidisciplinary evaluation are essential for accurate diagnosis. Complete surgical excision with limb preservation is achievable even in complex cases involving the popliteal fossa.

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