

Bilateral Symmetric Atypical Lipomatous Tumor: A Case Report

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DOI: <https://doi.org/10.52403/ijrr.20261001>

ABSTRACT

Introduction: Atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS) is the most common subtype of liposarcoma and may mimic benign lipomatous tumors because of its slow growth and nonspecific clinical presentation. Bilateral symmetrical involvement of the extremities is exceptionally rare and may complicate diagnosis.

Case Presentation: A 57-year-old woman presented with a two-year history of progressively enlarging bilateral thigh masses associated with persistent pain, predominantly on the right side. Physical examination revealed bilateral thigh enlargement, with circumferences of 60 cm on the right and 56 cm on the left. Plain radiography demonstrated soft tissue swelling without osseous involvement. Ultrasonography suggested a lipomatous lesion, while magnetic resonance imaging revealed extensive lipomatous masses with atypical features. Initial fine-needle aspiration biopsy favored an intramuscular lipoma. Because of the lesion size and

atypical imaging findings, a multidisciplinary evaluation was performed, followed by core needle biopsy. Histopathological examination demonstrated atypical stromal cells within a lipomatous neoplasm, and immunohistochemical analysis showed positive MDM2 expression, confirming the diagnosis of bilateral atypical lipomatous tumor/well-differentiated liposarcoma.

Clinical Discussion: This case illustrates the diagnostic challenge of differentiating ALT/WDLPS from benign lipomatous tumors. Although imaging studies may provide valuable clues, definitive diagnosis requires histopathological and immunohistochemical evaluation. MDM2 positivity is particularly useful in distinguishing ALT/WDLPS from benign lipomatous lesions.

Conclusion: Bilateral symmetrical ALT/WDLPS of the thighs is an uncommon presentation that may initially resemble a benign lipomatous process. Comprehensive evaluation integrating clinical findings, imaging, histopathology, and MDM2 immunohistochemistry is essential for

accurate diagnosis and appropriate management.

Keywords: atypical lipomatous tumor; bilateral thigh mass; lipomatous tumor; soft tissue sarcoma; well-differentiated liposarcoma.

INTRODUCTION

Adipocytic tumors are among the most common soft tissue neoplasms encountered in clinical practice, ranging from benign lipomas to malignant liposarcomas.^[1] Liposarcoma is a malignant mesenchymal neoplasm of adipocytic differentiation and accounts for approximately 20% of all soft tissue sarcomas.^[2] Clinically, these tumors often present as slowly enlarging, painless masses and may remain asymptomatic for prolonged periods before diagnosis. Liposarcomas comprise a heterogeneous group of tumors with distinct biological behaviors and prognostic implications.^[3] Liposarcomas are categorized into four major subtypes: atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS), dedifferentiated liposarcoma (DDLPS), myxoid liposarcoma, and pleomorphic liposarcoma.^[4] Among these subtypes, DDLPS and pleomorphic liposarcoma are considered high-grade malignant tumors with significant metastatic potential, whereas ALT/WDLPS and myxoid liposarcoma generally exhibit a more indolent clinical course and a favorable prognosis.^[5] ALT and WDLPS represent the same pathological entity but differ in terminology according to anatomical location and surgical resectability. The term ALT is generally used for tumors arising in surgically amenable sites, particularly the extremities, where complete excision is often curative. In contrast, the designation WDLPS is commonly applied to tumors occurring in anatomically challenging locations such as the retroperitoneum, where local recurrence and dedifferentiation are more frequent.^[6] ALT/WDLPS accounts for approximately 40–50% of all liposarcomas

and is characterized histologically by mature adipocytic proliferation with atypical stromal cells and variable numbers of lipoblasts, often associated with fibrous or sclerotic stromal components.^[5] ALT/WDLPS most commonly affects middle-aged and older adults and typically arises in the deep soft tissues of the extremities, particularly the thigh, as well as the retroperitoneum, mediastinum, paratesticular region, and subcutaneous tissues.^[7] Unlike benign lipomas, ALT/WDLPS demonstrates a propensity for local recurrence if incompletely excised. However, metastatic spread is exceedingly rare in the absence of dedifferentiation. Delayed diagnosis and treatment may result in progressive tumor enlargement, causing functional impairment and increasing surgical complexity.^[5,8] Bilateral and symmetrical presentations of ALT/WDLPS in the extremities are exceptionally uncommon, and reports describing comprehensive clinical, radiological, surgical, and pathological findings remain limited in the literature. Furthermore, distinguishing ALT/WDLPS from benign lipomatous tumors and other soft-tissue lesions, such as fibromatosis, may be challenging due to overlapping clinical and imaging features. The aim of this report is to present a rare case of bilateral symmetric atypical lipomatous tumors involving both thighs, highlighting the diagnostic challenges, surgical management, histopathological findings, and clinical outcome following treatment.

CASE PRESENTATION

A 57-year-old woman presented to our orthopedic oncology clinic with a 2-year history of progressive pain and swelling involving both thighs, with symptoms predominantly affecting the right side. The swelling had gradually increased in size over time and was associated with persistent pain that did not improve with rest. The patient had previously undergone fine-needle aspiration biopsy (FNAB) at another institution on 28 November 2022. She

denied any history of similar masses elsewhere in the body, unintentional weight loss, night sweats, or chronic cough. Physical examination revealed bilateral thigh enlargement, with the right thigh appearing larger than the left. Palpation

demonstrated tenderness over both lesions without overlying erythema or local warmth. The circumference of the left thigh was 56 cm, whereas that of the right thigh was 60 cm. The clinical appearance of both thighs is shown in Figure 1.



Figure 1. Clinical Picture (A) Right Thigh, and (B) Left Thigh

Routine laboratory investigations demonstrated a hemoglobin level of 9.7 g/dL, white blood cell count of 5,760 cells/ μ L, platelet count of 289,000 cells/ μ L, alkaline phosphatase (ALP) level of 105 U/L, lactate dehydrogenase (LDH) level of 240 U/L, aspartate aminotransferase (AST) level of 42 U/L, and alanine aminotransferase (ALT) level of 44 U/L.

Among these parameters, LDH was mildly elevated above the normal reference range. Plain radiographs of the right femur in anteroposterior and lateral projections demonstrated soft tissue swelling in the right femoral region with thickening of the lateral subcutaneous tissue without evidence of osseous destruction or periosteal reaction (Figure 2).

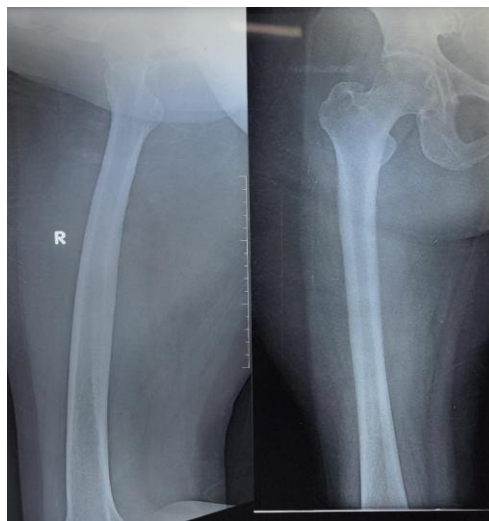


Figure 2. X-Ray Right Femur

Subsequently, ultrasonography of the right thigh revealed a solid lesion located along the lateral aspect of the femoral region,

suggestive of a lipomatous tumor. No invasion of the adjacent musculature was identified (Figure 3).

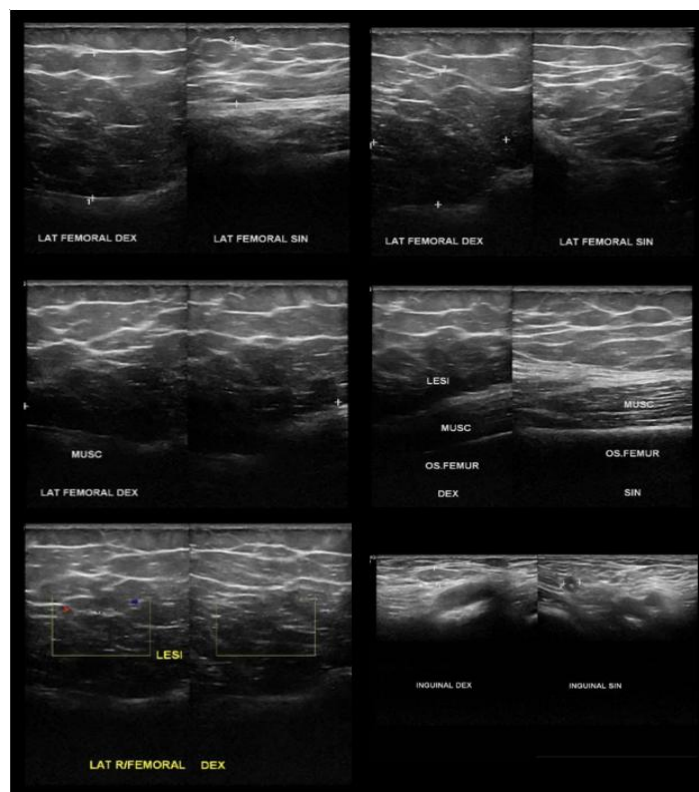


Figure 3. Ultrasound of the femoral region

Further evaluation with contrast-enhanced magnetic resonance imaging (MRI) of both thighs was performed. MRI of the left thigh demonstrated diffuse focal thickening of the subcutaneous adipose tissue extending from the proximal to the mid-lateral femoral region, consistent with a giant lipomatous

lesion without definitive radiological features of malignancy. In addition, a subchondral cyst was identified within the lateral femoral condyle, compatible with degenerative osteoarthritic changes (Figure 4).

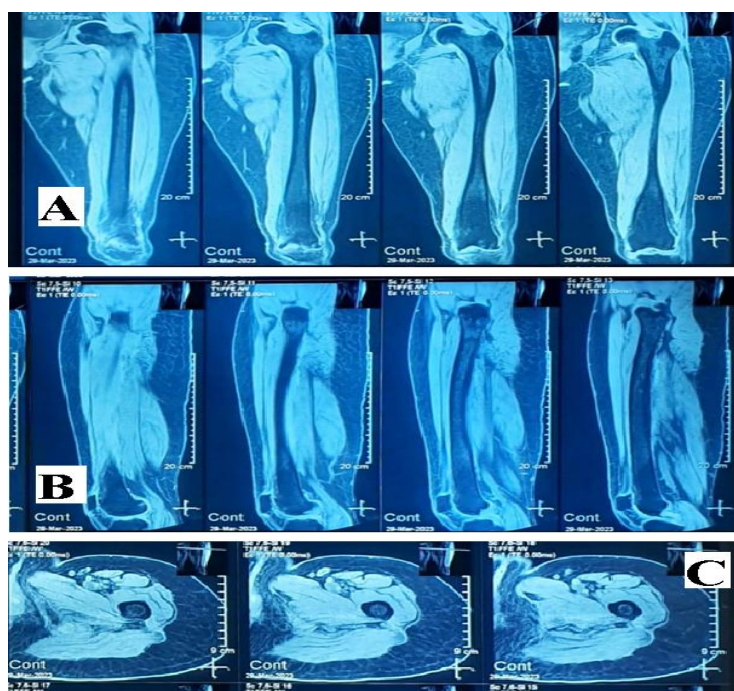


Figure 4. MRI T1 Weighted (A) Fat Suppressed Left Thigh Coronal View with Contrast; (B) Fat Suppressed Left Thigh Sagittal View with Contrast; and (C) Left Thigh Axial View with Contrast

MRI of the right thigh revealed multifocal fascial and intramuscular abnormalities involving the lateral and medial compartments of the femur, accompanied by

thickening of the lateral subcutaneous adipose tissue. A subchondral cystic lesion was also observed in the right iliac bone (Figure 5).

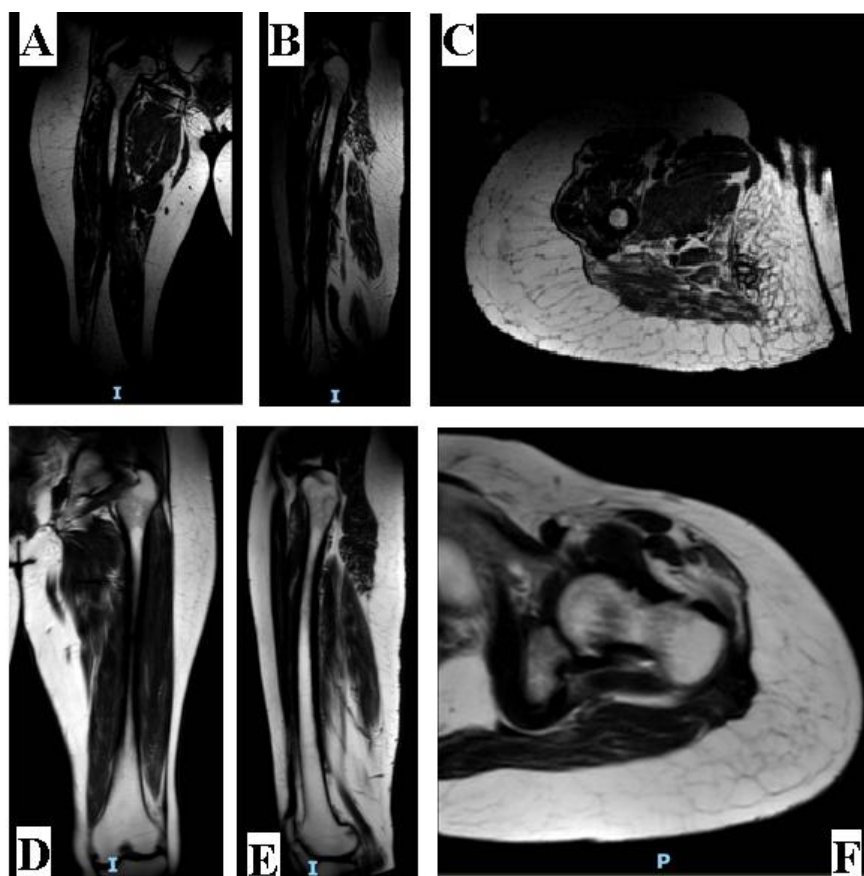


Figure 5. T2-weighted MRI of the right thigh demonstrating a soft-tissue lesion with fascial and intramuscular involvement. (A) Coronal view, (B) Sagittal view, and (C) Axial view. T2-weighted MRI of the left thigh demonstrating a large lipomatous lesion involving the subcutaneous adipose tissue. (D) Coronal view, (E) Sagittal view, and (F) Axial view.

The FNAB specimen obtained at the referring hospital was reported as a benign lipomatous neoplasm, favoring intramuscular lipoma. However, due to the lesion's large size and atypical imaging features, a multidisciplinary clinicopathological conference was convened involving orthopedic oncologists, radiologists, and pathologists. The differential diagnosis included benign lipoma and atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS). Therefore, a core needle biopsy was performed for definitive histopathological evaluation (Figure 6).

Histopathological examination demonstrated a lipomatous neoplasm with atypical stromal cells. Immunohistochemical analysis for murine double minute 2 (MDM2) showed positive nuclear staining, supporting the diagnosis of atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS) (Figure 7). Based on the clinicopathological findings and multidisciplinary discussion, the diagnosis of bilateral atypical lipomatous tumor was established, and the patient was subsequently scheduled for further oncological management.

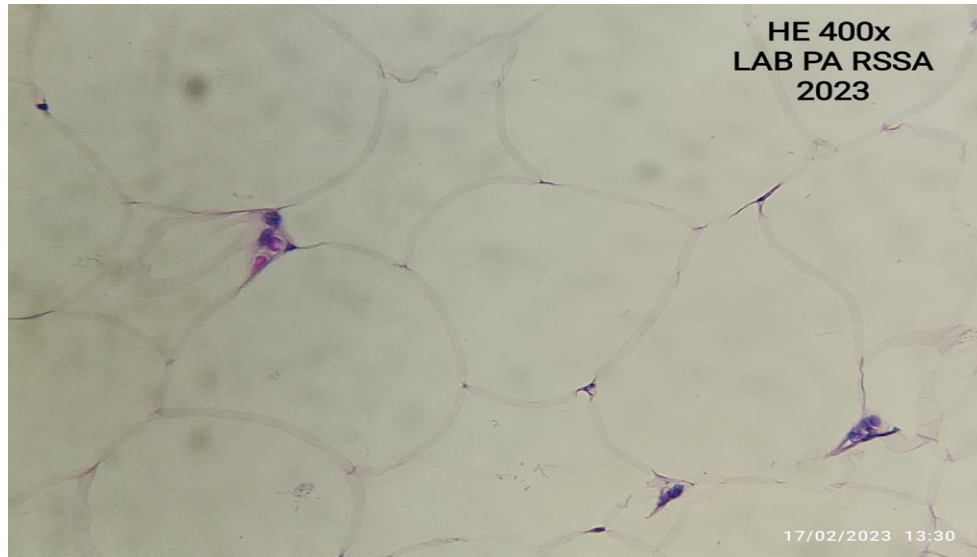


Figure 6. Core Biopsy of Proximal Right Femoral

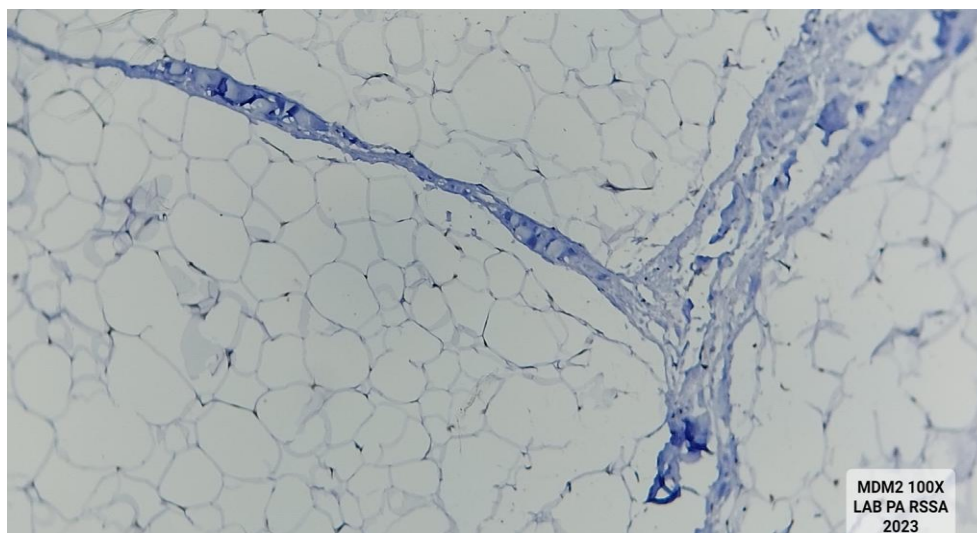


Figure 7. Picture of IHK MDM-2

CLINICAL DISCUSSION

The most notable feature of the present case is the bilateral and symmetrical involvement of the thighs. ALT/WDLPS most commonly presents as a solitary lesion; therefore, bilateral symmetric disease is an unusual presentation that may lead clinicians to initially consider benign lipomatous conditions rather than a malignant adipocytic neoplasm.^[5] This atypical presentation contributed to the diagnostic challenge encountered in our patient.

Distinguishing ALT/WDLPS from benign lipomatous tumors remains difficult due to the considerable overlap in their clinical and radiological features.^[9] In the present case, the initial FNAB findings favored an

intramuscular lipoma. However, FNAB has recognized limitations in evaluating large heterogeneous lipomatous tumors because sampling may not adequately capture areas containing atypical stromal cells. Consequently, histopathological examination of a representative tissue sample remains essential when clinical or radiological findings are suspicious.

Magnetic resonance imaging plays a crucial role in the preoperative assessment of lipomatous tumors. Previous studies have demonstrated that thick septations (>2 mm), nodular non-adipose components, and septal contrast enhancement are features suggestive of ALT/WDLPS rather than benign lipoma. ^[10,11] Nevertheless, these

findings are not always specific, and imaging alone cannot reliably establish the diagnosis. In our patient, MRI revealed extensive lipomatous lesions with atypical features, prompting further pathological evaluation despite the initial benign cytological findings.

The definitive diagnosis was established through histopathological and immunohistochemical analysis. Histologically, ALT/WDLPS is characterized by mature adipocytic proliferation admixed with atypical stromal cells and variable numbers of lipoblasts.^[5] Immunohistochemical assessment demonstrated MDM2 positivity, which strongly supports the diagnosis of ALT/WDLPS. MDM2 amplification is widely recognized as a valuable diagnostic marker for differentiating ALT/WDLPS from benign lipomatous tumors, particularly in cases with equivocal morphology.

Accurate diagnosis is clinically important because treatment strategies and prognosis differ substantially between benign lipomas and ALT/WDLPS.^[12] Complete surgical excision with negative margins remains the mainstay of treatment and offers excellent local disease control.^[12,13] Although metastatic spread is uncommon, inadequate excision may increase the risk of local recurrence and, in rare cases, dedifferentiation. Therefore, long-term postoperative surveillance is recommended, particularly for large tumors and lesions located in deep soft tissues.^[14-16]

This case underscores the importance of maintaining a high index of suspicion when evaluating large or atypically distributed lipomatous masses. Bilateral symmetrical lesions should not automatically be assumed to be benign. Integration of clinical assessment, advanced imaging, histopathological examination, and MDM2 immunohistochemistry is essential for achieving an accurate diagnosis and ensuring appropriate management.

CONCLUSION

Atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS) is the most common subtype of liposarcoma and typically presents as a slowly enlarging soft tissue mass in the deep tissues of the extremities. Because its clinical and radiological features may closely resemble those of benign lipomatous tumors, accurate diagnosis can be challenging, particularly in atypical presentations. This case highlights the diagnostic value of combining clinical assessment, advanced imaging, histopathological examination, and MDM2 immunohistochemical analysis in distinguishing ALT/WDLPS from benign lipomatous lesions. The present case is notable for its rare bilateral, symmetrical thigh involvement, underscoring that malignant adipocytic tumors should remain in the differential diagnosis even when lesions demonstrate indolent growth and apparently benign imaging features. Early recognition and appropriate surgical management are essential to prevent progressive enlargement, functional impairment, and local recurrence. Long-term surveillance is recommended due to the risk of local recurrence, particularly with incomplete excision or in challenging anatomical locations.

Declaration by Authors

Ethical Approval: Approved by the Ethics Commission of General Hospital Dr. Saiful Anwar with No. 400/007/CR/102.7/2026 issued on July 15th 2026

Acknowledgement: None

Source of Funding: None

Conflict of Interest: No conflicts of interest declared.

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- How to cite this article: Satria Pandu Persada Isma, Istan Irmansyah Irsan, Eviana Norahmawati, Irma Darinafitri, Dandy Drestanto Adiwignyo, Mochamad Febryan Kevien Fadrijanto. Bilateral symmetric atypical lipomatous tumor: a case report. *International Journal of Research and Review*. 2026; 13(10):1-9. doi: [10.52403/ijrr.20261001](https://doi.org/10.52403/ijrr.20261001)
