

A Rare Case of Chest Wall Osteolipoma Presenting as a Paravertebral Mass

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Abstract

Osteolipoma is an extremely rare histological variant of conventional lipoma. While lipomas are the most common soft tissue tumors in adults, the occurrence of an osteolipoma in the chest wall is exceedingly uncommon and presents unique diagnostic challenges.

We report the case of a 62-year-old male patient who presented with a progressively enlarging right dorsal paravertebral mass over a three-year period. Computed tomography and magnetic resonance imaging identified a well-circumscribed, heterogeneous fatty mass containing significant ossified components, located deep to the paraspinal muscles without rib or vertebral invasion. The patient underwent a complete en-bloc surgical excision without preoperative biopsy. Histopathological examination confirmed the diagnosis of a benign osteolipoma. After a 12-month follow-up, no recurrence or complications were observed.

Although rare, a thorough radiological and pathological correlation is essential to differentiate this benign entity from more aggressive ossifying neoplasms, such as liposarcoma or myositis ossificans. Surgical excision remains the treatment of choice.

Keywords : Osteolipoma ; Lipoma ; Chest Wall ; Rare Diseases

INTRODUCTION

Lipomas are the most common benign soft tissue neoplasms in adults(1). While usually composed of mature adipose tissue, they can rarely incorporate other mesenchymal elements(2). Osteolipoma, or ossifying lipoma, is an extremely rare histological variant characterized by the presence of mature lamellar bone within the tumor, accounting for less than 1% of all lipomatous lesions(3).

The occurrence of osteolipoma in the chest wall is exceedingly uncommon, often posing diagnostic challenges(2). Its pathogenesis is attributed either to osseous metaplasia of mesenchymal cells within a pre-existing lipoma or to the direct differentiation of multipotent

fibroblasts into osteoblasts(4). Due to its radiodensity, it can mimic malignant ossifying neoplasms such as extraskeletal osteosarcoma or well-differentiated liposarcoma(5).

This report describes a rare case of a large chest wall osteolipoma in a 62-year-old male, emphasizing the role of radiological and pathological correlation in achieving an accurate diagnosis.

CASE REPORT

A 62-year-old male patient presented to our department with a slow-growing, painless mass located in the right dorsal paravertebral region. The lesion had been progressively enlarging over the past three years, causing local discomfort but

no neurological symptoms. There was no history of prior trauma, weight loss, or constitutional symptoms.

Physical examination revealed a voluminous, firm, and non-tender mass measuring approximately 12 x 6 cm. The lesion was fixed to the underlying posterior chest wall at the T7–T9 vertebral levels. The overlying skin appeared normal, with no signs of inflammation, ulceration, or dilated veins. Neurological and respiratory examinations were unremarkable.

A chest computed tomography (CT) scan was performed, identifying a well-circumscribed, heterogeneous mass (3.3 x 5.8 x 10.7 cm) characterized by low-attenuation fat density (-80 to -100 HU) interspersed with significant ossified components (Figure 1) and showing no enhancement after contrast injection.

The lesion was located deep to the paraspinal muscles, abutting the adjacent ribs and vertebral bodies without signs of cortical erosion or invasion. Magnetic resonance imaging (MRI) further characterized the lesion, showing high signal intensity on both T1- and T2-weighted sequences, consistent with mature adipose tissue (Figure 2). The FAT SAT sequence showed heterogeneous signal suppression. Irregular thick septa and enhanced nodules were noted following dynamic gadolinium injection. The patient underwent surgical management under general anesthesia. An elective longitudinal incision was made over the mass, allowing for an en-bloc excision without preoperative biopsy. Intraoperatively, the tumor was found to be well-encapsulated, with no continuity or adherence to the adjacent bony structures or musculature (Figure 3). Due to the significant residual cavity in the paravertebral area, a Redon drain was placed to prevent seroma formation.

Gross pathological examination of the specimen revealed an encapsulated mass with a yellow, fatty cut surface containing gritty, hard calcified areas.

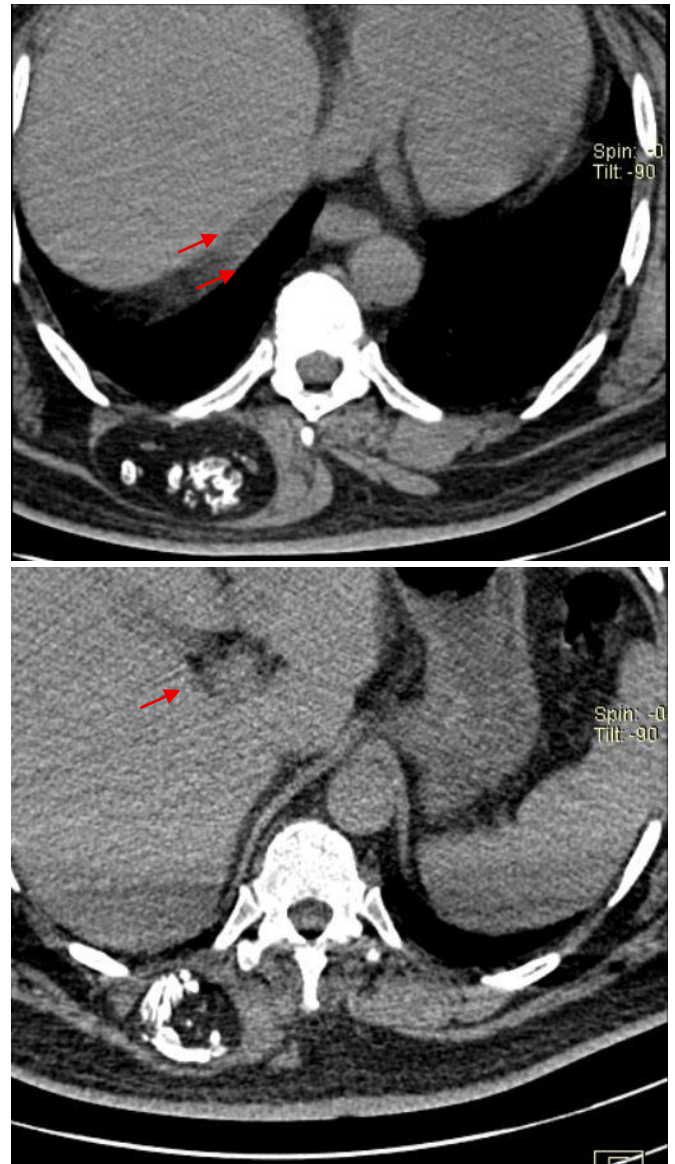


Figure 1: A CT scan showing a well-circumscribed, heterogeneous mass characterized by low-attenuation fat density interspersed with significant ossified components (arrows)

Microscopic analysis showed mature adipocytes interspersed with lamellar trabecular bone and occasional hematopoietic marrow. No cytologic atypia, mitotic activity, or necrosis were identified. Cyclin-Dependent Kinase 4 (CDK4) expression was negative. These findings confirmed the diagnosis of a benign chest wall osteolipoma.

At the 12-month follow-up, the patient remained asymptomatic with no clinical evidence of recurrence.

The postoperative course was uneventful; the patient was discharged on the first postoperative day, and the drain was removed 10 days later.

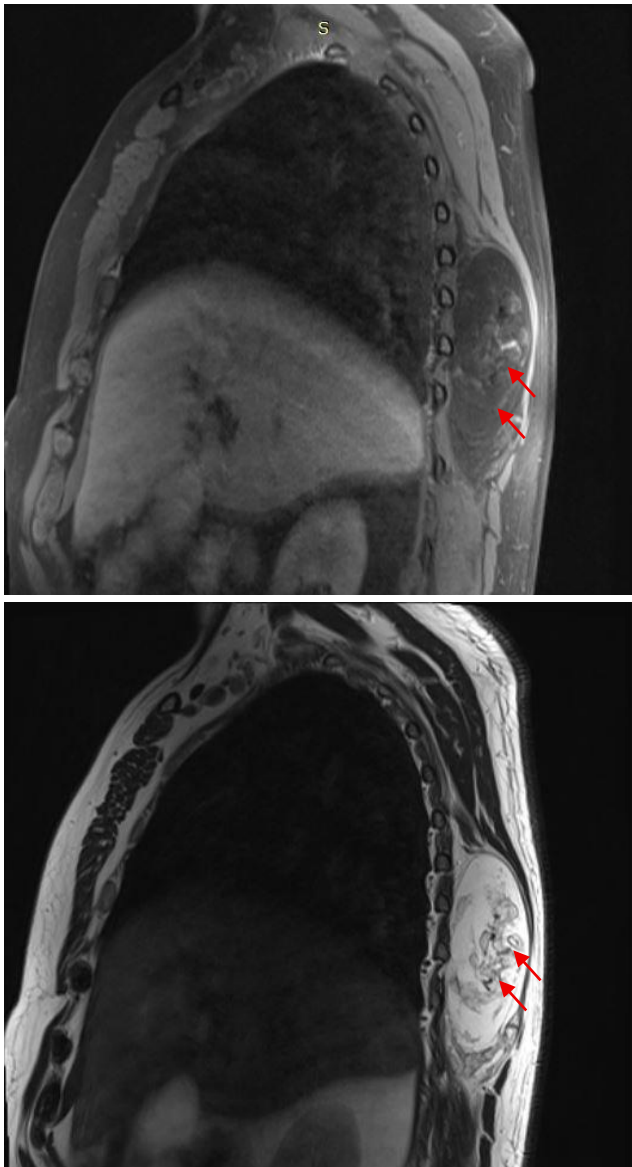


Figure 2: Magnetic resonance imaging characterizing the lesion, showing high signal intensity on both T1- and T2-weighted sequences with multiple thickened and nodular septa (arrows)



Figure 3: specimen after complete en-bloc resection

DISCUSSION

Osteolipoma is a rare histological variant of conventional lipoma, representing less than 1% of all lipomatous tumors(3). While lipomas are common soft tissue neoplasms, the presence of mature lamellar bone within the fatty matrix (as seen in our 62-year-old patient) distinguishes osteolipoma as a unique clinical and pathological entity(2). Although these lesions can occur in various anatomical sites, their manifestation in the chest wall is particularly rare and requires careful differentiation from other ossifying soft tissue masses(2).

The pathogenesis of osteolipoma remains a subject of ongoing discussion. Two main theories have been proposed in the literature. The "metaplastic theory" suggests that mesenchymal cells within a pre-existing lipoma undergo osseous metaplasia, often triggered by chronic mechanical stress, trauma, or local ischemia(4). Alternatively, the "fibroblast differentiation theory" posits that multipotent fibroblasts in the tumor tissue directly differentiate into osteoblasts(1). In our case, the three-year history of a progressively enlarging mass in a paravertebral location (an area subject to movement) could support the theory of

metaplastic change, although no specific trauma was reported.

Radiological evaluation is crucial for the preoperative assessment of chest wall osteolipomas. CT scans typically reveal a well-circumscribed mass with low-attenuation fat density containing irregular, mature bone components, as observed in our patient(2). MRI is particularly effective in identifying the fatty nature of the tumor through high signal intensity on T1- and T2-weighted sequences, while also highlighting the internal architecture and relationship with adjacent structures(2). However, the presence of ossification can complicate the radiological diagnosis, mimicking more aggressive lesions such as extraskeletal osteosarcoma, myositis ossificans, or well-differentiated liposarcoma(6).

The definitive diagnosis of osteolipoma is established through histopathological examination. The hallmark of this tumor is the presence of mature lamellar trabecular bone within a benign adipocytic neoplasm(2). The absence of cytologic atypia, mitotic activity, and lipoblasts is essential to rule out malignancy, particularly atypical lipomatous tumors or liposarcomas(7). In our case, the microscopic presence of hematopoietic marrow within the bone trabeculae further confirmed the benign, mature nature of the ossification.

In the management of atypical chest wall masses, a preoperative core needle biopsy is typically indicated to rule out malignancy. In our case, an upfront en-bloc surgical excision was performed without a prior biopsy for two main reasons. First, the lesion was well-circumscribed and lacked radiologic signs of local invasion or rib destruction, strongly suggesting a resectable process. Second, due to the highly heterogeneous composition of the mass (mature fat interspersed with lamellar bone), a core needle biopsy carried a high risk of sampling error, potentially yielding false-negative results (8). Furthermore, because complete en-bloc excision remains the definitive

curative treatment for both benign osteolipomas and low-grade liposarcomas, immediate resection was deemed the most definitive, cost-effective diagnostic and therapeutic strategy for this patient (9).

Surgical management via complete en-bloc excision remains the gold standard treatment for chest wall osteolipoma(3). This approach is generally curative. Recurrence appears to be rare after complete excision (10). However, long-term data are limited. In this case, the successful surgical outcome and the absence of recurrence after 12 months of follow-up align with the known clinical behavior of this rare tumor.

CONCLUSION

Chest wall paravertebral osteolipoma is a rare benign tumor that may clinically and radiologically mimic malignancy. Accurate diagnosis relies on the combination of imaging characteristics and definitive histopathological analysis. Surgical excision is curative and outcomes are excellent with minimal risk of recurrence. Awareness of this entity is important to guide appropriate management.

Conflict of Interest

The authors declare no conflict of interest associated with this publication.

Informed Consent

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

Author Contributions

All authors have contributed to the clinical management, data collection, and the drafting of the manuscript. All authors have read and approved the final version of the manuscript.

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