

A Giant Lipoma with Dedifferentiated Liposarcoma of the Thoracic and Dorsal Regions: A Case Report and Literature Review

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Abstract: A lipoma is a benign soft tissue tumor caused by the benign proliferation of mature adipose tissue. Tumors weighing over 1 kilogram or exceeding 5 centimeters in diameter are considered giant lipomas. Dedifferentiated liposarcoma, a highly malignant tumor derived from mesenchymal tissue, is a subtype of liposarcoma primarily found in the retroperitoneum. We report a rare case of a 56-year-old male patient who had a progressively enlarging massive tumor on his thoracic and dorsal regions over 10 years. Surgical excision was successful, and pathological examination revealed that most of the tumor showed mature lipoma changes, while a small area exhibited dedifferentiated liposarcoma changes.

Keywords: Lipoma; Giant Lipoma; Dedifferentiated Liposarcoma; Liposarcoma; Case Report.

1. Introduction

A lipoma is a benign tumor that occurs in regions rich in adipose tissue. When its weight exceeds 1 kilogram or its diameter exceeds 5 centimeters, it is termed a giant lipoma. Lipomas are commonly found on the back, shoulders, neck, and abdomen, followed by the arms and thighs [1]. Lipomas usually do not require treatment, but surgical resection may be necessary when they become too large, affecting aesthetics or causing dysfunction[1][2]. Dedifferentiated liposarcoma primarily occurs in the retroperitoneum and is rarely reported in the limbs or trunk. It is a subtype of liposarcoma and an extremely rare tumor[1][3][4]. Dedifferentiated liposarcoma is a malignant tumor with high rates of local recurrence and systemic metastasis[5]. Complete surgical resection combined with chemotherapy or local radiotherapy is usually required to reduce the risk of local recurrence and distant metastasis [6][7].

2. Case Report

The 56-year-old male patient was admitted due to a thoracic and dorsal mass first noticed over 10 years ago. Initially, he underwent excision of an egg-sized mass without postoperative pathology. Soon after, a quail-egg-sized mass reappeared and gradually enlarged. Notably, the patient did not receive any systemic treatment until the mass had grown to 23x18x12 cm at admission. The mass was painless, non-itchy, soft, well-defined, and movable. Laboratory tests and tumor markers were normal. The patient had no prior health issues.

Ultrasound showed a large solid lesion on the right thoracic and dorsal regions, possibly a lipoma, with the left side uncertain for sarcomatoid lesions. MRI revealed a large subcutaneous mass (~11.6x16.7x23.1 cm) with high signals on T1WI and T2WI, low signals on fat suppression, and inhomogeneous signals. A small round-like signal and strip-like intervals were noted. The mass enhanced on scans and extended into deep muscles, compressing surrounding tissues (Figure 1).

We performed a biopsy on a patient's thoracic-dorsal mass, obtaining specimens for histopathological examination (Figure 2). Histological analysis revealed that the mass consisted primarily of mature adipocytes and hyperplastic fibrous septa, with scattered atypical cells within the septa. Immunohistochemical staining showed partial positivity for CDK4, P16, and MDM2, low Ki-67 expression, and negativity for SMA, Desmin, HMB45, and CD34. Due to the large tumor size, the biopsy could not comprehensively represent the entire tumor, precluding definitive diagnosis beyond atypical lipomatous tumor or well-differentiated liposarcoma.

Subsequently, the patient underwent complete excision of the mass. Intraoperative findings included a smooth, encapsulated mass with clear boundaries, measuring approximately 12x17x23 cm (Figure 2). Histological reassessment demonstrated that most of the mass exhibited mature lipomatous changes with fibrous hyperplasia and focal lymphocytic infiltration. A single region, approximately 2x1.5x1 cm, showed dedifferentiated liposarcoma features, including adipoblastic cells, plump spindle cells, and abundant lymphocytic and plasmacytic infiltration, surrounded by well-differentiated liposarcoma areas (Figure 2). Immunohistochemical results were positive for CDK4, ERG (endothelial), P16, with focal positivity for S100 and MDM2, and 10%+ Ki-67 expression in hotspots. HMB45, SMA, Desmin, and CD34 were negative, except for endothelial positivity of CD34 and CD31. CK was also negative.

The final pathological diagnosis indicated that the majority of the mass was a mature lipoma (24x19x6 cm), with a focal area of dedifferentiated liposarcoma (2x1.5x1 cm, ICD-O code: 8858/3). The dedifferentiated component encompassed polymorphic liposarcoma, well-differentiated liposarcoma (ALT/WDLPS), and inflammatory myofibroblastic-like changes, representing a rare dual histological composition. Given the potential for recurrence in dedifferentiated liposarcoma, the patient was advised on regular follow-up. MRI follow-up over one year showed no evidence of residual

or recurrent tumor.

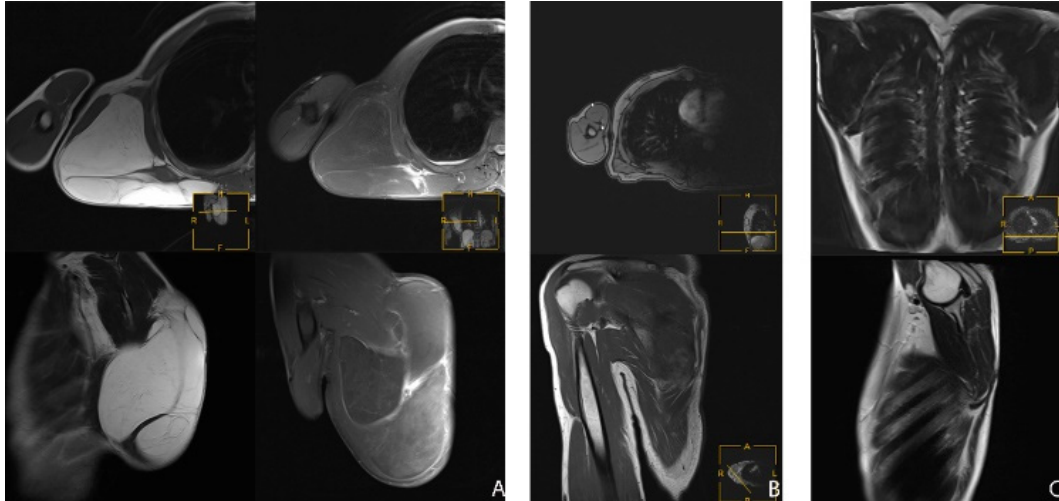


Figure 1. A. MRI image of the patient's thoracic and dorsal mass. B. MRI image of the patient's thoracic and dorsal region six months after complete excision of the mass. C. MRI image of the patient's thoracic and dorsal region one year after complete excision of the mass.

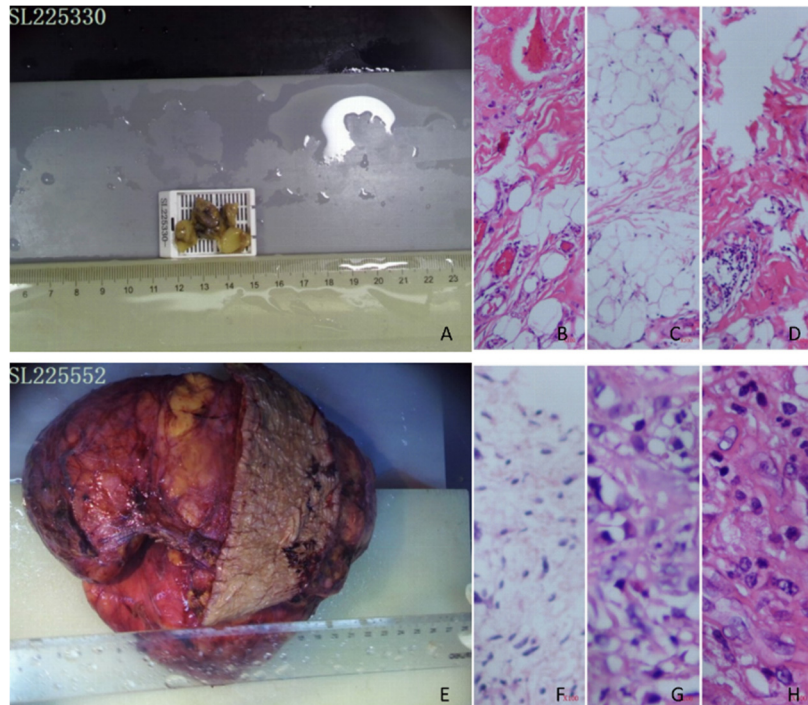


Figure 2. A. Gross image of the biopsy specimen of the patient's thoracic and dorsal mass. B, C, D. Histological staining images of the biopsy specimen of the patient's thoracic and dorsal mass (X100, X200, X400). E. Gross image after complete excision of the patient's thoracic and dorsal mass. F, G, H. Histological staining images after complete excision of the patient's thoracic and dorsal mass (X100, X200, X400).

3. Discussion

Adipose-derived tumors constitute a prevalent category of soft tissue tumors, encompassing a wide spectrum ranging from benign lipomas to high-grade liposarcomas[8]. Lipomas can occur in various parts of the body, with approximately 15% to 20% located on the back[1]. The pathogenesis of lipomas remains unclear, potentially associated with minor and repetitive trauma, and they are more frequently observed in obese individuals[9]. Lipomas are typically small, yet there are reports of giant lipomas exceeding 20 centimeters in diameter[10]. Single lipomas are the most common (80%), particularly in female patients, while multiple lipomas are more prevalent in males[11].

The clinical manifestations of lipomas vary based on the

size, location, and growth rate of the lesion. In most cases, lipomas present as painless, palpable, and movable masses, often ignored by patients until they significantly enlarge, affecting appearance or causing functional impairment, prompting them to seek medical attention[10]. The diagnosis of lipomas is generally not difficult and can be aided by computed tomography (CT) and magnetic resonance imaging (MRI), but it needs to be differentiated from other diseases such as lymph node cysts, giant cell tumors, myxomas, angioliipomas, and liposarcomas[1]. Most lipomas do not require treatment, but surgical excision is the preferred approach when they affect appearance or cause dysfunction, and pathological examination results after surgery can also help confirm the diagnosis.

Dedifferentiated liposarcoma, originating from adipose tissue, is a relatively rare malignancy[12] and a unique

subtype of liposarcoma[13]. This tumor is commonly seen in middle-aged and elderly individuals with no gender predisposition. The most common sites for dedifferentiated liposarcoma are the retroperitoneum, followed by the extremities and paratesticular/para-ovarian regions. Less frequently affected areas include the chest cavity, mediastinum, head, and neck (such as the larynx or esophagus)[13][14]. Diagnosis of dedifferentiated liposarcoma typically involves ultrasound, CT, and MRI, but these imaging results cannot confirm the diagnosis definitively, requiring pathological examination for confirmation[15][16].

Histologically, dedifferentiated liposarcomas often feature atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS) as the non-adipocytic tumor component[17]. Immunohistochemical staining positive for p16, MDM2, and CDK4 exhibits high sensitivity and specificity for diagnosing dedifferentiated liposarcoma. In differentiating dedifferentiated liposarcoma from non-adipocytic tumors, FISH detection of MDM2 gene amplification may be necessary, especially when diagnosing small biopsy specimens. Surgical excision is considered the basic treatment for dedifferentiated liposarcoma[18][19], and studies have shown that systemic therapy combined with surgery can reduce the recurrence rate among patients with dedifferentiated liposarcoma[20][21]. Cytotoxic chemotherapy drugs, such as doxorubicin, ifosfamide, gemcitabine, and docetaxel, have proven effective in unselected populations of patients with soft tissue sarcomas. Recently, tyrosine kinase inhibitors have demonstrated benefit in patients with dedifferentiated liposarcoma. Furthermore, potential targeted therapies such as anti-CDK4 therapy and anti-MDM2 therapy require further investigation[20].

4. Conclusion

Lipomas and dedifferentiated liposarcomas are two tumors with entirely different natures, typically requiring MRI and pathological examination for diagnosis. This case report describes a rare scenario where the histological examination of a thoracic-back mass revealed two distinct tumor types: lipoma and dedifferentiated liposarcoma. Clinicians should be aware of such exceptional cases to avoid missed diagnoses, misdiagnoses, and incorrect treatments.

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