Case Report

Beyond the usual: Scrotal liposarcoma with skeletal metastasis

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ABSTRACT

Paratesticular liposarcomas, particularly those arising from the spermatic cord, are rare, and dedifferentiated liposarcomas (DDLPS) in this location are even more uncommon. We report the rare case of a 60-year-old male presenting with progressive back pain and scrotal swelling. Imaging revealed a scrotal soft tissue mass and lytic vertebral lesion. The patient underwent wide local excision of the mass. Histopathological examination confirmed high-grade DDLPS, and immunohistochemistry showed strong positivity for CDK4 and MDM2, with patchy positivity for smooth muscle actin and desmin. Whole-body positron emission tomography-computed tomography revealed suspicious lesions in the spine and inguinal lymph nodes. Spinal biopsy was initially negative, subsequent disease progression confirmed vertebral metastases. The patient received systemic chemotherapy (gemcitabine–docetaxel), followed by pazopanib and palliative radiotherapy to spinal lesions. This case highlights the diagnostic and therapeutic challenges associated with paratesticular DDLPS. Although metastases are uncommon in DDLPS, bone involvement, as seen in this patient, indicates an aggressive disease course. Despite standard therapies, the prognosis in metastatic cases remains guarded, underscoring the need for newer targeted options.

Key words: De-differentiated liposarcoma, Pazopanib, Spermatic cord

Liposarcomas are malignant tumors originating from mesenchymal cells and represent one of the most common types of soft tissue sarcomas in adults, accounting for approximately 20% of all sarcomas [1]. Paratesticular liposarcomas, particularly those involving the spermatic cord, epididymis, and scrotal tissues, are rare clinical entities, with fewer than 200 cases reported in the literature worldwide [2,3]. The spermatic cord is the predominant site of origin, comprising nearly three-quarters of paratesticular liposarcomas [2]. Clinically, these tumors typically present as painless, slowly enlarging masses in the scrotal or inguinal region and are often initially mistaken for more common benign conditions such as inguinal hernias, hydroceles, or lipomas, complicating early diagnosis [4]. According to the World Health Organization classification, liposarcomas are categorized into several subtypes, including well-differentiated, dedifferentiated, myxoid, pleomorphic, and mixed forms [5]. Dedifferentiated liposarcoma (DDLPS) is defined by the presence of a high-grade, non-lipogenic sarcomatous component alongside well-differentiated liposarcoma. It typically arises in deep soft tissues such as the retroperitoneum and extremities, and its occurrence in the scrotal region is exceptionally uncommon [6,7]. While DDLPS is known for its aggressive local behavior, distant metastases are relatively rare but, when present, especially to the bone, are associated with a poorer prognosis [8]. Due to the rarity of paratesticular DDLPS, there is a lack of consensus regarding optimal diagnostic and therapeutic approaches. Imaging modalities such as ultrasonography and magnetic resonance imaging are valuable for tumor localization and surgical planning, but definitive diagnosis requires histopathological and immunohistochemical evaluation [9]. Complete surgical resection remains the cornerstone of treatment; however, the role of adjuvant therapies remains uncertain [10].

We report a rare case of DDLPS originating in the scrotum with synchronous bone metastases, underscoring the diagnostic challenges, management considerations, and clinical outcomes associated with this unusual presentation.

CASE REPORT

A 60-year-old male presented to the outpatient department with complaints of persistent back pain for 1 month and a gradually enlarging scrotal swelling unresponsive to analgesics.

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Ultrasonography of the scrotum revealed a soft tissue mass in the right scrotal region. The patient underwent a wide local excision of the scrotal mass along with a right inguinal hernioplasty.

Gross examination of the excised mass showed a 28 × 20 × 7 cm tumor. Histopathological analysis confirmed a high-grade (Grade 3) DDLPS with no evidence of lymphovascular or perineural invasion (Fig. 1). Immunohistochemistry was strongly positive for CDK4 and MDM2 and showed patchy positivity for smooth muscle actin and desmin, confirming the diagnosis of DDLPS (Fig. 2a-o and Table 1).

A whole-body 18F-fluorodeoxyglucose positron emission tomography (PET)-computed tomography (CT) scan for metastatic workup revealed a soft tissue lesion in the right inguinal region measuring 16 × 19 mm with SUV max 5.21, and right inguinal lymph nodes measuring 7 × 5 mm with SUV max 2.56. A lytic lesion in the T11 vertebral body with SUV max 7.08 was also noted. Ultrasound-guided biopsy of the right inguinal lesion confirmed metastatic DDLPS. CT-guided biopsy of the T11 vertebra was negative for malignancy.

The patient was started on systemic chemotherapy with gemcitabine and docetaxel. Subsequently, the patient experienced lower back pain with radiation to both lower limbs. The pain was constant, dull-aching in nature, partially responsive to analgesics, and not associated with any specific aggravating factors. Response evaluation after six cycles using PET-CT revealed mild metabolic regression of the inguinal lesion. However, new lytic lesions were observed in the D9, D10, D12, and L1 vertebrae, indicating disease progression. According to guidelines, the patient was planned for palliative radiation to the spinal metastasis, followed by which the patient was kept on pazopanib maintenance. He received external beam radiation therapy to the spinal metastases (D9-L1 level) at a dose of 30 Gy in 10 fractions using the 3D conformal radiotherapy technique. The patient is now on pazopanib (800 mg daily) maintenance.

Table 1: Immunohistochemsitry profiling

Marker	Result	Description
CDK4	Positive	Dedifferentiated liposarcoma marker
MDM-2	Positive	Dedifferentiated liposarcoma marker
SMA	Patchy positive	Myofibroblastic/muscle marker
DESMIN	Patchy positive	Muscle marker
Myo D1	Negative	Rhabdomyosarcoma marker
H- Cal	Negative	Smooth muscle marker
S-100	Negative	Neural/adipocytic/melanoma marker

SMA: Smooth muscle actin

DISCUSSION

DDLPS is a rare and aggressive subtype of liposarcoma, characterized by the presence of both well-differentiated and non-lipogenic high-grade sarcomatous components. While DDLPS commonly arises in the retroperitoneum and deep soft tissues of the extremities, its occurrence in the scrotal region is exceedingly rare, with limited cases (around 200) documented in the literature. This case signifies the diagnostic challenges and therapeutic complexities associated with scrotal DDLPS, particularly when accompanied by distant metastases.

The initial presentation of scrotal DDLPS often mimics benign conditions such as inguinal hernias, hydroceles, or lipomas, leading to a delay in diagnosis. In this case, the patient's scrotal swelling, in addition to back pain, led to imaging studies, which revealed a scrotal soft tissue mass along with bone and lymph node metastasis. Histopathological examination confirmed a high-grade DDLPS, and immunohistochemical analysis demonstrated strong positivity for CDK4 and MDM2. These markers are pivotal in distinguishing DDLPS from other adipocytic tumors, as their overexpression correlates with gene amplification on chromosome 12q13-15, a hallmark of DDLPS [11,12]. The utilization of immunohistochemical panels, including CDK4, MDM2, and p16, enhances diagnostic accuracy. While p16 alone has limited specificity, its combined assessment with CDK4 and MDM2 improves the differentiation between DDLPS and other soft tissue neoplasms [13].

DDLPS exhibits a higher tendency for local recurrence and less commonly, distant metastases. Metastasis in cases of DDLPS is comparatively rare. The most common site of metastasis is the lung, followed by the liver, and nodal metastases are also seen, as in this patient. In the presented case, the detection of lytic lesions in the T11 vertebra and subsequent involvement of additional vertebral bodies highlight the tumor's aggressive behavior. Although bone metastases from DDLPS are rare, their presence signifies advanced

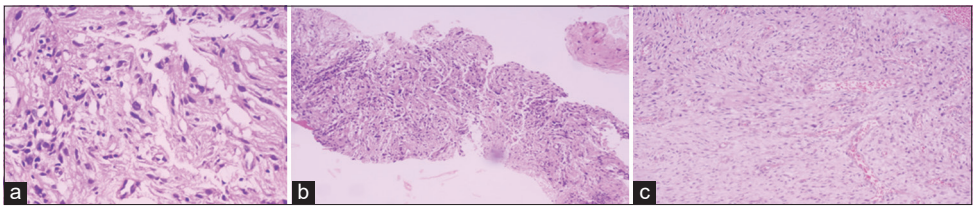

Figure 1: (a) The section shows cellular tumor with severely pleomorphic cells infiltrating the stroma in whorls and fascicular patterns. The cells are having oval to elongated to spindled, hyperchromatic nuclei with scant to moderate amount of cytoplasm; (b and c) The section shows moderately pleomorphic malignant cells infiltrating the stroma in whorling pattern. The cells are oval to elongated, having vesicular to hyperchromatic nuclei, prominent nucleoli with moderate cytoplasm. Few atypical lipoblast is also seen.

disease and necessitates a multidisciplinary approach to management [14].

Surgical resection remains the cornerstone of treatment for localized DDLPS. However, the role of adjuvant therapies, including chemotherapy and radiotherapy, is not well-defined. In this case, the patient underwent systemic chemotherapy with gemcitabine and docetaxel, a regimen utilized in soft tissue sarcomas, followed by the administration of pazopanib, a tyrosine kinase inhibitor approved for advanced soft tissue sarcomas. Despite these interventions, disease progression was observed, underscoring the need for novel therapeutic approaches [15]. Radiation therapy can be used in a palliative setting for symptomatic relief.

Emerging treatments targeting molecular aberrations in DDLPS, such as MDM2 and CDK4 amplifications,

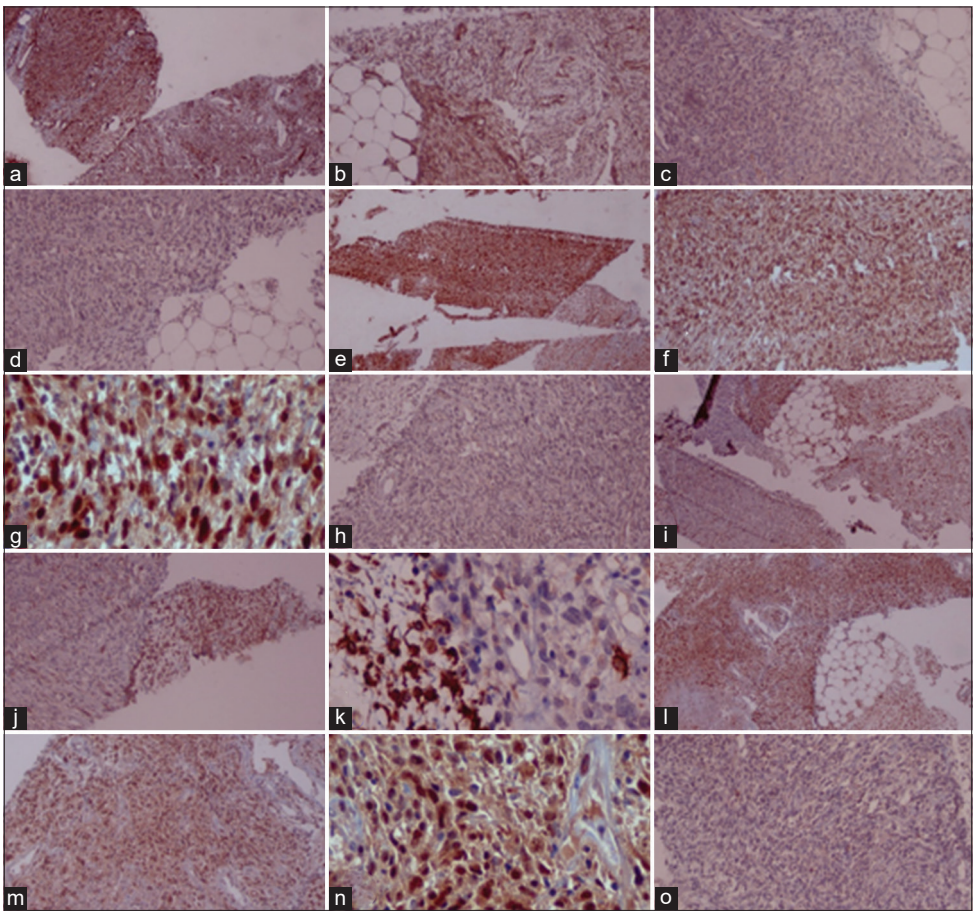

Figure 2: Immunohistochemistry report (a) smooth muscle actin (SMA) ×4, (b) SMA ×10, (c) Myo D1 ×10, (d) Myogenin ×10, (e) MDM2 ×4, (f) MDM2- ×10, (g) MDM2 – ×40, (h) HCAL ×10, (i) desmin- ×4, (j) Desmin ×10, (k) Desmin ×40, (l) CDK4-×4, (m), cdk4- ×10, (n) CDK4- ×40, (o) S100- ×10

Table 2: Case reports of metastatic dedifferentiated liposarcoma of the scrotum

Case	Age	Presentation	Tumor characteristics	Metastasis	Treatment	Outcome	References
1	70	Indolent scrotal swelling	Giant DDLPS with osteosarcoma features; MDM2 amplification	Complicated respiratory course due to metastatic disease	Surgical excision	Poor prognosis	[19]
2	57	Right scrotal mass misdiagnosed as hydrocele	Unresectable PDDLPS	Retroperitoneum and left pleura	Doxorubicin, then eribulin	Died 5 months after diagnosis	[20]
3	66	Right scrotal swelling	Low-grade DDLPS; MDM2 and CDK4 positive	Not specified	Radical orchiectomy	Not specified	[21]
4	77	Painless right scrotal mass	DDLPS with leiomyosarcomatous differentiation	Not specified	Radical inguinal orchiectomy	Not specified	[22]
5	51	Large, painless right scrotum	Giant paratesticular liposarcoma	Local recurrence and distant metastasis	Surgical resection	Not specified	[23]
6	68	Paratesticular mass	Myxoid liposarcoma	Not specified	Surgical resection	Not specified	[24]

DDLPS: Dedifferentiated liposarcomas

are under investigation. Preclinical studies have demonstrated the efficacy of MDM2 inhibitors in reactivating p53-mediated apoptotic pathways, offering a potential avenue for targeted therapy [16]. In addition, CDK4/6 inhibitors have shown promise in inducing cell cycle arrest in DDLPS cell lines, suggesting a synergistic effect when combined with MDM2 antagonists [17].

The prognosis of DDLPS is influenced by factors such as tumor size, histological grade, and the presence of metastases. High-grade tumors with distant spread, as observed in this case, are associated with poorer outcomes. The amplification of MDM2 and CDK4 not only serves as a diagnostic marker but also correlates with aggressive tumor behavior and reduced survival rates [18]. Very few cases of metastatic DDLPS are available in the literature, some of which are described in Table 2 [19-24].

CONCLUSION

This case highlights the rarity and aggressive nature of scrotal DDLPS with bone metastases. Accurate diagnosis relies on a combination of histopathological evaluation and immunohistochemical profiling. Given the limited success of conventional therapies in advanced cases, this case highlights the need for continued research into targeted treatments that address the specific molecular drivers of DDLPS. A multidisciplinary approach is essential for optimizing patient outcomes in this challenging clinical scenario.

REFERENCES

1. Dei Tos AP. Liposarcoma: New entities and evolving concepts. Ann Diagn Pathol 2000;4:252-66.
2. Montgomery E, Fisher C. Paratesticular liposarcoma: A clinicopathologic study. Am J Surg Pathol 2003;27:40-7.
3. Singam P, Hong GE, Cheok LB, Tamil AM, Ho C. A rare case of paratesticular dedifferentiated liposarcoma. Urol Ann 2010;2:75-7.
4. Rodríguez D, Barrisford GW, Sanchez A, Preston MA, Kreydin EI, Olumi AF. Primary spermatic cord tumors: Disease characteristics, prognostic factors, and treatment outcomes. Urol Oncol 2014;32:52.e19-25.
5. Fletcher CD, Bridge JA, Hogendoorn PC, Mertens F, editors. WHO Classification of Tumours of Soft Tissue and Bone. 4th ed. France: IARC; 2013.
6. Azizi MH, Rizuana IH, Wong YP, Sidek K, Fam XI. Giant paratesticular dedifferentiated liposarcoma with intraabdominal extension: A case report. Front Oncol 2023;13:1216776.
7. Kransdorf MJ, Murphey MD. Imaging of Soft Tissue Tumors. 3rd ed. United States: Lippincott Williams and Wilkins; 2006.
8. Italiano A, Toulmonde M, Cioffi A, Penel N, Le Cesne A, Bui B, *et al*. Advanced well-differentiated/dedifferentiated liposarcomas: Role of chemotherapy and survival. Ann Oncol 2012;23:1601-7.
9. Guthrie T Jr., Wadler S, Horwitz J, Gollub M. Clinical and radiographic features of liposarcomas. J Clin Oncol 2003;21:2033-4.
10. Arai H, Sogabe H, Morikawa S. A case of dedifferentiated liposarcoma discovered due to an intrascrotal calcified ossification. Int Canc Conf J 2024;13:301-5.
11. Weaver J, Rao P, Goldblum JR, Joyce MJ, Turner SL, Lazar AJ, *et al*. Can MDM2 and CDK4 distinguish well-differentiated liposarcoma? An immunohistochemical study of 100 cases. Mod Pathol 2009;22:137-43.
12. Thway K, Flora R, Shah C, Olmos D, Fisher C. Diagnostic utility of p16, CDK4, and MDM2 as an immunohistochemical panel in distinguishing well-differentiated and dedifferentiated liposarcomas from other adipocytic tumors. Am J Surg Pathol 2012;36:462-9.
13. Binh MB, Sastre-Garau X, Guillou L, De Pinieux G, Terrier P, Lagacé R, *et al*. MDM2 and CDK4 immunostainings are useful adjuncts in diagnosing well-differentiated and dedifferentiated liposarcoma subtypes: A comparative analysis of 559 soft tissue neoplasms with genetic data. Am J Surg Pathol 2005;29:1340-7.
14. Lucas DR. Liposarcoma: Revisiting the diagnosis. Am J Surg Pathol 2001;25:1122-31.
15. Tap WD, Jones RL, Van Tine BA, Chmielowski B, Elias AD, Adkins D, *et al*. Olaratumab and doxorubicin versus doxorubicin alone for treatment of soft-tissue sarcoma: An open-label phase 1b and randomised phase 2 trial. Lancet 2016;388:488-97.
16. Ray-Coquard I, Blay JY, Italiano A, Le Cesne A, Penel N, Zhi J, *et al*. Effect of the MDM2 antagonist RG7112 on the p53 pathway in patients with MDM2-amplified, well-differentiated or dedifferentiated liposarcoma: An exploratory proof-of-mechanism study. Lancet Oncol 2012;13:1133-40.
17. Dickson MA, Tap WD, Keohan ML, D'Angelo SP, Gounder MM, Antonescu CR, *et al*. Phase II trial of the CDK4 inhibitor PD0332991 in patients with advanced CDK4-amplified well-differentiated or dedifferentiated liposarcoma. J Clin Oncol 2013;31:2024-8.
18. Coindre JM, Pédeutour F, Aurias A. Well-differentiated and dedifferentiated liposarcomas. Virchows Arch 2010;456:167-79.
19. Goldblum JR, Folpe AL, Weiss SW. Enzinger and Weiss's Soft Tissue Tumors. 6th ed. Netherlands: Elsevier Saunders; 2013.
20. Garcia D, Doxtader E, Demos DS, Chintapalli KN, Fordham LA, Meis JM. Dedifferentiated liposarcoma of the scrotum: A rare case report and review. Radiol Case Rep 2021;16:859-63.
21. Goto T, Nishida K, Kobayashi K, Sugiura H, Tada K, Yokouchi M, *et al*. Dedifferentiated liposarcoma of the scrotum: A case report and review of the literature. Sarcoma 2005;9:41-4.
22. Tamai K, Kishi K, Hattori Y, Furukawa H, Ohtsuka A, Shimokawa T. Dedifferentiated liposarcoma of the scrotum with leiomyosarcomatous differentiation: A case report. J Cutan Pathol 2012;39:274-8.
23. Özdamar MY, Taşar S, Baş E, Acar Ö, Uçar A. Giant paratesticular liposarcoma: A rare cause of scrotal mass. Turk J Urol 2017;43:115-8.
24. Fouimtizi SE, Samlali S, Hajji A, Oukabli M, Rais H. Giant paratesticular myxoid liposarcoma: A rare case report. Urol Case Rep 2024;53:102598.

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