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Case Report

Monophasic Paravertebral Lumbar Synovial Sarcoma in an Adult Patient: Case Report

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Abstract: Synovial sarcoma is a rare malignant soft-tissue tumor, accounting for about 8–10% of sarcomas and is frequently diagnosed in young adults. It most commonly arises in the lower limbs, with paravertebral location being uncommon. We report the case of a 46-year-old female patient with a progressively enlarging right lumbar mass, initially considered benign. Magnetic resonance imaging revealed a solid right paravertebral lesion with signs of aggressiveness. Biopsy confirmed a monophasic synovial sarcoma, grade 2 (WHO, 2022), with a mitotic index of 5 mitoses per 10 high-power fields and no necrosis. Staging was T2N0M0, stage IIIA. The patient underwent wide resection of the mass in the lumbar paravertebral musculature, with clear margins. She remains under clinical-oncologic follow-up and is being evaluated for adjuvant chemotherapy. This case highlights the importance of differential diagnosis in paravertebral tumors and reinforces the role of multidisciplinary management in the treatment of synovial sarcoma.

Keywords: Synovial sarcoma; Soft-tissue tumors; Oncology; Case report.

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1. Introduction

Synovial sarcoma is a malignant neoplasm of mesenchymal origin, characterized by the chromosomal translocation t(X;18)(p11;q11), which results in fusion of the SS18 and SSX genes [1]. Despite its name, it does not necessarily arise from synovial tissue and may occur in multiple anatomical sites. It accounts for about 8–10% of soft-tissue sarcomas, with higher incidence in adolescents and young adults [2]. Most cases occur in the lower limbs, particularly in the knee and thigh regions. Paravertebral location is rare and is often associated with delayed diagnosis due to its nonspecific presentation and resemblance to benign lesions (lipoma, neurofibroma, and other soft-tissue tumors). Uncommon locations, such as the retroperitoneum and paravertebral region, are rare and associated with greater diagnostic difficulty.

Clinically, it presents as a painful, progressively enlarging mass, frequently mistaken for benign lesions. The prognosis of synovial sarcoma depends on factors such as tumor size, depth, axial location, surgical margin status, and histologic grade. Standard treatment consists of wide surgical resection, often combined with radiotherapy. Adjuvant chemotherapy (based on doxorubicin/ifosfamide) may be considered in high-risk cases.

In this report, we describe an uncommon case of monophasic lumbar paravertebral synovial sarcoma in an adult patient, discuss diagnostic and therapeutic challenges, and review the literature to highlight key management principles.

2. Case Report

2.1 Clinical data and history

A 46-year-old female patient, previously healthy, presented with a progressively enlarging mass in the right lumbar region for approximately eight months, associated with local pain and a sensation of pressure. Physical examination revealed a firm, tender mass located in the right paravertebral musculature, measuring approximately 4.0 × 4.0 × 2.5 cm. Laboratory tests and the remainder of the physical examination showed no significant abnormalities.

2.2 Imaging studies

Lumbar spine magnetic resonance imaging revealed a solid expansile mass in the right paravertebral musculature, measuring 4.7 × 5.1 × 4.2 cm. Although the initial clinical suspicion was of a benign lesion (given the initially slow growth), the MRI findings showed clear signs of aggressiveness that ruled out this hypothesis. The lesion displayed features incompatible with common benign tumors (such as lipoma), notably its intermediate T1 signal (Figure 3), marked T2 signal heterogeneity with areas of hyperintensity (Figure 1), and the characteristic "triple signal" pattern (Figure 2), in addition to intense and nearly homogeneous contrast enhancement (Figure 4), indicating high cellularity and neoangiogenesis. Chest computed tomography showed no evidence of metastasis.

Figure 1. Sagittal STIR-weighted image shows an expansile lesion in the right paravertebral musculature with hyperintensity, indicating increased cellularity and perilesional edema.

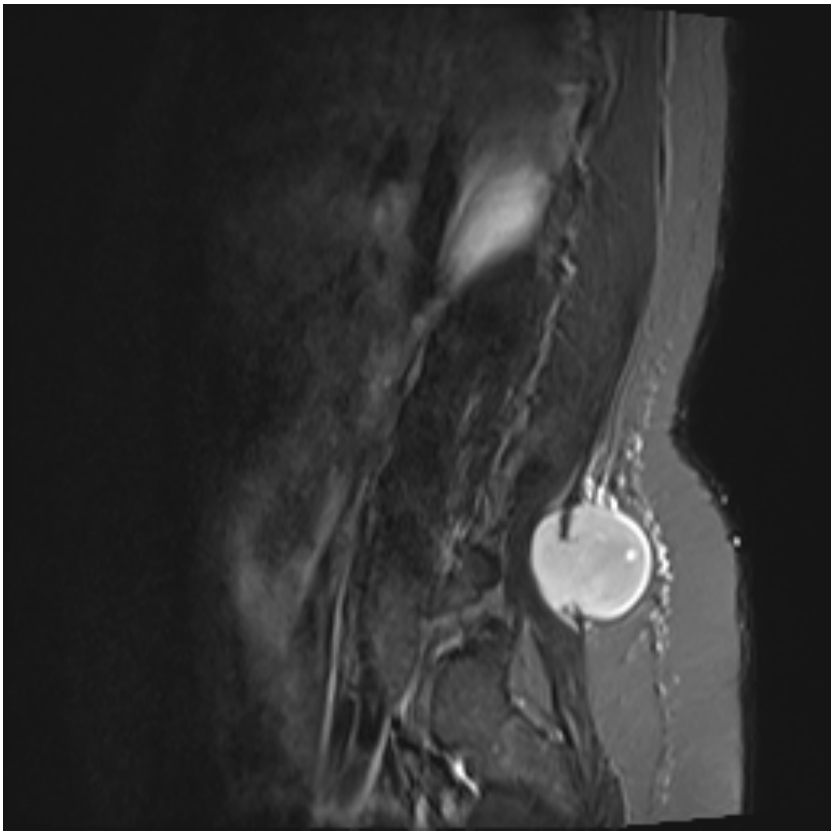


Figure 2. Sagittal T2-weighted image reveals the "triple signal," characterized by the simultaneous presence of areas of low, intermediate, and high signal intensity, a pattern considered characteristic of aggressive sarcomatous tumors.

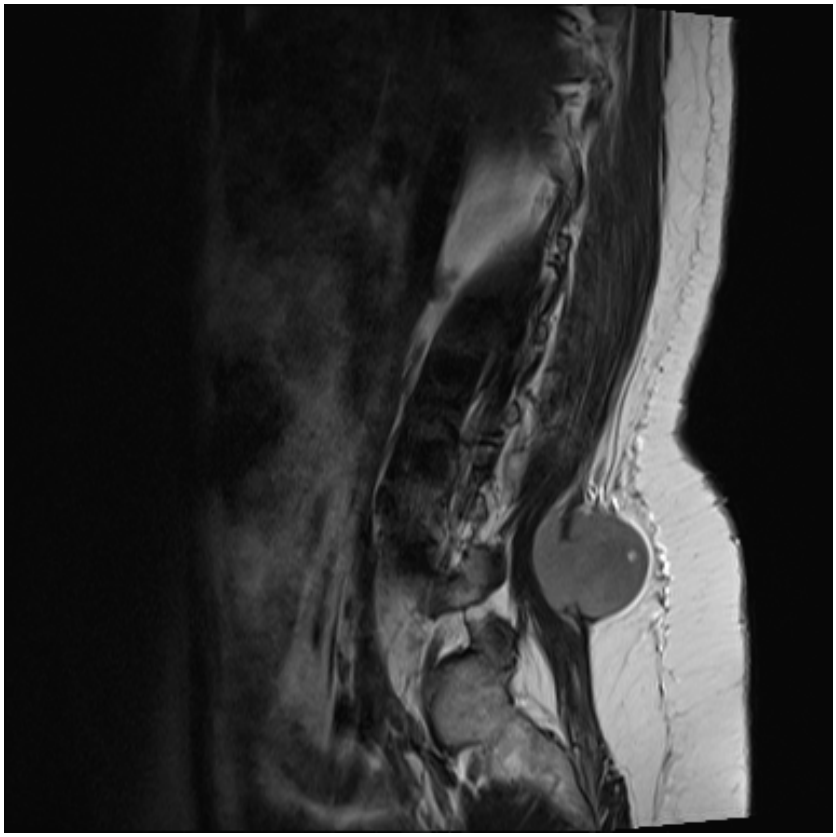


Figure 3. Axial T1-weighted image without contrast shows a lesion with intermediate signal intensity, higher than that of the adjacent musculature.

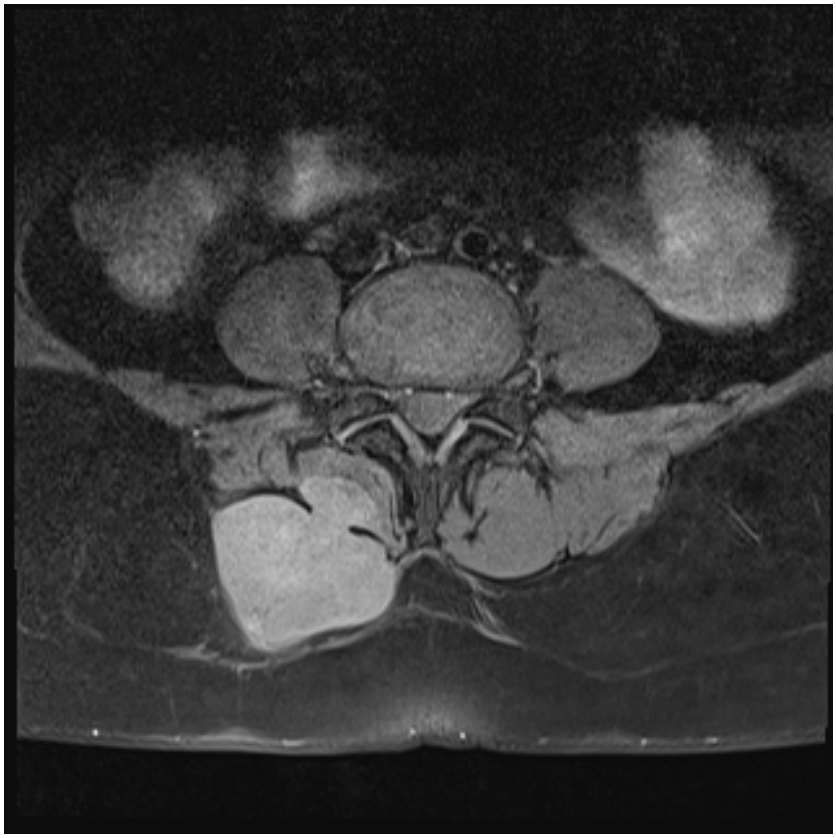
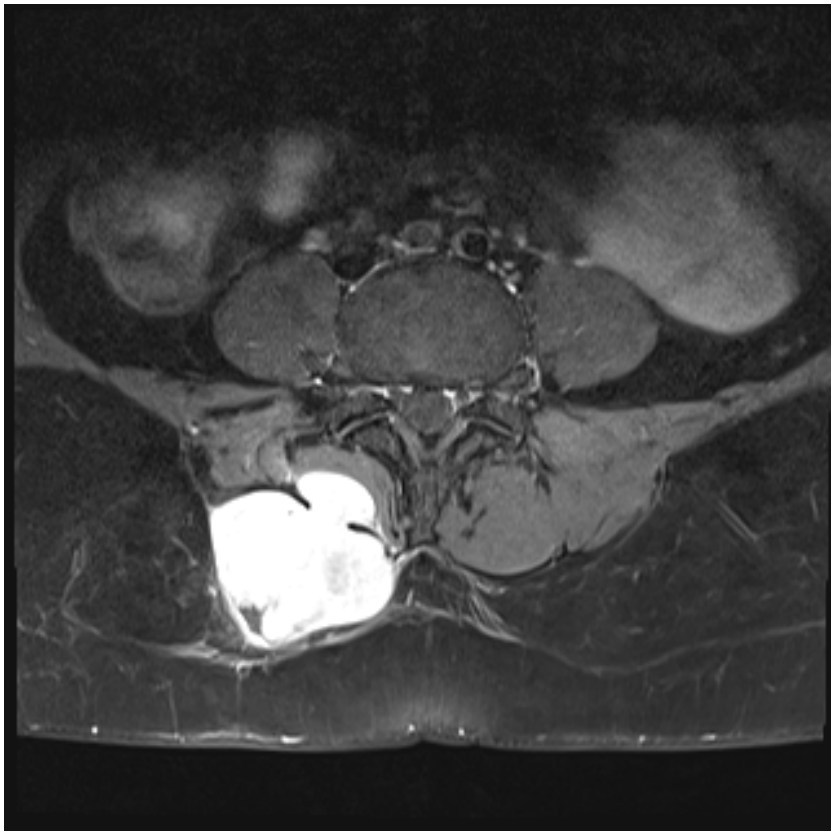


Figure 4. Axial T1-weighted image after contrast administration demonstrates nearly homogeneous enhancement of the lesion, indicating significant tumor activity and a mild peripheral edema.



2.3 Biopsy and Staging

Incisional biopsy confirmed synovial sarcoma, monophasic subtype, grade 2 (WHO, 2022), with a mitotic index of 5/10 high-power fields, and no necrosis or angiolymphatic invasion. Immunohistochemistry showed positivity for EMA, vimentin, and BCL2, and negativity for S100 and desmin. Clinical staging was T2N0M0, stage IIIA.

2.4 Treatment and Follow-up

The patient underwent wide tumor resection, with a 16.0 cm longitudinal incision and deep dissection to the lumbar paravertebral musculature, achieving clear margins. The immediate postoperative period was uneventful. Adjuvant radiotherapy was discussed in a multidisciplinary meeting but was initially deferred due to the attainment of wide (R0) margins and the risk of spinal cord toxicity given the paravertebral location. She is currently under follow-up with clinical oncology, with referral for evaluation of adjuvant chemotherapy, justified by the combination of high-risk factors: tumor size (T2) and axial location.

3. Discussion

Synovial sarcoma usually presents in the extremities, but uncommon locations such as the paravertebral region make diagnosis more challenging [3, 4]. Its nonspecific initial presentation may delay investigation, as observed in the present case, which was initially considered clinically benign. The t(X;18)(p11;q11) translocation is the most specific and common molecular event in synovial sarcoma, resulting in fusion of the SS18 and SSX genes (most frequently SSX1 or SSX2) [1]. Detection of this rearrangement would provide greater diagnostic certainty and is recommended when available. In the present case, molecular testing for the t(X;18) translocation was not available at our institution, representing a diagnostic limitation. However, the diagnosis of monophasic synovial sarcoma was

strongly supported by the immunohistochemical panel (EMA+, BCL2+, vimentin+, S100–, desmin–), consistent with the morphological findings and excluding the main differential diagnoses for spindle-cell tumors.

The monophasic subtype is composed predominantly of spindle cells and may be confused with other spindle-cell sarcomas (e.g., fibrosarcoma, leiomyosarcoma, solitary fibrous tumor). Immunohistochemistry assists in differentiation: positivity for EMA and BCL2, focal cytokeratin expression, and TLE1 expression (when tested) support synovial sarcoma; negativity for S100 and desmin helps exclude neural or muscular neoplasms [5]. Histologic grade (mitotic rate, necrosis) has prognostic value; for example, high mitotic indices, extensive necrosis, and pleomorphic morphological changes indicate more aggressive behavior. In this case, there were 5 mitoses/10 HPF and no necrosis, suggesting moderate aggressiveness.

Studies report 5-year survival rates between 60% and 70%, but factors such as tumor size >5 cm, depth, and axial location are associated with worse prognosis [8]. It is important to note that axial location (such as paravertebral) is an independent negative prognostic factor, conferring greater risk of local recurrence and distant metastasis compared with extremity lesions of similar size and grade [3, 4]. The combination of T2 size (≥5 cm) with axial location, as in this patient, places the case in a higher-risk subgroup, justifying close surveillance and consideration of adjuvant systemic therapy. This case underscores the importance of early diagnosis and multidisciplinary management in these rare tumors.

Surgical resection with clear margins is the cornerstone of curative treatment. When feasible, wide margins, including fascia or adjacent tissue, are preferred to minimize local recurrence. Resection in the paravertebral region is complex due to its proximity to neural and osseous structures. In postoperative follow-up of synovial sarcoma, advanced MRI techniques such as diffusion-weighted imaging (DWI) and dynamic contrast-enhanced MRI (DCE-MRI) play an increasing role in early detection of recurrence. DWI helps identify areas of high cellularity, while DCE evaluates tumor neoangiogenesis, distinguishing viable tumor from scar tissue. Rapid enhancement and early washout on DCE, and reduced ADC values on DWI, suggest residual or recurrent tumor activity, aiding more precise therapeutic decisions. Although these advanced MRI techniques were not used in the initial diagnostic evaluation of this case, they are fundamental in postoperative surveillance for early recurrence detection, differentiating it from postoperative scarring.

Adjuvant radiotherapy is often employed to reduce local recurrence, especially when margins are narrow or residual risk exists [6]. In axial locations, radiotherapy may be limited by spinal cord tolerance. In the present case, despite the axial location, the achievement of R0 margins allowed the multidisciplinary team to postpone radiotherapy, avoiding potential neurological morbidity; radiotherapy was reserved for possible future local recurrence. Adjuvant chemotherapy, typically with doxorubicin and ifosfamide, is considered for high-risk cases (tumor >5 cm, high grade, positive margins, or occult metastases) [7]. Evidence of absolute benefit remains controversial, but some series show improved disease-free survival in selected patients. The referral of this patient for chemotherapy evaluation, despite grade 2 histology and clear margins, was based on the combination of two high-risk features: T2 tumor size (≥5 cm) and axial location, both of which increase the likelihood of subclinical metastases.

4. Conclusion

Synovial sarcoma, although rare, should be considered in the differential diagnosis of paravertebral masses in adults. Diagnostic confirmation requires histopathological and molecular analysis, and appropriate treatment involves wide resection combined with adjuvant therapies in selected cases. Case reports such as this are valuable for highlighting clinical particularities and reinforcing the importance of a multidisciplinary approach in oncologic care.

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Research Ethics Committee Approval: The patient provided written informed consent for participation, and the study was conducted in accordance with the ethical guidelines of the Declaration of Helsinki. All data were anonymized to protect the patient's privacy.

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