

CASE REPORT

Retroperitoneal synovial sarcoma

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Abstract

Retroperitoneal synovial sarcomas are very rare. The authors describe a 39-year-old male with a primary retroperitoneal synovial sarcoma showing a monophasic pattern. Immunohistochemically, the tumor cells were positive for cytokeratin AE1/AE3, epithelial membrane antigen, vimentin, S-100 protein, CD99 and calretinin. The differential diagnosis, clinical evolution and principles of treatment are shortly discussed.

Keywords: retroperitoneum, synovial sarcoma, monophasic.

Introduction

Synovial sarcomas are rare tumors typically arising about the knee and ankle joints. They can, however, occur around joints and recent reports have mentioned a wide and unexpected distribution of locations [1–3]. Primary retroperitoneal sarcomas are extremely rare and both their clinico-pathological features and principles of treatment are still incompletely defined.

In this paper we describe a new case of retroperitoneal synovial sarcoma and discuss the histological peculiarities of this entity, which should be included in the differential diagnosis of retroperitoneal soft tissue tumors.

Material and methods

The patient, a 39-year-old male was admitted in a hospital for "pneumonia". The examinations revealed a voluminous thoraco-abdominal tumor. A biopsy was indicated and the tumor was histologically labeled "malignant hemangiopericytoma". Chemotherapy using the MAID scheme (dacarbazine, ifosfamide, farmarubicin) was indicated in order to reduce the tumor volume.

The patient was then admitted in our hospital. Surgery revealed a voluminous retroperitoneal and intrathoracic (posterior mediastinum) tumor, invading the diaphragmatic aspects of the pericardium and the diaphragm; esophagus and the gastric fornix were adherent to the tumor. The tumor was resected *en bloc* and submitted to the department of pathology.

Pieces of tumor were fixed in 10% formalin and embedded in paraffin. The slides were stained with hematoxylin-eosin and Gömöri's reticulin technique. Csaba's method was used for the identification of mast cells. Immunohistochemistry was performed with Dako reagents, at the following dilutions, for: cytokeratin AE1/AE3 (1/100), epithelial membrane antigen (EMA) (1:100), vimentin (1:500), CD99 (2:500), smooth

muscle actin (2:500), S-100 protein (1:3000) and calretinin (1:500).

Results

Gross inspection of the resected specimen revealed a 17/10/19 cm tumor. The cut surface of the mass showed a grayish tan color, with large areas of necrosis.

Microscopic examination revealed a monomorphic pattern with fascicles of spindle cells intersecting each other at different angles, with focally whorled areas (Figure 1).

The tumor was hypercellular, but the mitotic activity was low (< 10/10 HPF). On this background there were small nests composed of rounded cells, having a rather large amount of eosinophilic or clear cytoplasm (Figure 2); they were highlighted by the reticulin stain (Figure 3).

The Csaba's technique revealed the presence of numerous mast cells (Figure 4).

Necrotic areas were large, occupying about 40% of the tumor surface. Immunohistochemically, the neoplastic cells were positive for vimentin (Figure 5) and focally positive for cytokeratin AE1/AE3 (Figure 6), EMA (Figure 7), CD99 (Figure 8) and calretinin (Figure 9) and negative for smooth muscle actin.

The resection limits were invaded by tumor cells. No vascular invasion was noted in the numerous slides which were examined and no lymph nodes were present in the material we have received.

Discussions

Primary retroperitoneal synovial sarcomas are rare findings, representing about 1% of retroperitoneal tumors. Most publications report single cases [4–15].

In a review of the literature published in 2004, Fisher C *et al.* [16] found about 33 primary intra-abdominal synovial sarcomas, most of them

retroperitoneal, and added a series of 11 intra-abdominal tumors, eight of them located in the retroperitoneum.

Morphologically, synovial sarcomas occur in two main variants: monophasic and biphasic. The monophasic lesions are composed of spindle cells arranged in fascicles, sometimes exhibiting whorled configurations or showing a fibrosarcoma- or hemangiopericytoma-like pattern [17].

Biphasic lesions contain glandular elements embedded in the spindle cell background. Sometimes the glandular structures are more subtle, being revealed by a reticulin stain. The presence of stromal mast cells may represent a valuable diagnostic clue. Some cases show myxoid areas [18], which may dominate the picture [19].

Cystic synovial sarcomas are a rare finding [20].

Poorly differentiated forms or sarcoma showing rhabdoid features have also been seen [21].

Synovial sarcoma may mimic desmoplastic round cell tumors [22].

Immunohistochemically, synovial sarcomas are positive, at least focally, for cytokeratin (either AE1/AE3 or CAM5.2), epithelial membrane antigen, vimentin, CD99 and calretinin. Some cases are focally positive for S-100 protein and a significant number of cases are immunoreactive for bcl-2, calponin, Her2/neu and MAGE-CT [2].

Differential diagnosis of monophasic synovial sarcoma includes fibrosarcoma, malignant peripheral nerve sheath tumor, leiomyosarcoma, gastrointestinal stromal tumor, solitary fibrous tumor, sarcomatoid mesothelioma and small round cell tumors. Biphasic lesions may be misdiagnosed as carcinosarcoma, malignant mesothelioma or mullerian adenosarcoma.

The *etiology* of synovial sarcoma remains unknown. Two cases reported by Egger JF *et al.* [23] were associated with previous radiation. Molecular biology studies revealed a characteristic chromosomal translocation t(X;18) (p11.2; q11.2) in most of the cases [24–29].

Detailed cloning analysis of the breakpoints has revealed that the *SYT* gene at 18q11 is fused with the distal portion of one of two duplicated genes at Xp11, *SSX1* or *SSX2*. This *SYT-SSX* fusion is a feasible and reliable molecular technique for the diagnosis of synovial sarcoma. The underlying molecular mechanisms of the *SYT-SSX* fusion gene in the malignant tumor cell growth of synovial sarcoma are still poorly understood. The study of Xie Y *et al.* [30] provides evidence that *SYT-SSX* stabilizes cyclin D1 and is critical for cyclin D1 expression in synovial sarcoma cells, being important for the development and progression of the disease.

The *prognosis* of patients with retroperitoneal synovial sarcoma is dim [16].

The most important prognostic factors are: clinical stage, tumor size, mitotic activity and tumor necrosis, because the differentiation score remains unchanged (i.e., score 3) [31].

The *SYT-SSX* fusion type has an impact on clinical behavior of synovial sarcoma, the overall survival being significantly better among *SYT-SSX2* cases [28].

Fisher C *et al.* [16] noted that both the cases of retroperitoneal synovial sarcoma reported in the literature and the patients included in their series died with local recurrence or extension, but did not metastasize outside the abdomen.

The standard *therapy* is surgical resection. Most series report overall resectability series of approximately 50% because, like in our case, the tumors reach a large size before presentation. The usual approach is to use adjuvant radiotherapy. Chemotherapy may also be considered in high grade lesions [32].

☐ Conclusions

Primary retroperitoneal synovial sarcomas with a monophasic fibrous pattern are very rare findings. The high mortality due to local extension of the tumor should alert the physicians on the possibility of this disease in the differential diagnosis of abdominal masses. The histopathological diagnosis may be difficult and largely based on immunohistochemical findings.

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Figure 1 – Monophasic synovial sarcoma: fascicular pattern (HE stain, ×25)

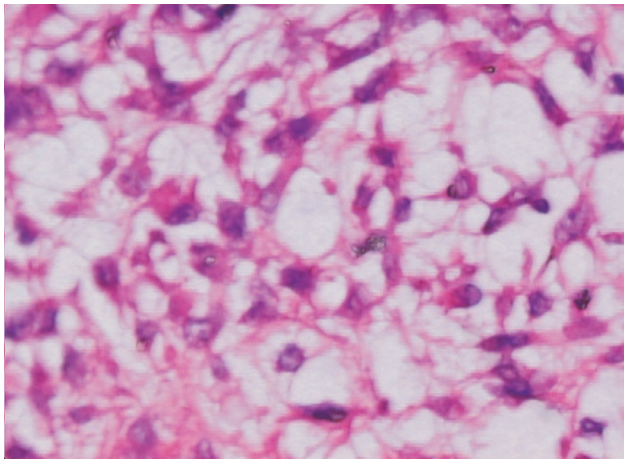
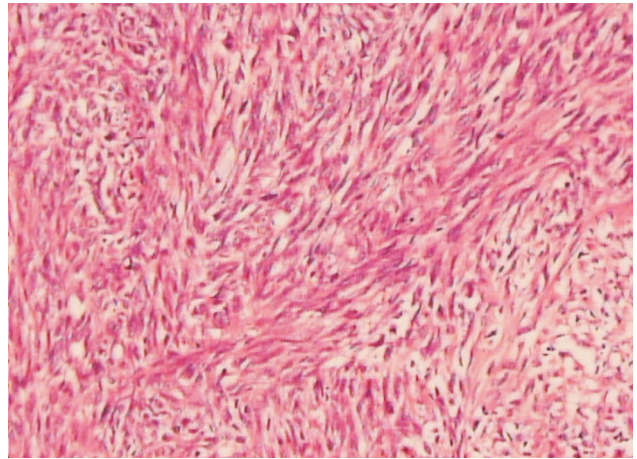


Figure 2 – Large tumor cells with clear cytoplasm (HE stain, ×100)

Figure 3 – Nest of rounded cells surrounded by reticulin fibers (Gömöri stain, ×50)

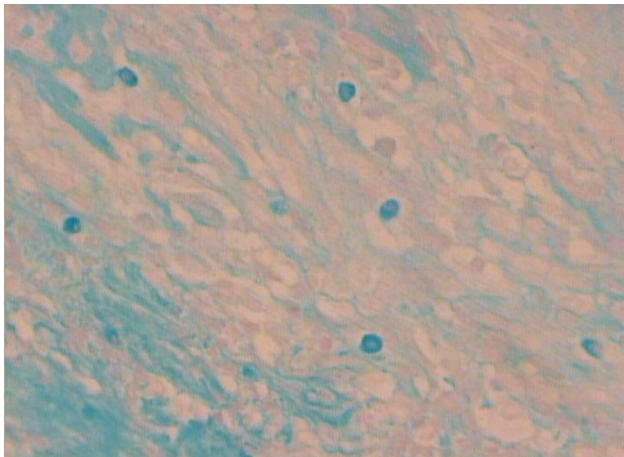
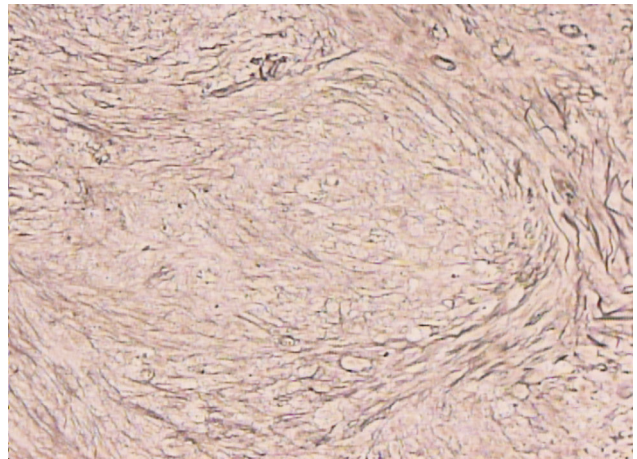


Figure 4 – Mast cells stained in blue with Csaba's technique (×50)

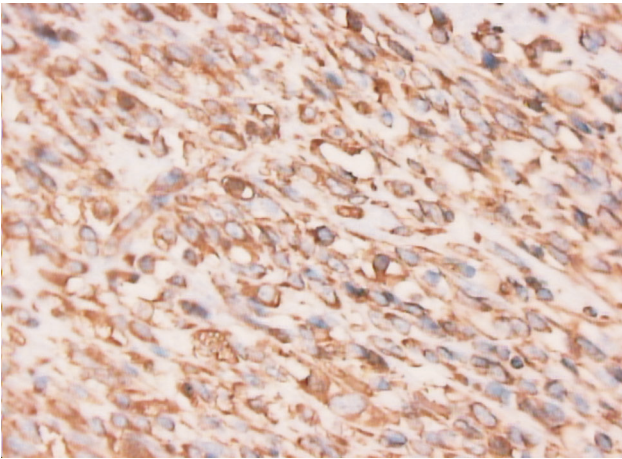


Figure 5 – Diffuse and strong expression of vimentin ($\times 50$)

Figure 6 – Foci of tumor cells positive for cytokeratin ($\times 50$)

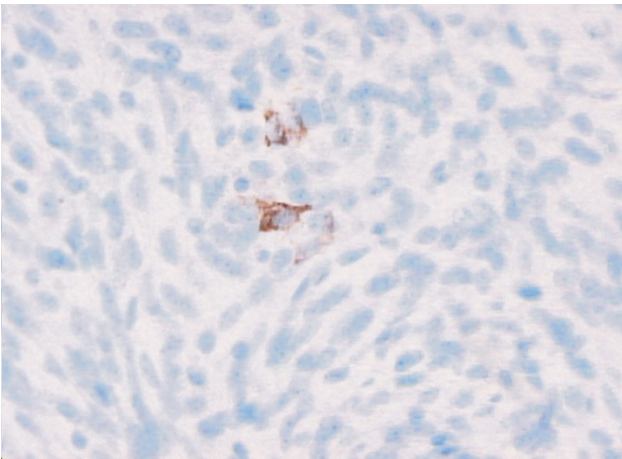
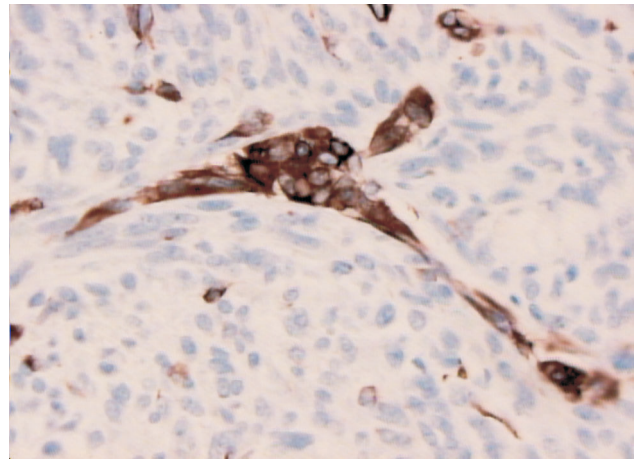
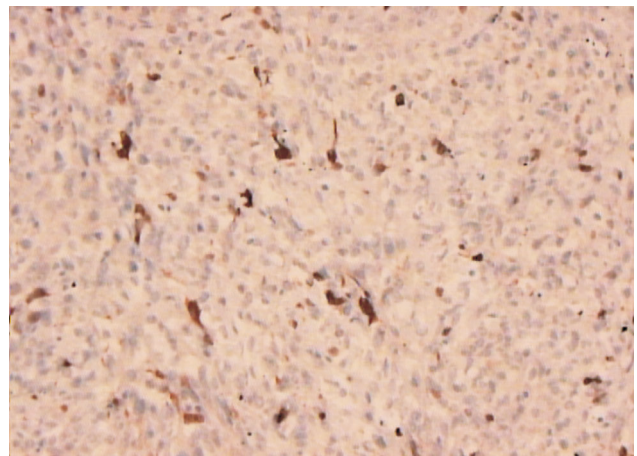


Figure 7 – A small number of tumor cells stained with EMA ($\times 50$)

Figure 8 – Scattered tumor cells positive for calretinin ($\times 25$)



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