CASE REPORT JSLS

Management of Monophasic Synovial Sarcoma of the Small Intestine

Calvin Eriksen, MD, Lance Burns, MD, Angela Bohlke, MD,
Salima Haque, MD, Douglas P. Slakey, MD

ABSTRACT

Background: Reports of primary intraabdominal synovial sarcomas are extremely rare.

Methods: A literature review using PubMed was performed. A retrospective review of the one known case at our institution was completed.

Results: Even the most experienced pathologists report that synovial sarcomas can be very difficult to diagnose correctly. One cytogenic abnormality that is common (>90%) and pathognomonic for synovial sarcoma is a characteristic chromosomal translocation resulting in the SYT/SSX fusion gene. Wide regional excision has been performed for intraabdominal sarcoma, with improved results. Our patient is more than 24 months with no evidence of recurrent or metastatic disease.

Conclusions: The prognosis for patients with intraabdominal synovial sarcoma remains poor. However, wide regional excision may allow for prolonged disease-free survival.

Key Words: Synovial sarcoma, Small intestine, Wide excision.

INTRODUCTION

Synovial sarcomas are rare, unique spindle cell tumors and account for approximately 10% of all soft tissue tumors. A review of the literature reveals that a majority of such tumors are retroperitoneal and located in the pelvis.[1–5] Fourteen cases of reported primary intraabdominal synovial sarcoma involving the gastrointestinal tract have been reported, and only 3 of the cases involved small intestine, the mesentery, or the omentum.[1–13]

Historically, the term synovial sarcoma refers to morphology that resembles developing synovium.[8] Ironically, current research shows that synovial sarcomas arise from mesenchymal stem cells and not actual synovial tissues.[14] Typically, they occur in periarticular locations, with a greater propensity for the lower extremities. In the literature, there have been an increasing number of reports of synovial sarcomas being found in various locations throughout the body. The median age at diagnosis is 35, and there is no predilection for either sex. Unlike other soft tissue histologies, synovial sarcoma has no identifiable etiologic agent or genetic condition that predisposes an individual to develop this malignancy.[14]

CASE REPORT

The patient is a 39-year-old female who presented to the Tulane Medical Center surgery clinic for evaluation of progressively worsening right-sided abdominal pain. The patient had experienced dull pain intermittently for 7 years to 10 years. She had seen numerous physicians about her abdominal pain without any identification of a cause. The evaluation and treatment had included an exploratory laparoscopy at another facility approximately 7 years earlier, but no anatomic abnormalities or pathology was identified.

The patient's abdominal pain had become more constant and severe, causing her to seek another medical opinion. On physical examination, the pain was reproducible with palpation. The patient had minimal guarding but no rebound tenderness. The remainder of her physical examination was unremarkable.

A CT scan was ordered along with routine laboratory tests (CBC, comprehensive metabolic panel). The CT showed a

Departments of Surgery and Pathology, Tulane University School of Medicine, New Orleans, Louisiana, USA (all authors).

Address correspondence to: Douglas P. Slakey, MD, Department of Surgery, Tulane University, 1430 Tulane Ave/SL22, New Orleans, LA 70012, USA. Telephone: (504) 988-2317, E-mail: dslakey@tulane.edu

DOI: 10.4293/108680810X12924466006846

4x4-cm thickened area of the distal small bowel **(Figure 1)**. The blood work was within normal limits. After we discussed the results of the evaluation with the patient, exploratory laparoscopy was scheduled.

During exploratory laparoscopy, a friable mass, 4cm to 5cm in diameter, was identified in the mid ileum. Resection of an 8-cm segment of small bowel and adjacent mesentery that included the mass was performed. Frozen sections of the proximal and distal margins were normal, and an extracorporeal end-to-end hand sewn anastomosis was performed. Postoperatively, the patient had an uncomplicated hospital course and was discharged home.

Initial pathologic assessment revealed a 4.5-cm mass thought to be a gastrointestinal stromal tumor (GIST). Further histopathologic analysis revealed a monophasic synovial sarcoma (see 'Histopathology' below).

The definitive diagnosis of synovial sarcoma was proven by the confirmation of a chromosomal translocation resulting in an SYT/SSX fusion gene. With the confirmation of synovial sarcoma, determination of appropriate follow-up treatment was determined based on the history of synovial sarcomas in general. Synovial sarcomas have the propensity to spread along tissue planes and generally have a poor prognosis. The treatment of choice for synovial sarcoma in the extremities is wide surgical resection, including all adjacent lymph nodes. Little data exist in the literature regarding surgical treatment of intraabdominal synovial sarcoma. Based on the natural history of synovial sarcoma and known recommendations, we recommended reoperation to complete a more extensive resection of the adjacent bowel and mesentery. The patient decided to proceed with the second surgery during which a 45-cm segment of small bowel including the adjacent mesentery, lymphatic, and vascular supply was resected to the root of the mesentery. The specimen was sent to pathology for examination.

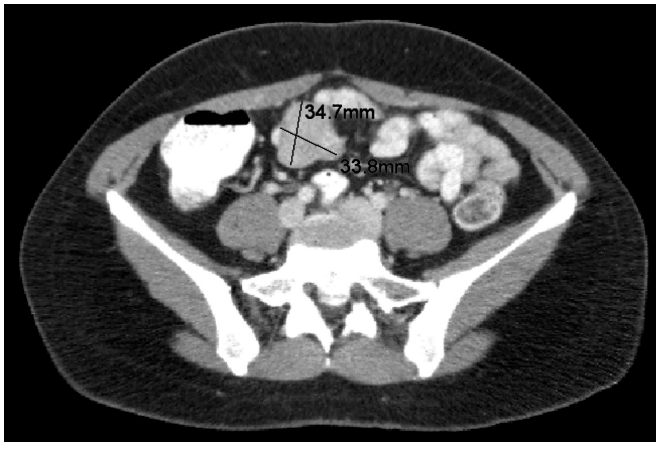

Figure 1. Abdominal CT scan–mass involving small intestine.

The specimen from the second surgery consisted of a 45-cm long segment of small bowel centered on the previous anastomotic site. A 1-cm mass was identified in the mesentery adjacent to the previous anastomotic site. Permanent pathology diagnosed the mass as synovial sarcoma, and perineural and vascular invasion were identified. Thirty-one lymph nodes were found and were negative for malignancy.

At the time of writing, the patient has completed a 24-month follow-up. She has no abdominal pain or other symptoms, and her examination is unremarkable. Her laboratory results are normal, and CT scans of the chest and abdomen do not reveal any evidence of disease.

Histopathology

Synovial sarcoma typically presents as 1 of 2 histologic subtypes: monophasic or biphasic. Monophasic synovial sarcomas are entirely composed of ovoid-spindle morphology. Biphasic subtypes are composed of both spindle and epithelial components. A poorly differentiated histologic subtype has also been described. This subtype is composed of uniform, densely packed small ovoid blue cells. A poorly differentiated subtype is rarely found in isolation; however, up to 20% of synovial sarcomas contain isolated areas.[14]

In this case, a white-tan mass measuring 4.5cm in its greatest dimension was resected. The tumor involved the submucosa and extended into the mesentery. Histopathologically, the mass was composed of a densely cellular monomorphic population of spindled cells with focally whorled areas. No epithelial components were identified. Nuclei were plump and hyperchromatic, and mitoses ranged from 8 to 21 per 50/HPF, demonstrating a high-grade morphology. Both Ki-67 and p53 immunoreactivity were diffuse, confirming the high proliferation index. Focal areas of necrosis were identified. Additional immunohistochemistry revealed positive immunoreactivity to vimentin, CD99, EMA, and bcl-2. The tumor was negative for c-kit (CD117), a marker often suggestive of gastrointestinal stromal tumor (GIST). Additionally, it was negative for smooth muscle actin, desmin, S100, AE1/AE3, CAM 5.2, CK7, CD34, and CEA. At this point, a differential diagnosis of an uncommon form of c-kit negative GIST versus monophasic synovial sarcoma was considered. Tissue was sent for further studies, which revealed positive immunoreactivity for transduction-like enhancer gene

family (TLE)(3+) and FISH for the SYT gene rearrangement that showed a break apart signal on chromosome 18q11.2, characteristic for t(X,18).

Terry et al[15] evaluated TLE1 as a useful immunohistochemical marker for the diagnosis of synovial sarcoma, because it is positive in a majority of cases. Fluorescence in situ hybridization (FISH) for the t(X;18) SYT-SSX fusion gene remains the gold standard and provides the most definitive diagnosis.[16] In this case, these studies confirmed the diagnosis of synovial sarcoma, monophasic type.

DISCUSSION

The diagnosis of synovial sarcoma is becoming easier due to advanced techniques with FISH and immunohistochemical staining. Heide et al[9] have suggested that primary intraabdominal synovial sarcomas are underdiagnosed and therefore believe that primary synovial sarcoma should be included in the differential diagnosis of all CD117 negative abdominal spindle cell tumors. The fact that synovial sarcomas are CD117 negative is important, because it does not allow for the use of imatinib in chemotherapy. The use of immunohistochemical staining

Table 1.
Summary of Publications

Authors	Year	Location	Sex	Age	Type	Size (mm)	Treatment	Outcome
Helliwell	1995	Ileal mesentery	M	46	Biphasic	90x70x70		ANED 9 mo
Chan	2004	Jejunum						
Wang	2006	Omentum	M	66	Biphasic	200x200x100	Subtotal gastrectomy, resection of omentum, liver segmentectomy	Died 2 mo after operation (recurrence)
Buiga	2007	Ascending mesocolon	F	41	Monophasic	100x60	Colectomy	Not mentioned
Heide	2008	Duodenum	F	39	Monophasic	50x40	Duodenectomy	Recurrence after 8 mo
Makhlouf	2008	Gastric atrum-body junction	F	67	Monophasic	8	Partial gastrectomy after biopsy	ANED 12mo
		Body	M	49	Monophasic	20	Segmental resection	DOD omental metastases, 29 mo
		Body	F	68	Monophasic	20	Wedge resection	ANED 22 mo
		Body	M	29	Monophasic	28	Partial gastrectomy	ANED 224 mo
		Antrum, gastroduodenal junction	F	54	Monophasic	30	Antrectomy/gastroduodenal resection	Recent case
		Lesser curvature/body	F	58	Monophasic	30	Wedge resection	ANED 21 mo
		Fundus	F	37	Monophasic	40	Partial gastrectomy	A Local recurrence 9.5cm, reexcised DOC 48 mo
		Distal fundus	M	50	Monophasic	60	Resection, chemotherapy	Alive with recurrence 6 mo
		Greater curvature/body	M	42	Biphasic	80	Partial gastrectomy, chemotherapy	DOD 25 mo
		Fundus	F	66	Monophasic	150	Gastrectomy, partial esophagectomy	Lost to follow-up

[a]ANED=alive, no evidence of disease; DOD=died of disease; DOC=died of other causes.

for TLE1 and the use of FISH for the SYT-SSX fusion genes will improve the diagnosis and treatment of patients with synovial sarcomas.[12,15]

The prognosis for intraabdominal synovial sarcoma is poor. According to Fisher et al,[1] average survival rates were only 17 months with a high incidence of recurrence. This series included both retroperitoneal and intraabdominal tumors. Previous reports document that all patients with primary retroperitoneal sarcomas died within a time period of 7 to 24 months. Their death was due to recurrence or extension, while no sarcoma metastasized out of the abdomen. Reports of intraabdominal sarcomas *not* involving the retroperitoneum sarcomas were interestingly disease free in the period of follow-up (9 months to 6 years).[17] Due to the limited number of reported cases, it is difficult to determine the actual survival rates for intraabdominal synovial sarcomas.[10,17] However, literature is extensive regarding synovial sarcoma in the extremities, with reported 5-year survival rates of 76% and disease-free survival rates of 59%, suggesting that similar modes of surgical treatment may be beneficial for intraabdominal tumors.[18,19] The standard of care for synovial sarcoma reported in the orthopedic literature is wide local excision or amputation, with lymph node biopsy. Based on the results for synovial sarcoma of the extremities, surgical excision—with a wide margin—is the only curative therapy and offers the best outcome; however, the application to intraabdominal cases is largely unstudied. Until this report, intraabdominal cases have been treated by excision of the tumor but not with a wide margin. For example, the cases of gastric synovial sarcoma reported by Makhlouf et al[17] were treated primarily by gastrectomy, without further surgery. **Table 1** summarizes the treatments and results of published cases of intraabdominal synovial sarcoma.

Other treatment modalities including radiotherapy and chemotherapy have been evaluated, but the results are not as good as results with wide surgical excision. The role of adjuvant radiation therapy for tumors >5cm has been shown to reduce the rate of recurrence. Chemotherapy with ifosfamide with mesna ± doxorubicin for metastatic disease has been studied, but conclusions are limited by the small sample sizes. In addition, therapy with ifosfamide, nitrogen mustard, is itself an associated significant morbidity.

In making a treatment plan for the patient, one must take into consideration the highly malignant nature of synovial sarcoma. We believe that wide surgical resection of the tumor and adjacent tissue is the best option, based on the standard of treatment for synovial sarcomas in the extremity and the high rate of local recurrence and extension. To the best of our knowledge, this is the first reported case where a second wider resection was performed after the diagnosis of synovial sarcoma. The fact that our second surgical specimen revealed a 1-cm mass separate from the original tumor with perineural and vascular invasion illustrates the need for wide resection. This surgical case highlights the need for wide surgical resection but also brings up an interesting question. Were past synovial sarcoma cases labeled recurrence actually recurrence, or undiagnosed extension with inadequate resection? In our case, reoperation with wide surgical resection was chosen to decrease the chance of recurrence and reduce morbidity and mortality.

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