Gastric synovial sarcoma: a case report and literature review

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Case report

A 54-year-old Caucasian man presented with dyspepsia for 5 months with mild loss of weight. Endoscopic examination showed a 2-cm gastric ulcer with raised edges on the lesser curvature of the stomach. Endoscopic ultrasound demonstrated that the lesion involved the submucosa and muscularis propria, measuring 8 mm thick. Biopsy revealed, along with body-type mucosa, spindle cell tissue, 2 mm in diameter. The cells had indistinct cytoplasm with elongated nuclei showing mild enlargement, and variation in size and shape. The initial comprehensive immunohistochemical staining panel (AE1/3, CAM5.2, c-KIT, CD34, DOG1, actin, desmin, STAT6, synaptophysin, HMB45, CD45, and calretinin) gave no positive results while the Ki67 index was 5% to 10%. Computed tomography scan of the abdomen showed a 1.6-cm submucosal mass located at the gastric lesser curvature. There was no abnormal focal metabolic uptake in positron emission tomography scan. No hypermetabolic lymph node was found. The preoperative diagnosis was a submucosal spindle cell tumour.

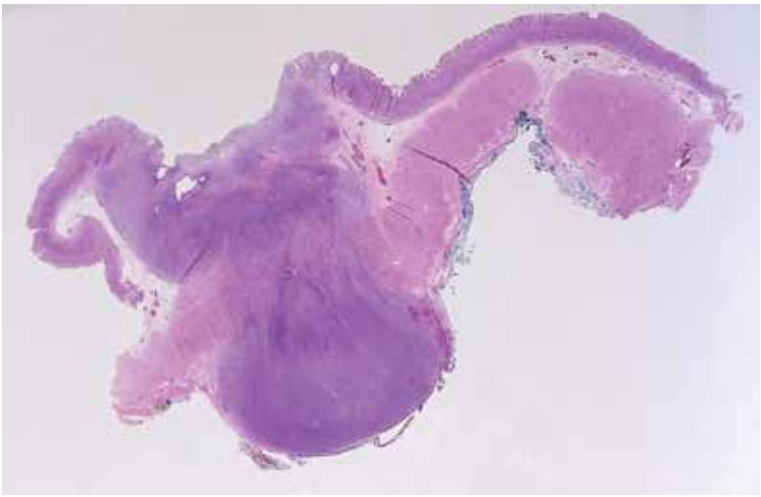

FIG 1. Gastric synovial sarcoma on haematoxylin and eosin staining

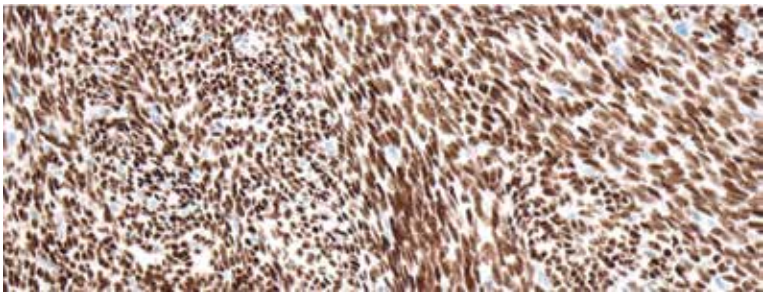

FIG 2. Immunohistochemical stain showing transducin-like enhancer of protein upregulation of the gastric synovial sarcoma (× 20)

Laparoscopic wedge resection of the gastric lesion was performed. Gross examination of the resected specimen showed gastric mucosa measuring 4 cm × 3.5 cm with submucosal tissue of 1 cm thick. There was an ulcerated lesion measuring 0.7 cm × 0.6 cm and 1.6 cm in maximal depth.

Microscopically, a dumbbell-shaped nodule was seen under the ulcer and extending through the muscularis propria to form a smooth nodule on the serosal aspect (Fig 1). Further immunohistochemical staining of the tumour cells was negative for cytokeratin (AE1/3, c-KIT, DOG1, CD31, CD34, desmin, actin, S-100, STAT6, ALK, calretinin, and HMB45. Ki-67 index was not high. The cells, however, showed positive staining for transducin-like enhancer protein 1 (TLE-1) upregulation (Fig 2) consistent with a diagnosis of synovial sarcoma and this was confirmed with fluorescence in situ hybridisation, which demonstrated a positive result for SS18 (synovial sarcoma) translocation. Six peritumoural lymph nodes and adjacent omentum showed no metastasis.

The patient recovered from his surgery without complications. He was followed up for 18 months after surgery with no signs of recurrence.

Discussion

Synovial sarcoma is a soft tissue sarcoma with common presentation in para-articular regions of the extremities although it is not related to synovium. It was first reported in 1893 and accounts

for about 10% of all primary malignant soft tissue neoplasms.[1,2] About 80% of synovial sarcomas are found in extremities, particularly the knee in the popliteal fossa, although they have also been reported in anatomical locations away from joints, including deep spaces in the head and neck, chest and abdominal wall, and visceral organs.[3,4]

Three histological subtypes of synovial sarcoma have been described: monophasic, biphasic, and poorly differentiated patterns. Monophasic synovial sarcoma is the most common subtype, in which the mesenchymal spindle cell component predominates. Biphasic synovial sarcoma has both a mesenchymal spindle cell component and an obvious epithelial component, representing 20% to 30% of synovial sarcomas.[5,6] Poorly differentiated synovial sarcoma typically shows small round cell morphology and high mitotic activity, representing 15% to 25% of synovial sarcomas.[7]

Primary gastric synovial sarcomas are extremely rare, with only 31 cases reported in the English literature. Here we report a patient with primary gastric synovial sarcoma and published cases in the literature are reviewed.

Primary gastric synovial sarcoma is very rare, with the majority of malignant mesenchymal tumours in the stomach represented by malignant gastrointestinal stromal tumours (GISTs) and leiomyosarcoma. Synovial sarcoma has been reported to affect other parts of the gastrointestinal tract, including the oesophagus, duodenum, small bowel, ascending colon mesentery, liver, gastrocolic ligament, or omentum. However, the incidence of these tumours is very low, and few case reports are available in the literature. In 2000, Billings et al[8] first reported two cases of primary synovial sarcoma in the gastroesophageal junction and stomach. In 2008, Makhlouf et al[9] reported a series of 10 gastric synovial sarcomas, with mean age at diagnosis of 52 years. A recent published case was reported by Fuente et al[10] in 2019. The most commonly reported clinical presentations of gastric synovial sarcomas are epigastric pain and anaemia.[11] A clinical summary of the 36 cases of primary gastric synovial sarcoma, including our case, is shown in the Table.[8-10,12-23]

When a gastric spindle cell tumour is encountered, the differential diagnosis mainly focuses on other gastrointestinal mesenchymal tumours, such as GIST, leiomyoma, leiomyosarcoma, schwannoma and fibromatosis. Appropriate immunohistochemical staining is crucial in order to make a diagnosis of synovial sarcoma. Although TLE-1 is positive in the majority of synovial sarcomas, it is not specific for synovial sarcoma, as it can also be positive in other tumours such as endometrial stromal sarcoma, schwannoma, epithelioid sarcoma, solitary fibrous tumour, and rarely GISTs.

To confirm the diagnosis of synovial sarcoma, molecular analysis is essential. As many as 90% of synovial sarcomas possess a fusion between the *SS18* gene on chromosome 18 and an SSX gene found on the X chromosome.[11] This translocation, t(X;18), can be reliably detected on formalin-fixed paraffin-embedded tissue by polymerase chain reaction or fluorescence in situ hybridisation.[24,25]

Optimal treatment for gastric synovial sarcoma is surgical resection. There is no evidence that lymph node dissection (as in gastric adenocarcinoma) will benefit. Our patient underwent laparoscopic wedge resection of the gastric tumour and had an uneventful recovery. After surgery, we did not administer chemotherapy or radiotherapy as the resection margins were clear.

From the literature, all recurrences or disease-related deaths in gastric synovial sarcomas occurred in tumours >3 cm or those containing a poorly differentiated component; however, the prognosis of the disease is uncertain owing to the rare occurrence.

Important points to note

It is difficult to make a preoperative diagnosis of gastric synovial sarcoma based on endoscopic appearance only, as biopsies are usually negative. When sufficient tissue is obtained preoperatively, immunohistochemical staining can be applied. A panel of immunohistochemical stains should be utilised if the diagnosis is not apparent. When surgical resection is performed, the resected specimen should be saved for further evaluation.

When approaching a submucosal lesion identified on endoscopy with uncertain histological diagnosis, treatment usually is directed as if the lesion is a GIST, since this is most common. Local excision without lymphadenectomy is adequate, as in the current patient. Immunohistochemical staining and fluorescence in situ hybridisation are useful in differentiating gastric synovial sarcoma from other gastric spindle cell tumours.

The majority of recurrences in soft tissue sarcomas occur within the first 3 years of observation, and recurrence is rare in gastric synovial sarcoma. The assessment of recurrence risk, based on factors such as tumour grade and size, helps in determining a follow-up policy. According to the 2018 European Society for Medical Oncology Clinical Practice Guidelines[26] on soft tissue and visceral sarcomas, the following approach is recommended: follow-up of surgically treated intermediate- or high-grade patients every 3 to 4 months in the first 2 to 3 years, then twice a year up to the fifth year, and once a year thereafter; low-grade sarcoma patients may be followed for local relapse every 4 to 6 months, with chest X-rays or computer tomography scan at longer intervals in the first 3 to 5 years, then annually.[26] However, gastric synovial sarcomas are so rare that reliable guidelines cannot be recommended.

TABLE. Clinical feature of 34 gastric synovial sarcomas

Case	Age/ sex	Size (cm)	Gastric involvement	Subtype	Type of surgery	Adjuvant treatment	Outcome
1[8]	47/M	5.2	Gastroesophageal junction	Biphasic	Partial gastrectomy	No	ANED, 21 months
2[8]	55/F	16	Antrum	Monophasic	Hemigastrectomy	No	Liver metastasis (at diagnosis), DOD, 6 months
3[12]	42/M	11.5	Posterior gastric wall	Biphasic	Tumour resection	Chemotherapy	Mesenteric metastases, DOD, 24 months
4[9]	67/F	0.8	Body-antrum junction	Monophasic	Partial gastrectomy	No	ANED, 12 months
5[9]	49/M	2	Body	Monophasic	Segmental/wedge resection	No	Omental metastases, DOD, 29 months
6[9]	68/F	2	Body	Monophasic	Wedge resection	No	ANED, 29 months
7[9]	29/M	2.8	Body	Monophasic	Partial gastrectomy	No	ANED, 224 months
8[9]	54/F	3	Antrum	Monophasic	Antrectomy/ gastroduodenal resection	No	Follow-up case
9[9]	58/F	3	Lesser-curvature/body	Monophasic	Wedge resection	No	ANED, 21 months
10[9]	37/F	4	Fundus	Monophasic	Partial gastrectomy	No	Local recurrence, DOC, 48 months
11[9]	50/M	6	Distal fundus	Monophasic	Tumour resection	Chemotherapy	Recurrence, AWD, 6 months
12[9]	66/F	15	Fundus	Monophasic	Gastrectomy/partial oesophagectomy	No	Lost to follow-up
13[9]	42/M	8	Greater curvature/body	Biphasic	Partial gastrectomy	Chemotherapy	DOD, 25 months
14[13]	38/F	7.5	Body	Monophasic	Tumour resection	Chemotherapy	Omental/hepatic metastases, Recurrence in the liver, AWD, 6 months
15[14]	44/F	4.7	Lesser curvature/body	Monophasic	Laparotomy-wide excision	N/A	ANED, 60 months
16[15]	22/M	2.5	Posterior mid-gastric body	Monophasic	Wedge resection	No	N/A
17[16]	42/F	3.5	Body	Monophasic	Partial gastrectomy	No	ANED, 72 months
18[17]	44/M	15	Lesser curvature	Monophasic	Total gastrectomy	No	ANED, 18 months
19[18]	62/M	3.8	Cardia and fundus	Monophasic	Total gastrectomy	No	ANED, 9 months
20[19]	50/F	8	Body	Monophasic	N/A	N/A	N/A
21[19]	36/M	6	Stomach	Poorly differentiated	N/A	N/A	AWD, 36 months
22[19]	37/M	6	Stomach	Monophasic	N/A	N/A	N/A
23[19]	26/M	N/A	Stomach	Monophasic	N/A	N/A	AWD, 185 months
24[19]	58/M	10	Stomach	Monophasic	N/A	N/A	DOD, 6 months
25[19]	21/M	10	Stomach	Monophasic	N/A	N/A	ANED, 48 months
26[19]	36/M	6	Stomach	Biphasic	N/A	N/A	ANED, 48 months
27[19]	54/F	3.8	Stomach	Monophasic	N/A	N/A	N/A
28[19]	49/F	3.5	Stomach	Monophasic	Tumour resection	No	N/A
29[19]	35/F	12	Stomach	Monophasic	Tumour resection	Chemotherapy	Liver metastases, AWD, 48 months
30[20]	49/F	3.5	Stomach	Monophasic	Local surgical excision	No	ANED, 10 months
31[20]	35/F	12	Stomach	Monophasic	Local surgical excision	Yes	Liver metastases, AWD, 24 months
32[21]	51/F	1.7	Body	Monophasic	Partial gastrectomy	No	ANED, 2 months
33[22]	58/M	6.3	Greater curvature/body	Monophasic	Wedge resection	N/A	Liver, peritoneal metastases, AWD, 7 months
34[23]	57/M	1.8	Lesser curvature	Monophasic	Wedge resection	No	ANED
35[10]	42/M	3	Lesser Curvature	Monophasic	Tumour resection	No	ANED, 12 months
36	54/M	1.6	Lesser curvature	Monophasic	Wedge resection	No	Current case

Abbreviations: ANED = alive with no evidence of disease; AWD = alive with disease; DOC = died of other causes; DOD = died of disease; N/A = not available

Conclusion

Gastric synovial sarcoma is extremely rare, and diagnosis requires specific immunohistochemical and molecular analysis. The presence of spindle cells usually reflects common mesenchymal tumour, yet the diagnosis of synovial sarcoma should also be considered when these cells are observed in gastric tumours and there is a discrepancy between the tumour morphology and the immunohistochemical stain results. The prognosis of these tumours is uncertain, given the rarity of the disease.

Author contributions

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity. S Law had the concept of the study, S Law and R Collins acquired the necessary data, all authors analysed and interpreted the data, all authors took part in drafting the manuscript as well as critically revised it for intellectual content.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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Ethics approval

The patient was treated in accordance with the Declaration of Helsinki. The patient provided informed consent for all procedures.

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