

AMSER Case of the Month

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Gastrointestinal Stromal Tumor

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HD is a 83 year old female who presented at OSH after a fall at her home with diffuse pain.

- PMH

- Anemia, HTN, Post Polio Syndrome, Schatzkis ring, Pituitary Adenoma, and Basal Cell Carcinoma.

- PSH

- Appendectomy, Cholecystectomy, Hysterectomy, RLE muscle transplant.

- ROS

- Admitted to fatigue, decrease appetite, early satiety, episodes of nausea and vomiting, minimal abdominal discomfort with associated 16 pound weight loss over 2 year span.

- CTAP was performed

ACR Appropriateness Criteria

Variant 4: Acute nonlocalized abdominal pain. Not otherwise specified. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis with IV contrast	Usually Appropriate	☼☼☼
CT abdomen and pelvis without IV contrast	Usually Appropriate	☼☼☼
MRI abdomen and pelvis without and with IV contrast	Usually Appropriate	0
US abdomen	May Be Appropriate	0
MRI abdomen and pelvis without IV contrast	May Be Appropriate	0
CT abdomen and pelvis without and with IV contrast	May Be Appropriate	☼☼☼☼
Radiography abdomen	May Be Appropriate	☼☼
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☼☼☼☼
In-111 WBC scan abdomen and pelvis	Usually Not Appropriate	☼☼☼☼
Tc-99m cholescintigraphy	Usually Not Appropriate	☼☼
Tc-99m WBC scan abdomen and pelvis	Usually Not Appropriate	☼☼☼☼
Fluoroscopy upper GI series with small bowel follow-through	Usually Not Appropriate	☼☼☼
Fluoroscopy contrast enema	Usually Not Appropriate	☼☼☼

Radiology Images (not labeled)



Radiology Images (labeled)



The arrow on the axial image on the left shows intramural thickening within the lumen of the stomach consistent with a submucosal mass. On the left another round lesion is seen on the coronal and is extending outside the stomach. These lesions showed progressive increase in size when compared to imaging done ~1 year prior.

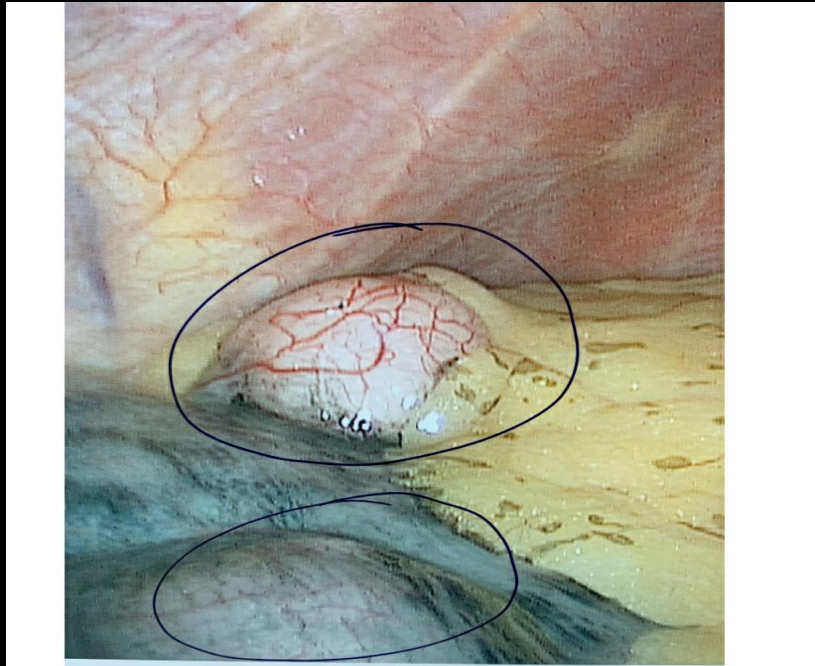
Further work up

- EUS
 - One hypoechoic intramural lesion was found within the greater curvature of the stomach. This lesion was 19mm x 23mm and was originating from the submucosa or muscular propria of the stomach.
 - Another separate hypoechoic lesion was found measuring 12x14mm and was originating from the external gastric muscular propria.
 - These lesions were not amendable by endoscopic resection and the larger lesion was tattooed for easy localization.
- Due to image findings and progressive symptoms laparoscopic partial gastrectomy and tumor resection surgery was planned to remove the tumors.

DDX (based on imaging)

- Gastrointestinal Stromal Tumor
- Leiomyoma
- Leiomyosarcoma
- Schwannoma
- Neuroendocrine Tumor (Carcinoid)
- Metastasis
- Lymphoma

Intraoperative images



Two masses seen here one within the lumen of the stomach and one laying on the outside of the gastric mucosa. The ink from the tattoo can also be seen here.



Intraluminal mass being removed. Only minimal amount of stomach had to be removed.

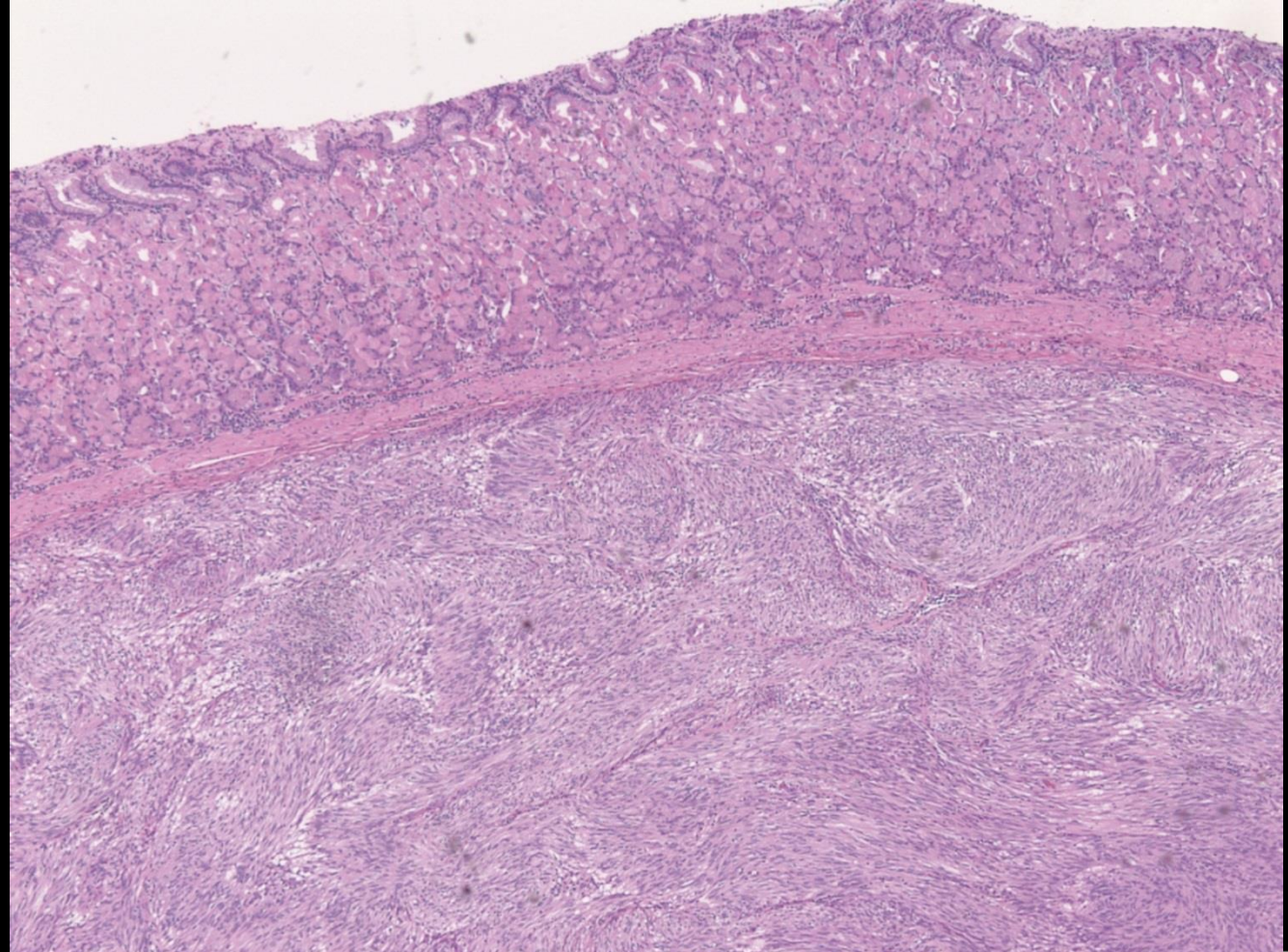
Gross Path (labeled)



Both masses are seen in the image on the left. The Intraluminal mass is seen in the image on the right with the staple line removed. Final dimensions include a maximum diameter of 2.5 cm

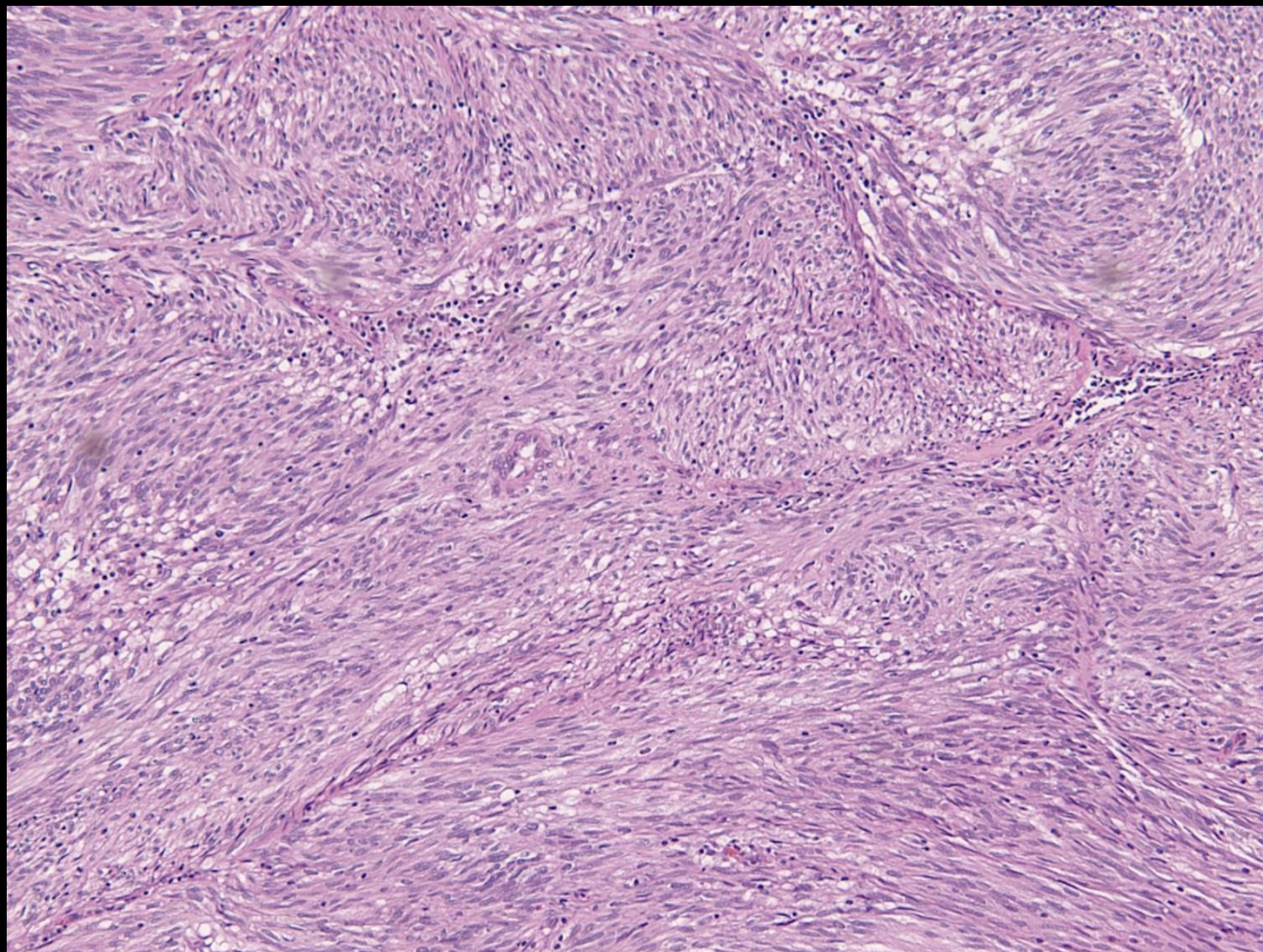
Micro Path (H&E 10x)

Low power view showing the gastric mucosa with well circumscribed round tumor



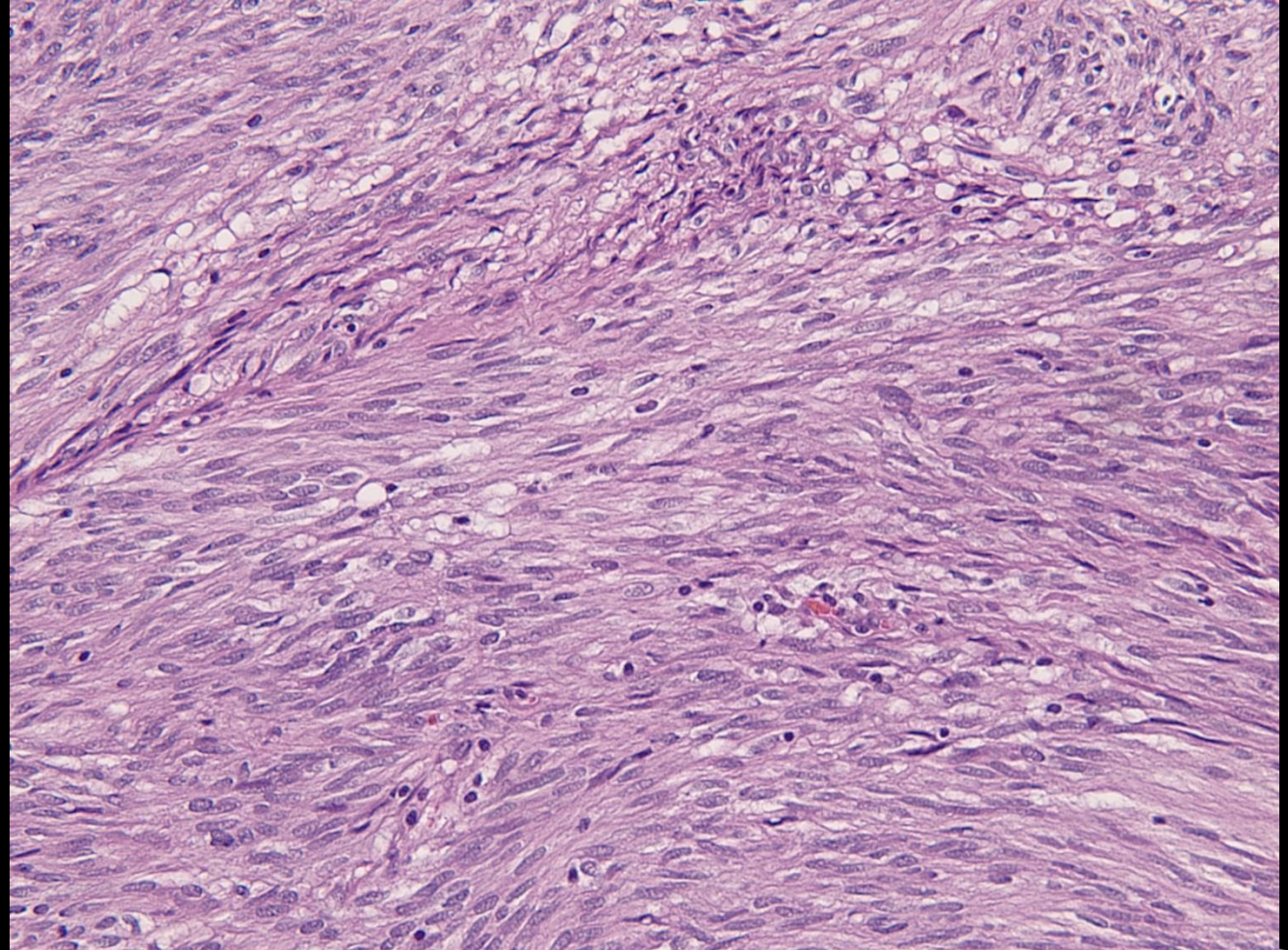
Micro Path (H&E 20x)

Cells are seen here
at medium power
arranged in short
fascicles and whorls
of elongated nuclei



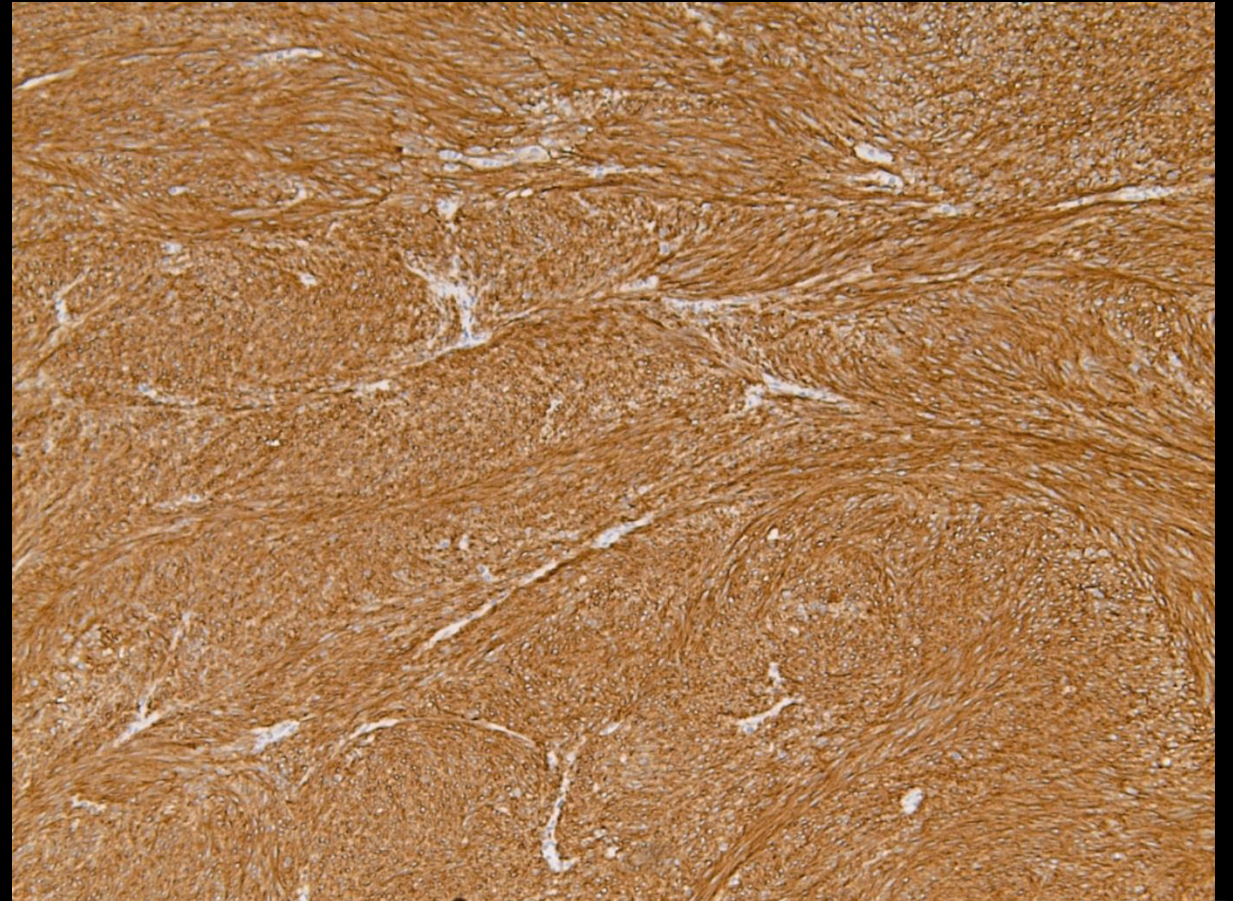
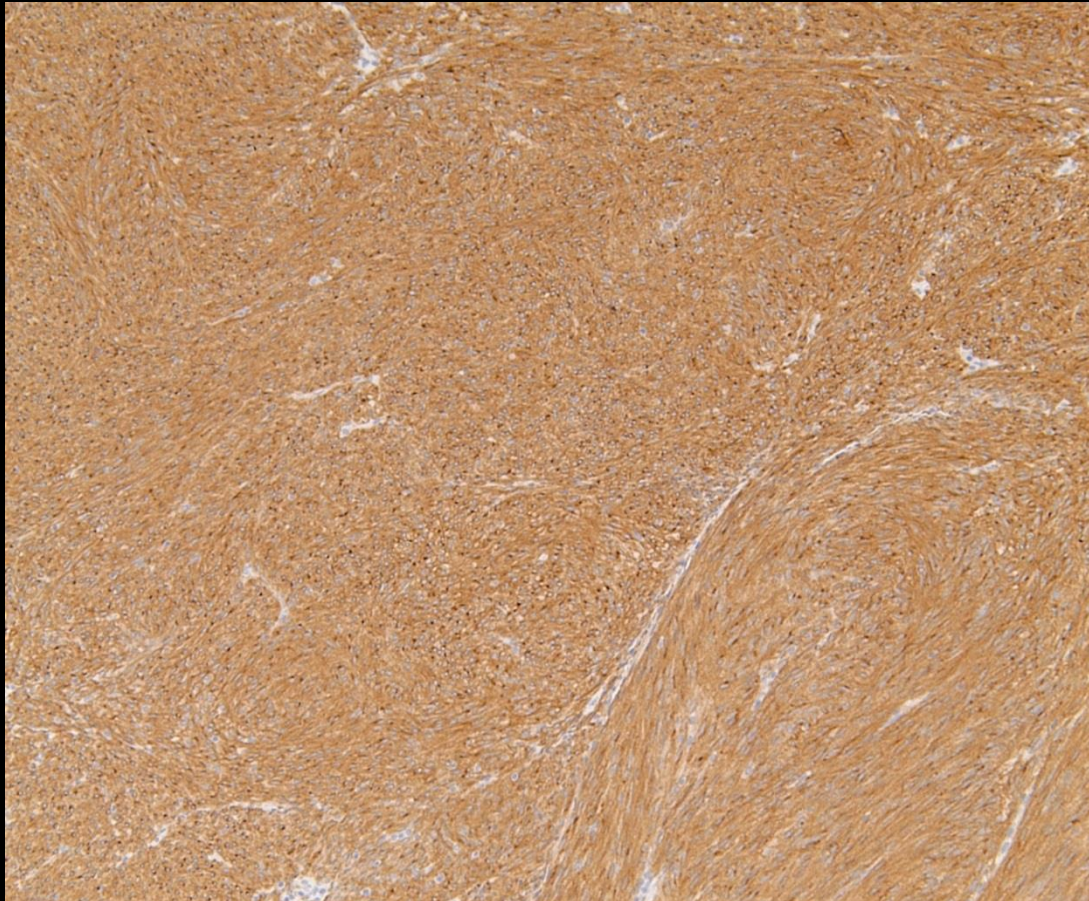
Micro Path (H&E 40x)

High power image showing spindle cell morphology with occasional perinuclear vacuoles suggestive of smooth muscle. Low pleomorphism with very few to no mitosis.



Micro Path (CD117)

Micro Path (DOG1)



Micro Path

Other stains included in work up

- S100 (Negative – rule out schwannoma)
- Desmin (Negative – rule out leiomyosarcoma)

DDX continued.

- Leiomyoma – Ruled out because it would not stain positive for CD117
- Leiomyosarcoma – Ruled out due to negative Desmin Stain
- Schwannoma – Ruled out due to negative S100 Stain
- Gastrointestinal Lymphoma – Ruled out microscopically. (Does not show characteristics of gastric lymphoma such as collections of lymphocytes that are invading glands as well as sheets of mature lymphocytes)
- Neuroendocrine Tumor (Carcinoid) - Ruled out microscopically. (Does not show typical speckled nuclear chromatic and does not show absence of nuclei with granular cytoplasm as typically seen in NETs)

Final Dx:

Gastrointestinal Stromal Tumor

Gastrointestinal Stromal Tumor

- Pathology

- Originate from the interstitial cell of Cajal located in the proper muscle layer
- Characterized by over-expression of the tyrosine kinase receptor KIT
- Histologically stains positively for c-kit (CD117) and DOG1 proteins.

- Etiology

- 0.1-3% of all GI neoplasms
- Median age 63 years old with no predilection of male vs female
- Most arise in stomach (~60%) and small intestine (~30%)
- Up to 50% are metastatic/multifocal at presentation
- Metastasis: Liver & peritoneal cavity

Gastrointestinal Stromal Tumor

- Presentation
 - Usually asymptomatic but can cause nonspecific symptoms, such as abdominal pain, bloating, melena, fatigue secondary to anemia, or obstruction.
 - Most common presentation is bleeding related to mucosal erosion
- Treatment
 - Treatment begins with resection of the tumor to gain a diagnosis and assess for risk stratification. Adjunctive treatment with Imatinib and tyrosine kinase inhibitor is recommended for all moderate to high risk patients.

Risk Stratification

Malignant potential of GIST tumors is assessed using size location and mitotic rate.

- Largest diameter section was 2.5cm
- Mitotic rate was 4 per hpf
- Location of tumor was gastric which lowest risk of malignancy

Tumor Parameters		Risk of Progressive Disease* (%)			
Mitotic Index	Size	Gastric	Duodenum	Jejunum/Ileum	Rectum
≤ 5 per 50 hpf	≤ 2 cm	None (0%)	None (0%)	None (0%)	None (0%)
≤ 5 per 50 hpf	> 2 ≤ 5 cm	Very low (1.9%)	Low (4.3%)	Low (8.3%)	Low (8.5%)
≤ 5 per 50 hpf	> 5 ≤ 10 cm	Low (3.6%)	Moderate (24%)	(Insuff. data)	(Insuff. data)
≤ 5 per 50 hpf	> 10 cm	Moderate (10%)	High (52%)	High (34%)	High (57%)
> 5 per 50 hpf	≤ 2 cm	None†	High†	(Insuff. data)	High (54%)
> 5 per 50 hpf	> 2 ≤ 5 cm	Moderate (16%)	High (73%)	High (50%)	High (52%)
> 5 per 50 hpf	> 5 ≤ 10 cm	High (55%)	High (85%)	(Insuff. data)	(Insuff. data)
> 5 per 50 hpf	> 10 cm	High (86%)	High (90%)	High (86%)	High (71%)

Abbreviations: GIST, gastrointestinal stromal tumor; hpf, high power field; Insuff, insufficient.

Adapted from Miettinen and Lasota, 2006. Data are based on long-term follow-up of 1055 gastric, 629 small intestinal, 144 duodenal, and 111 rectal GISTs. (Miettinen et al. 2001, 2005, and 2006).

*Defined as metastasis or tumor-related death.

†Denotes small numbers of cases.

Case Management & Follow up

- Adjunctive therapy with Imatinib was not recommended in this case
- Follow up with this patient may include upper endoscopy within 6-12 months to assess the surgical site
- Further observation with CT imaging every year for the next 5 years is also recommended to assess for recurrence

References:

- https://www.researchgate.net/figure/Risk-Stratification-of-Primary-GIST-by-Mitotic-Index-Size-and-Site_tbl1_237460125
- <https://radiopaedia.org/articles/gastrointestinal-stromal-tumour-1?lang=us>
- <https://www.archivesofpathology.org/doi/full/10.5858/arpa.2011-0022-RA>
- Molavi, Diana. MD, PHD. The Practice of Surgical Pathology 2nd edition Sinai Hospital Baltimore Pathology, 2018.