Organ Preserving Endoscopy: Endoscopic Submucosal Dissection

Tom Tielleman, MD

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Director of Endoscopy, Parkland Memorial Hospital

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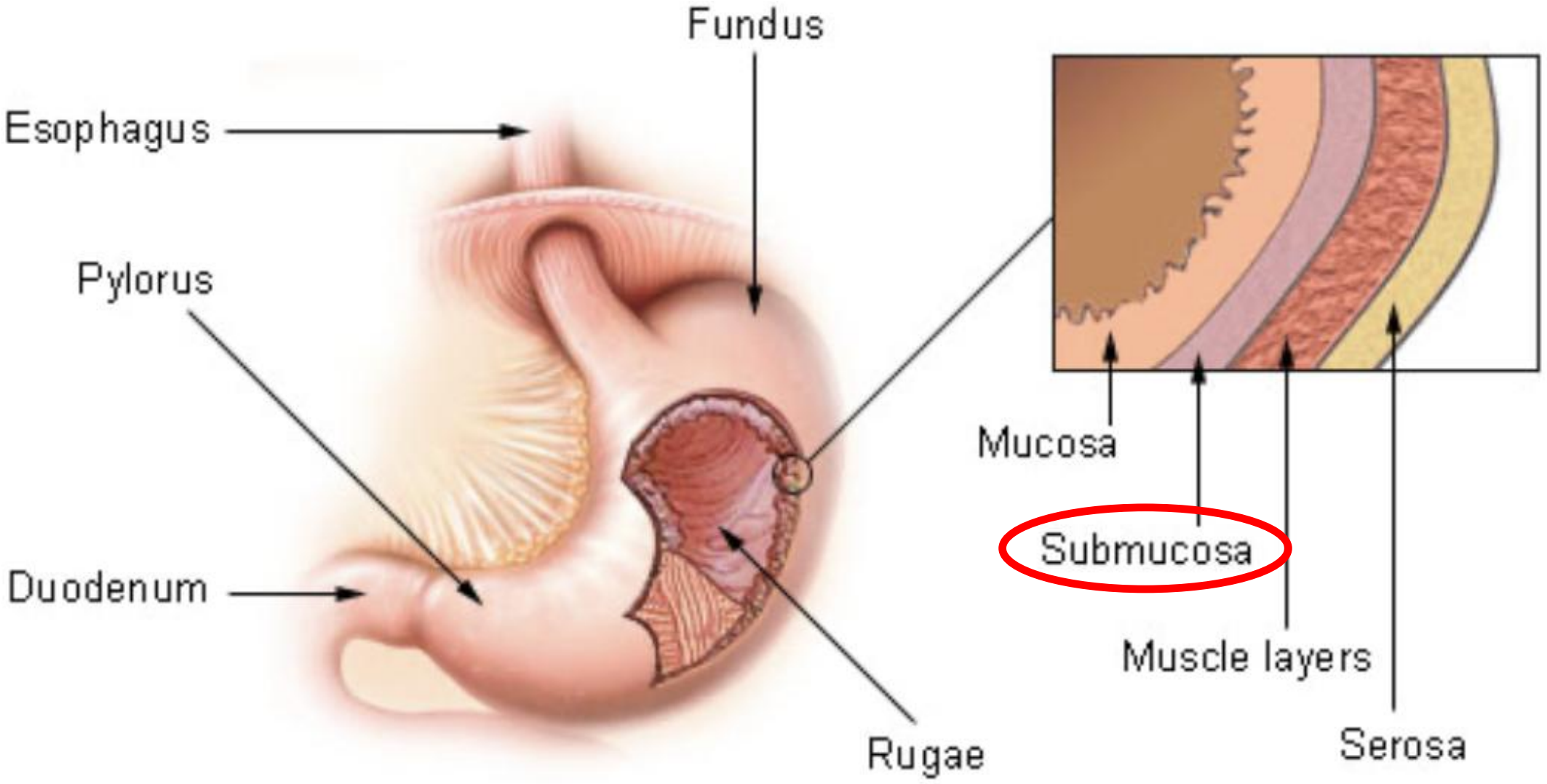
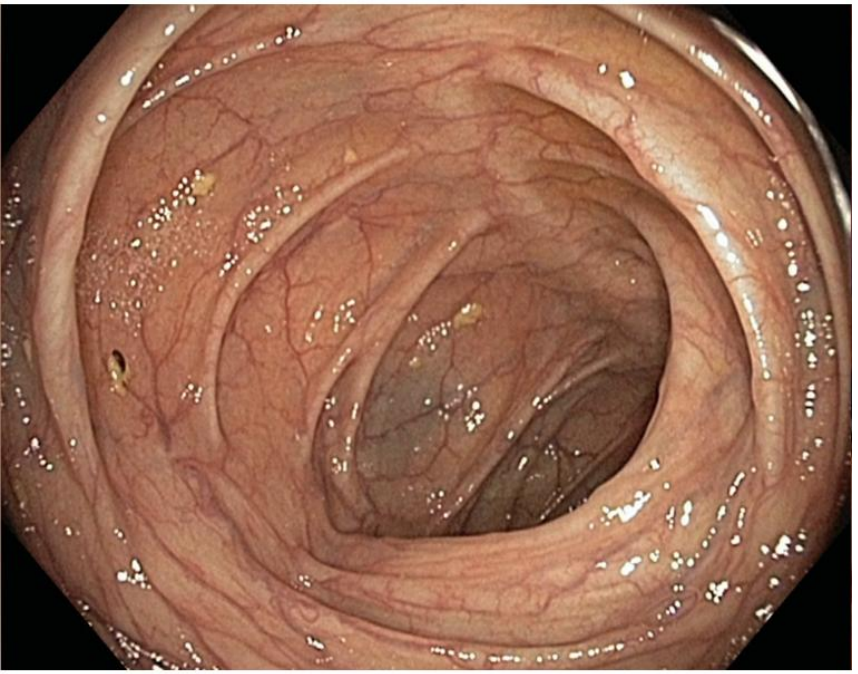
Third Space Endoscopy



Third Space Endoscopy



First Space

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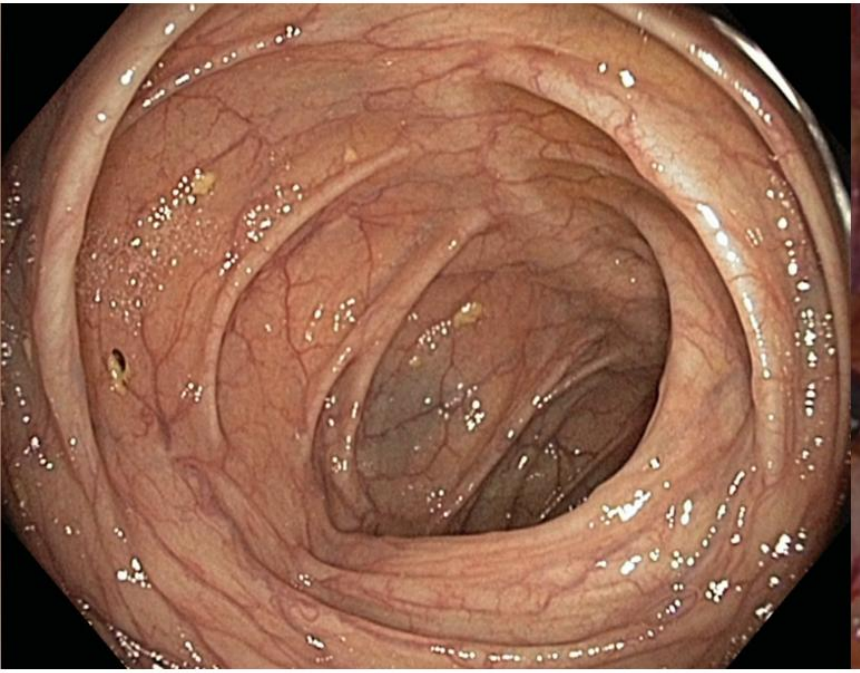
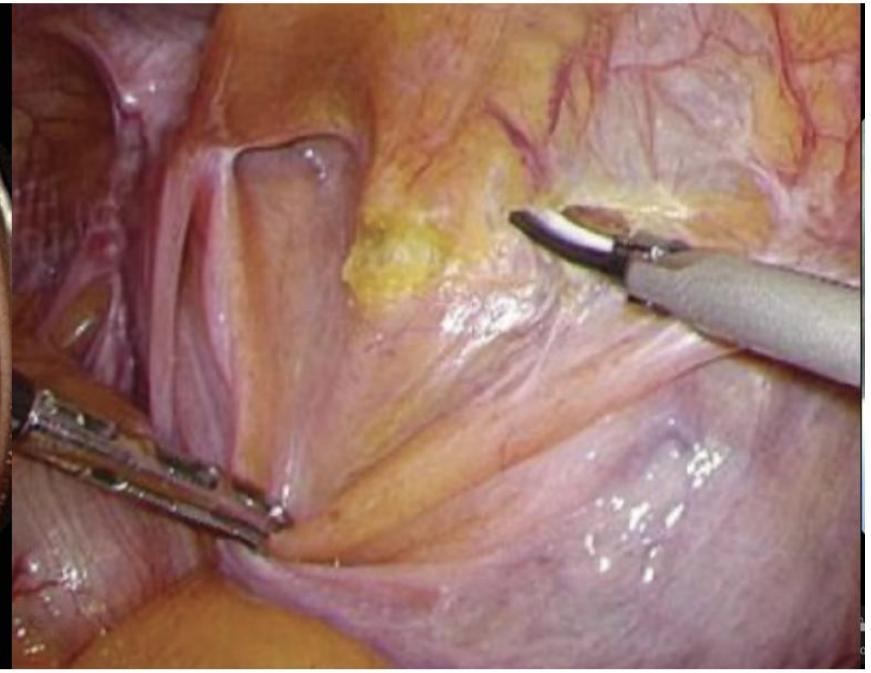
Third Space Endoscopy



First Space



Second Space

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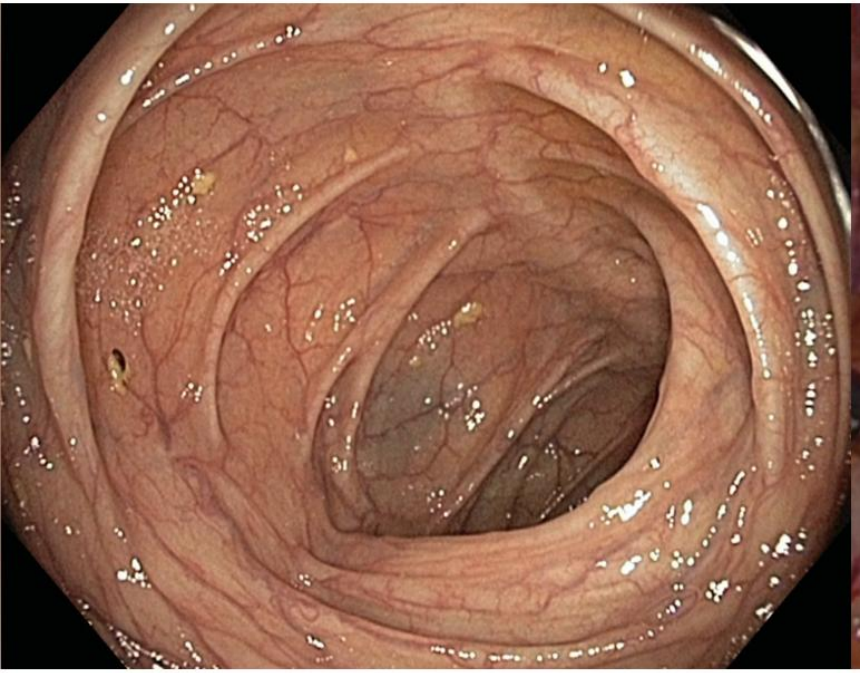
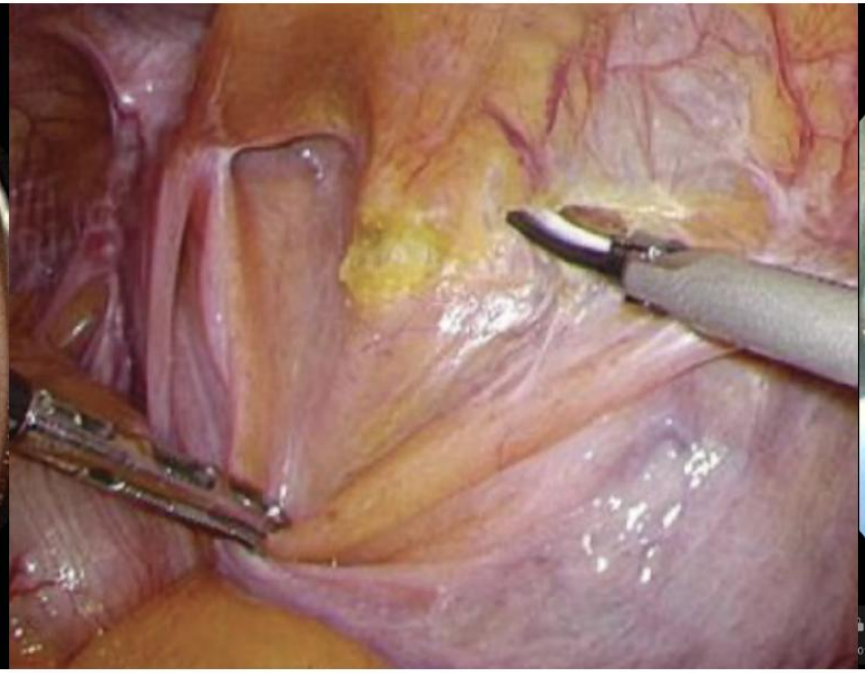
Third Space Endoscopy



First Space



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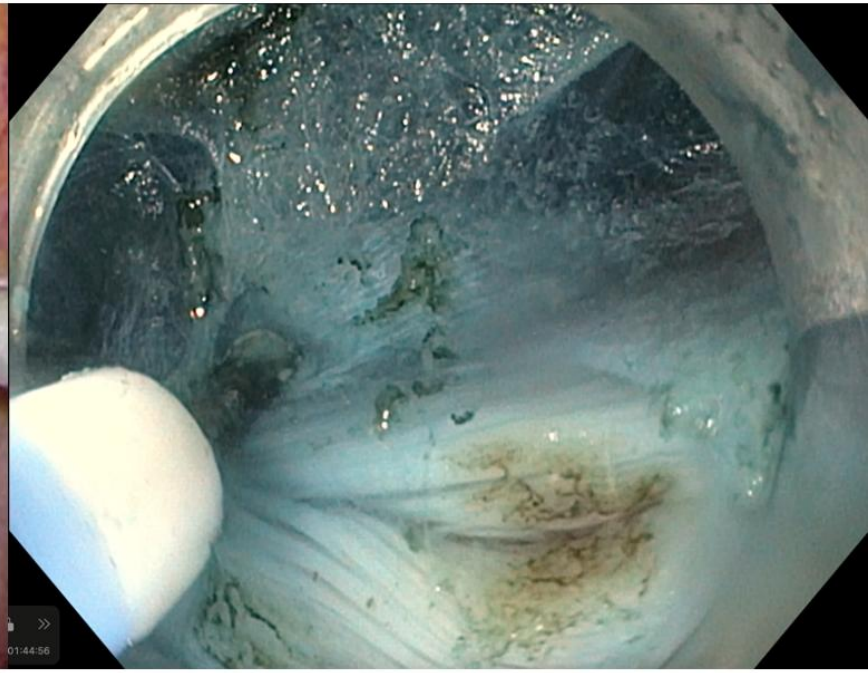

Third Space

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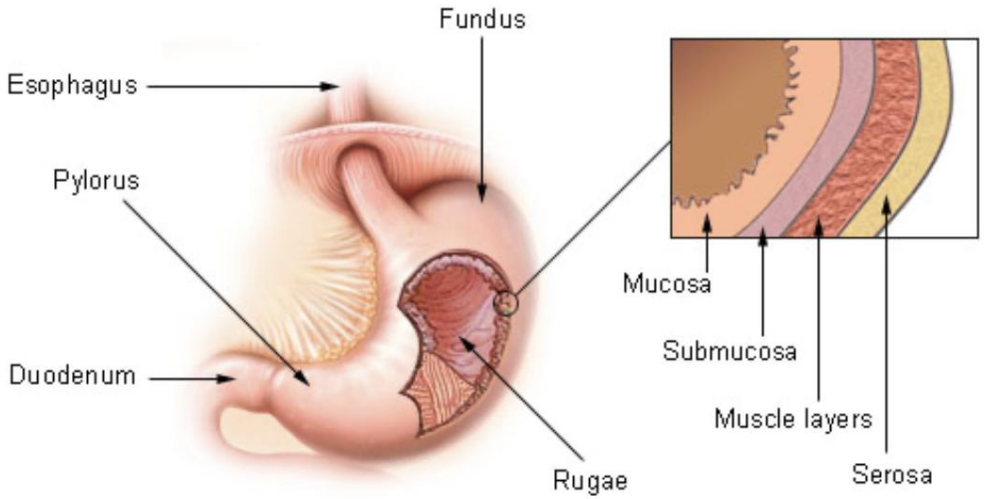
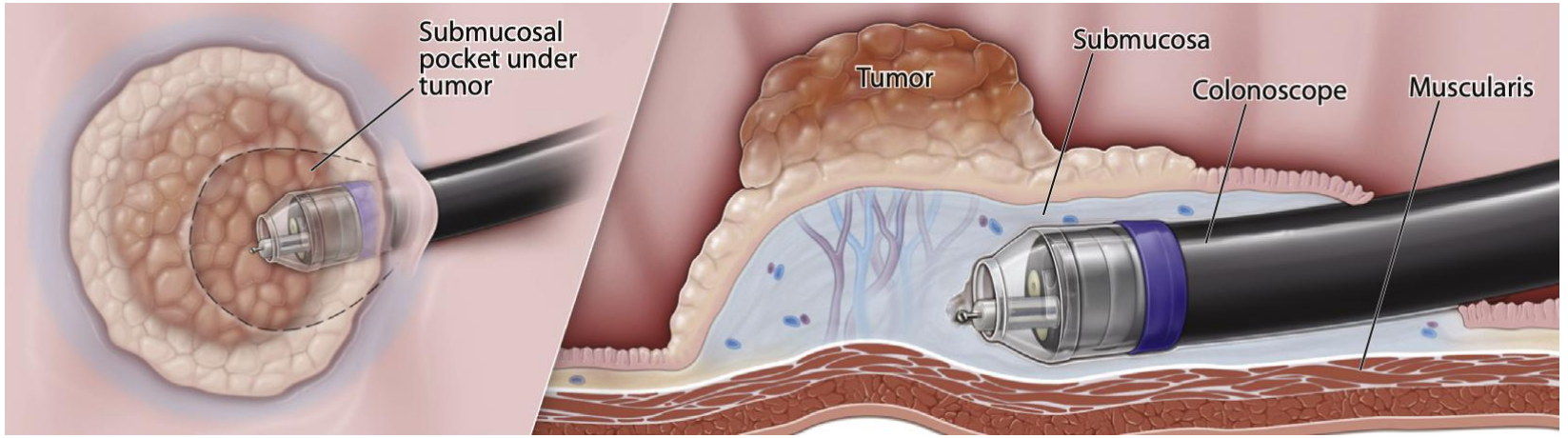
What is ESD?

- Advanced technique that involves injection of fluid into the submucosa to allow for dissection of the submucosa beneath the lesion thus separating it from the muscularis propria





Takezawa et al. GIE 2019

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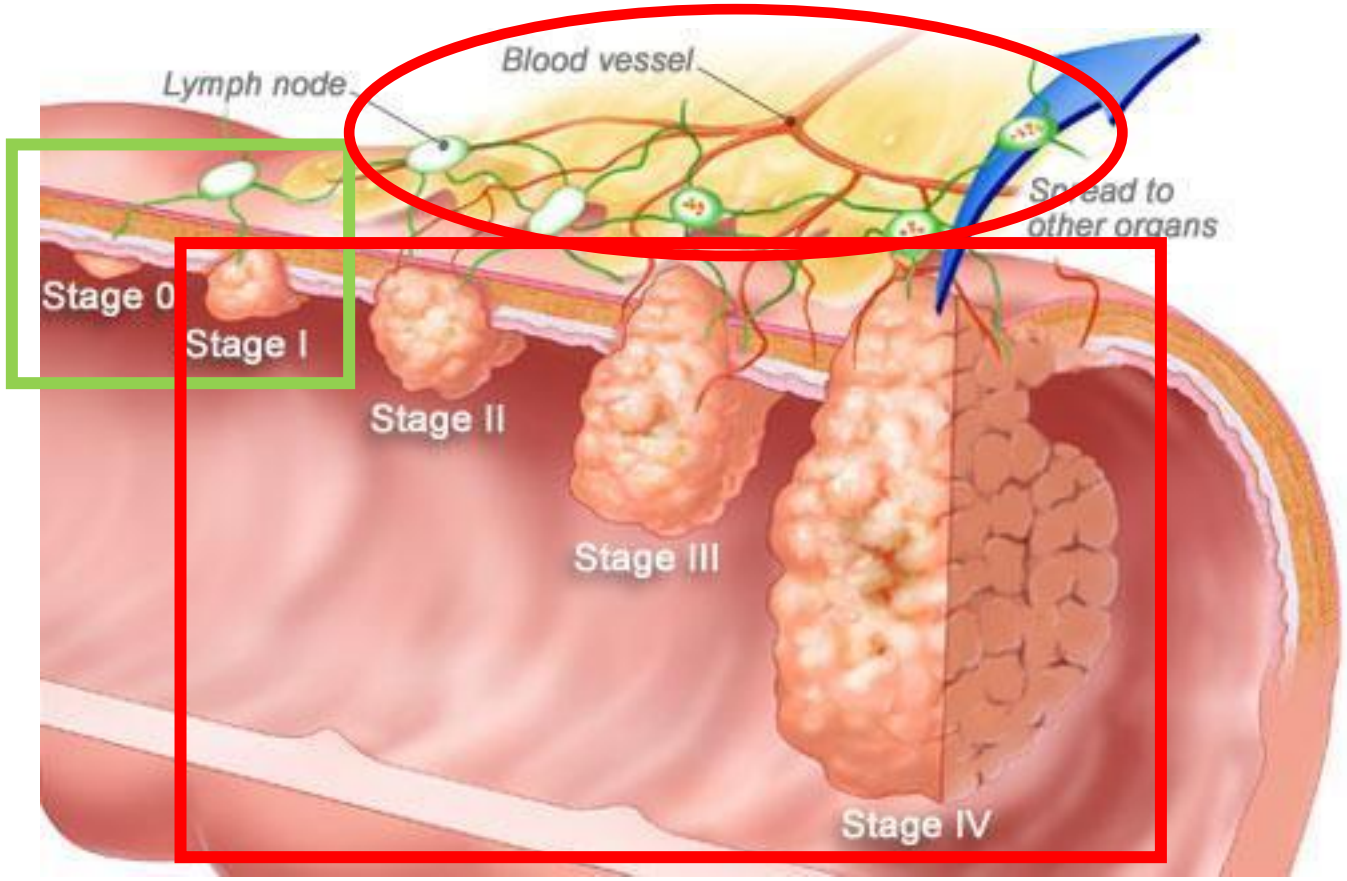
Indications of ESD

ESD is Local Excision

Meant for lesions with minimal risk of lymph node metastasis

- Low Grade Dysplasia
- High Grade Dysplasia
- Intramucosal Cancer
- Superficial Submucosal Cancer



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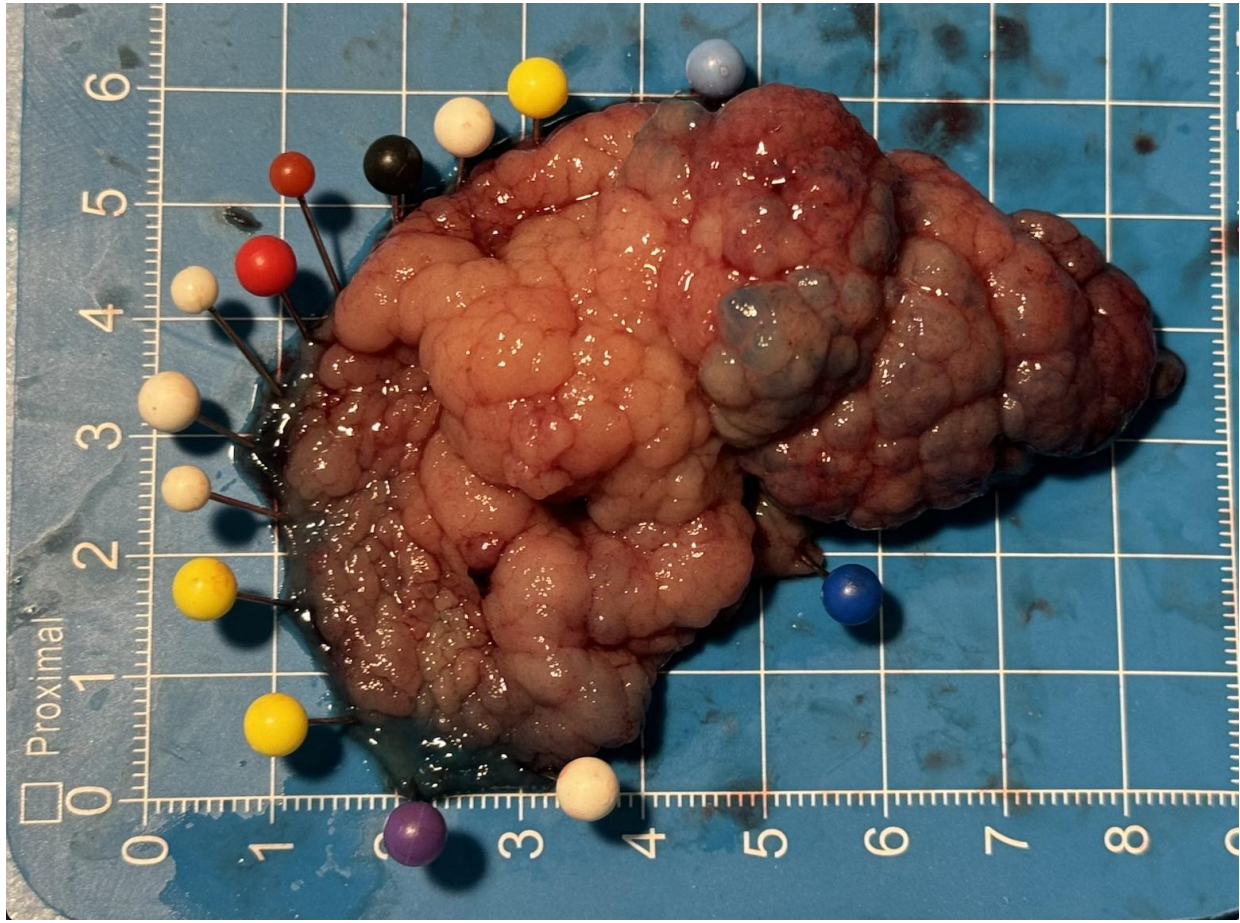
Advantages of ESD

- Allows for en-bloc resection (no matter size of the lesion)
- Allows for in-depth histopathological analysis
- Decreased Recurrence Rates Compared to EMR
- Curative for pre-malignant lesions & early cancers
  - Organ Preservation with Same Oncologic Outcomes as Surgery
- Avoidance of Surgery & resultant hospital stay/potential post-operative complications
  - ESD often outpatient procedure or one day observation



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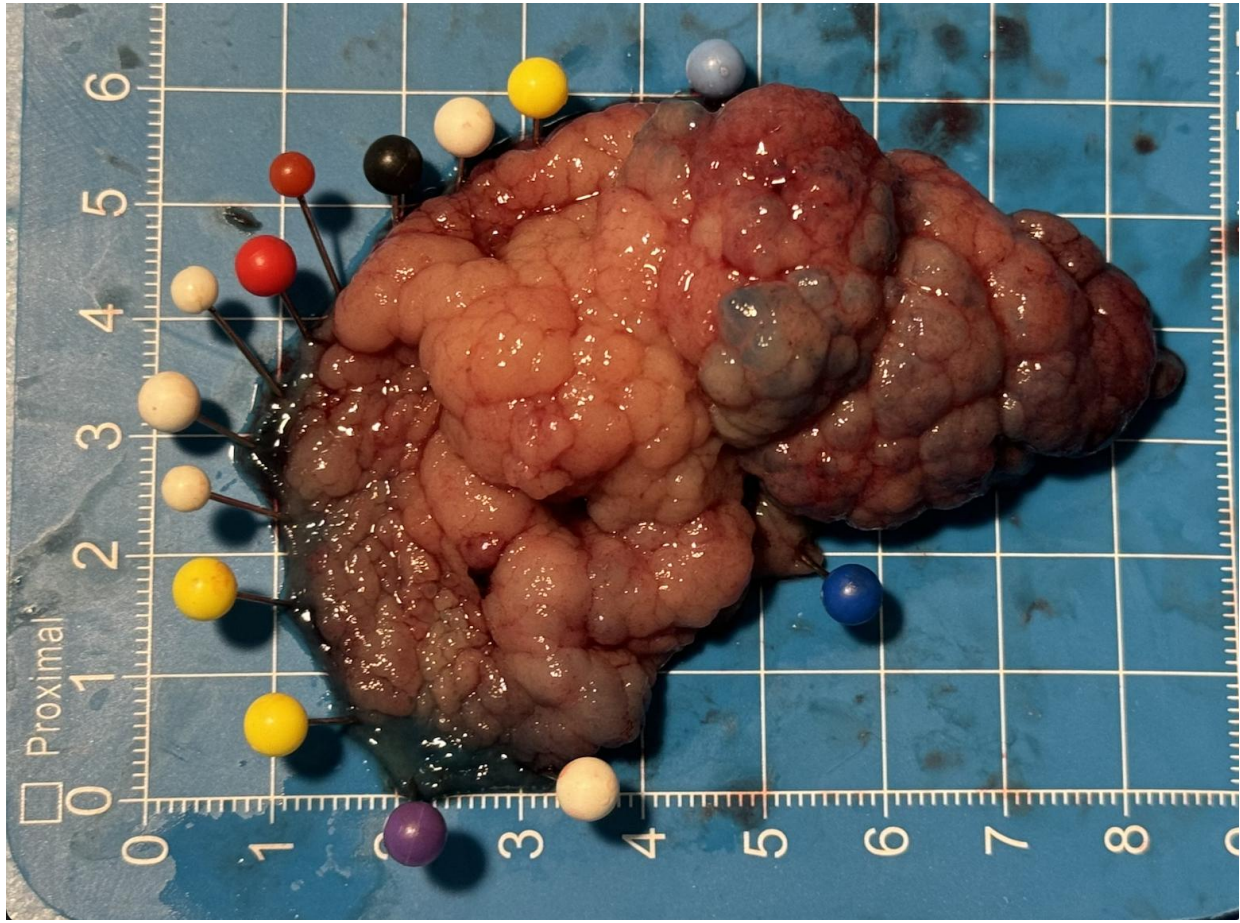

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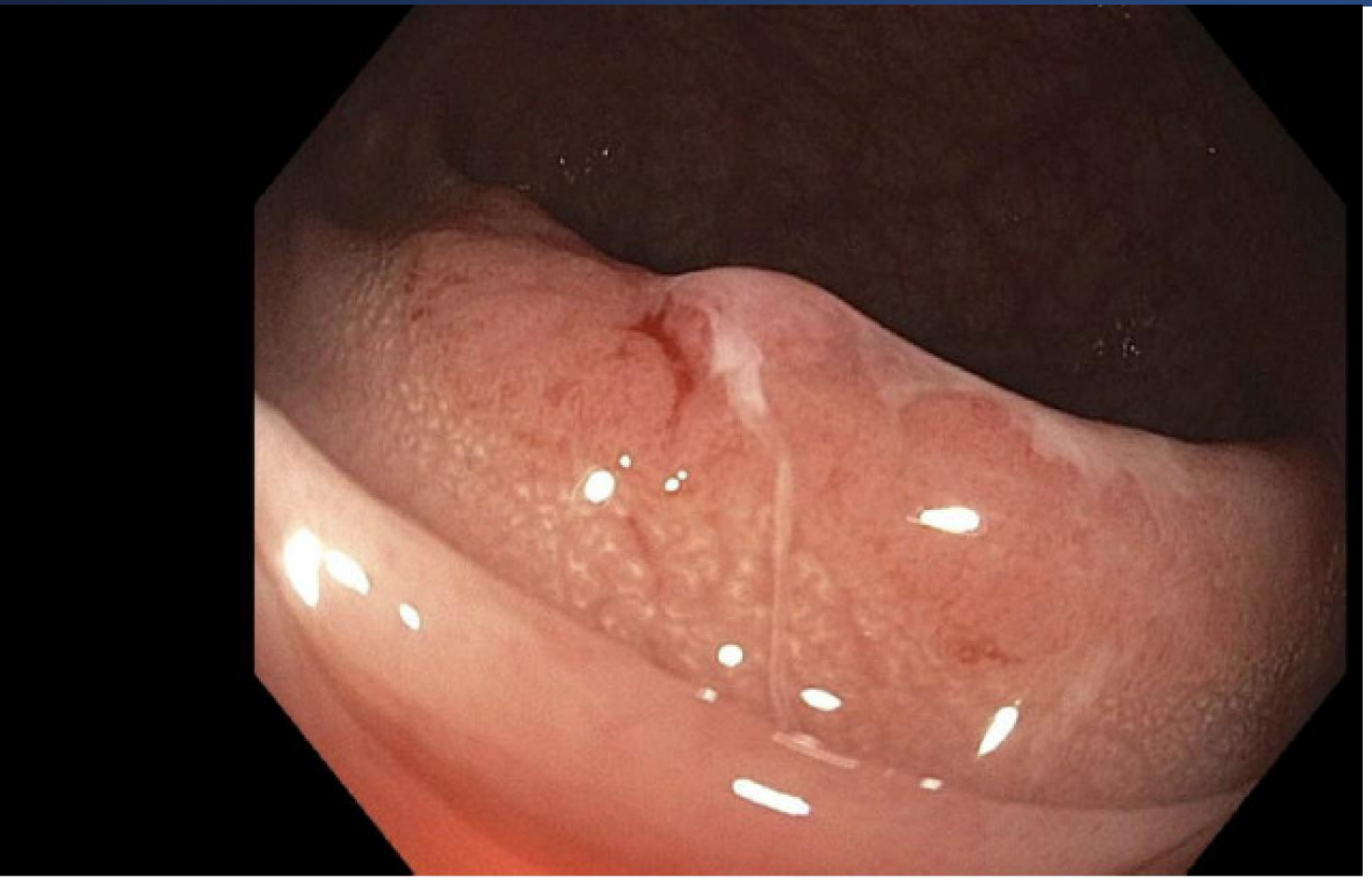
Case 1

- 67-year-old female who presented for their first screening colonoscopy.

Findings:

- “A localized area of erythematous and nodular mucosa was found in the recto-sigmoid colon, involving approximately one-third of the colon wall. Possible flat polyp. Biopsies were taken with a cold forceps for histology”

Case 1



Pathology:

Fragments of tubular adenoma with focal high-grade dysplasia

Rectosigmoid Junction

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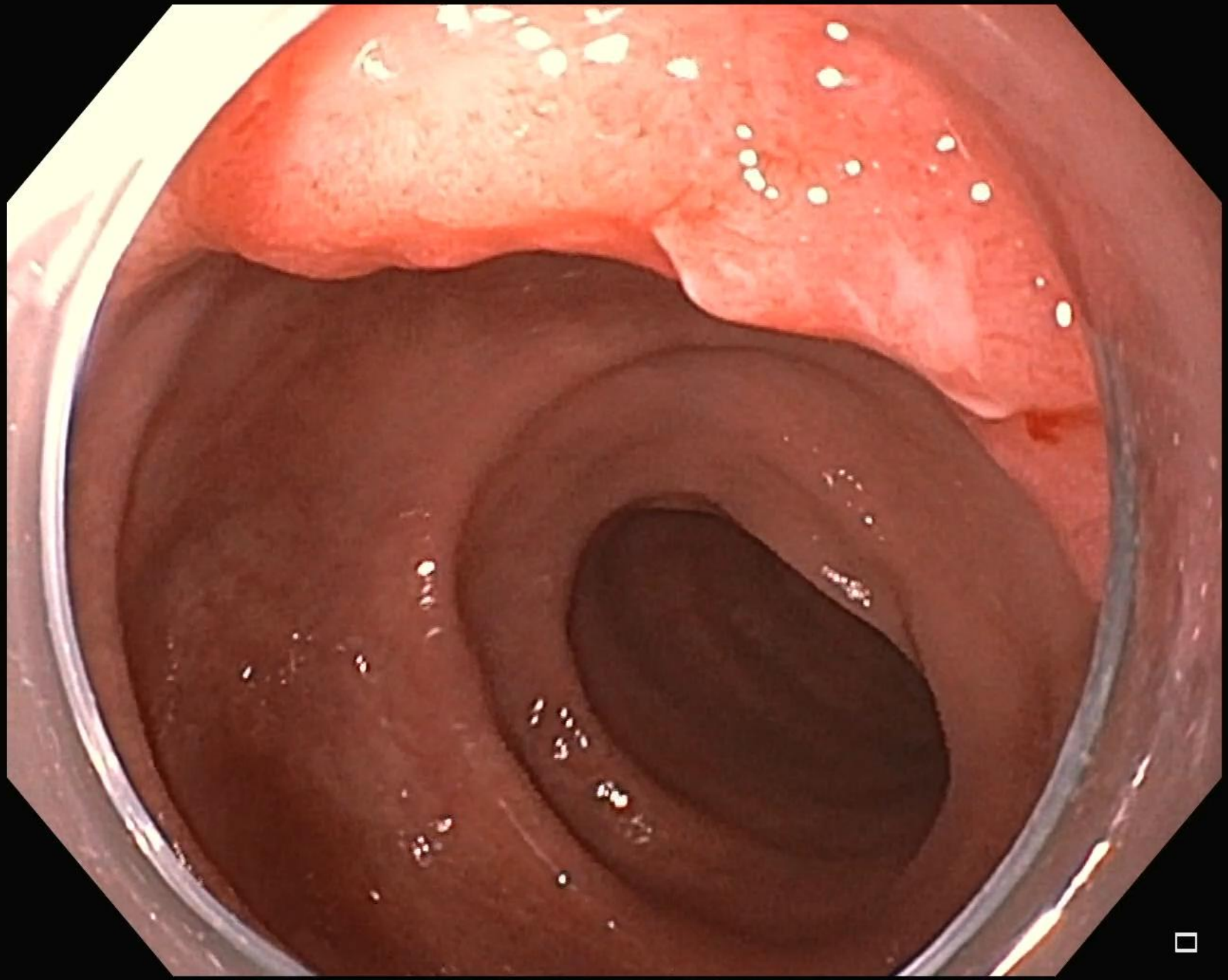

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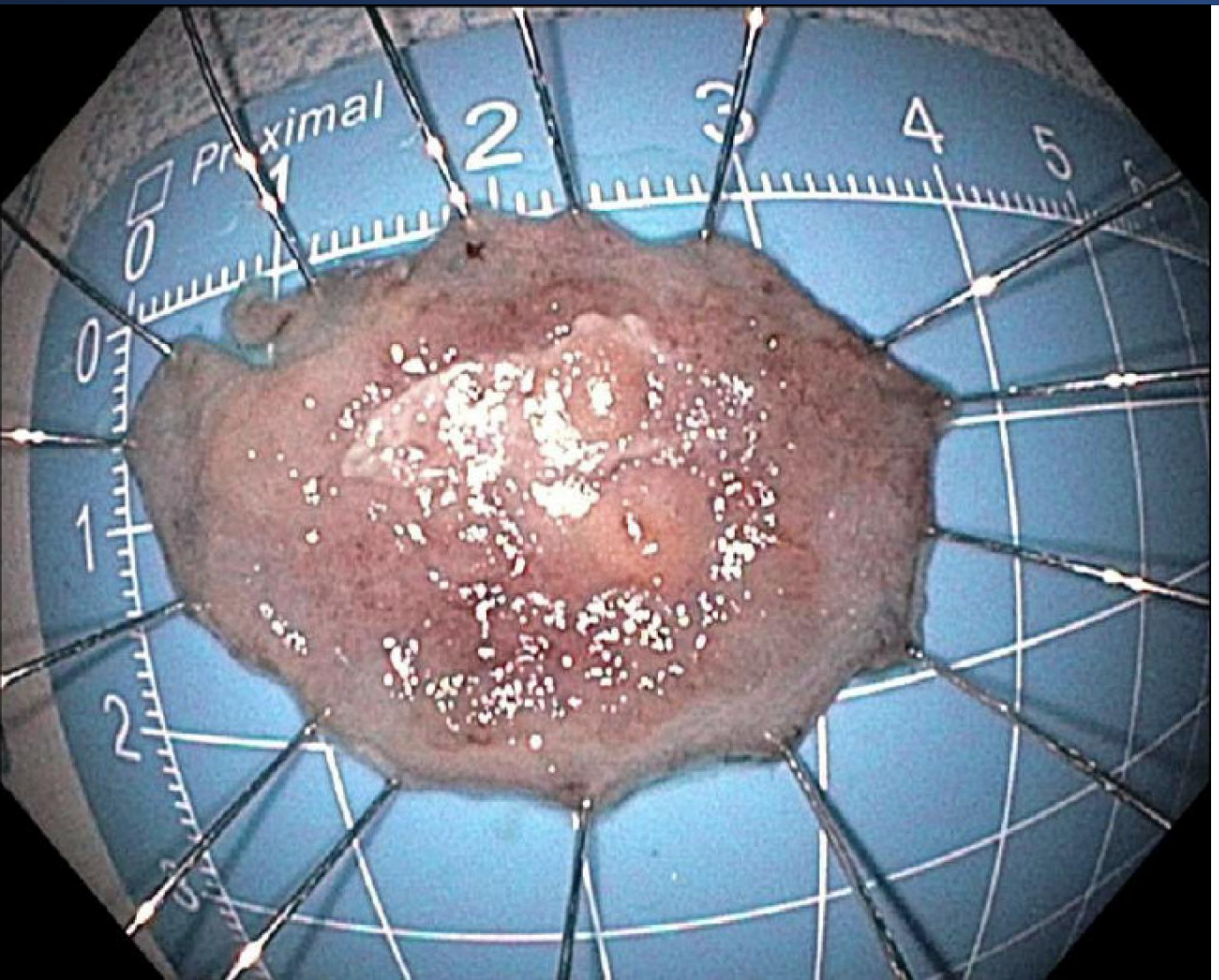

Pathology

- Invasive moderately differentiated adenocarcinoma (about 0.8 cm in greatest extent), arising from a tubular adenoma with high-grade dysplasia
- Invasive adenocarcinoma < 1 mm from cauterized submucosal base
- Peripheral lateral mucosal edges, negative for dysplasia and/or carcinoma
- No lymphovascular invasion identified

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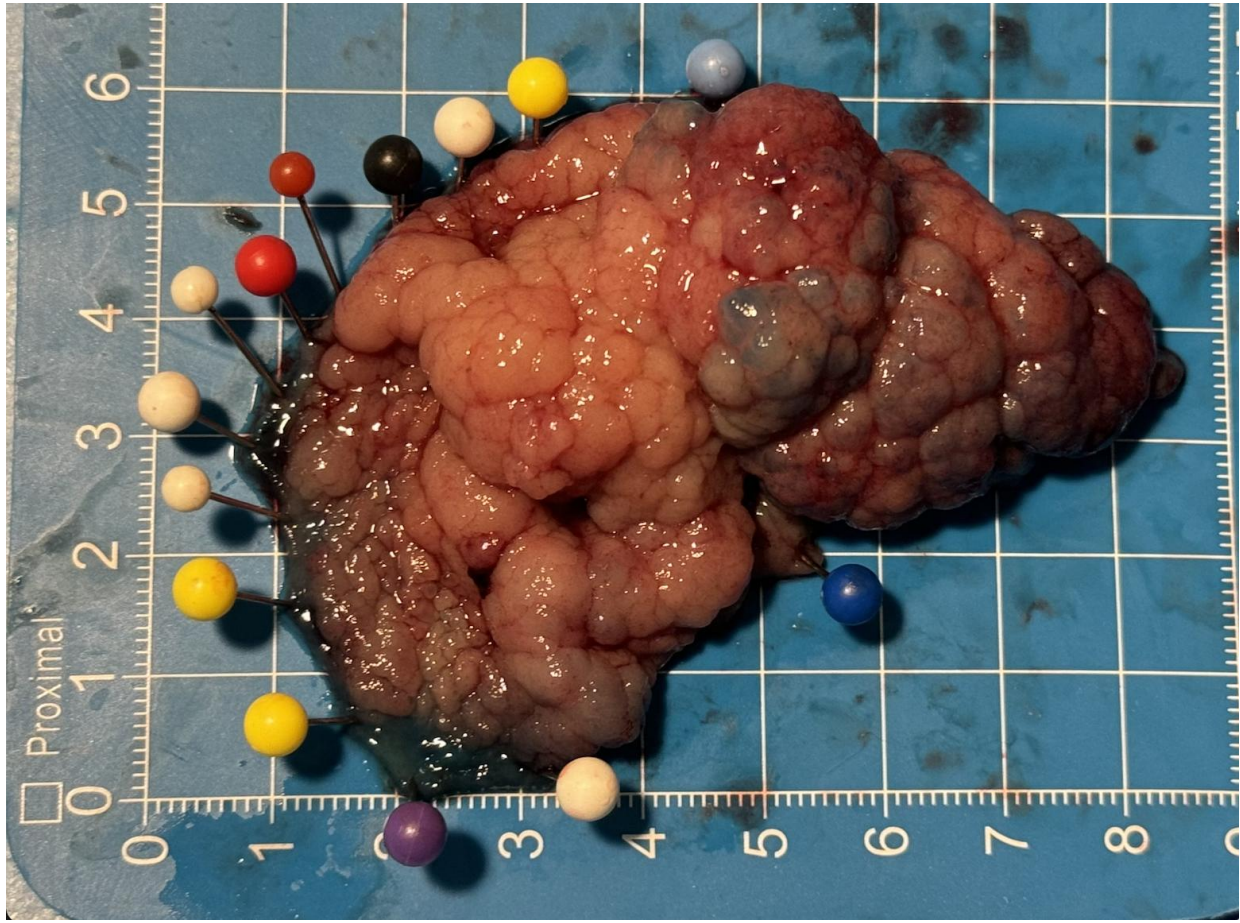

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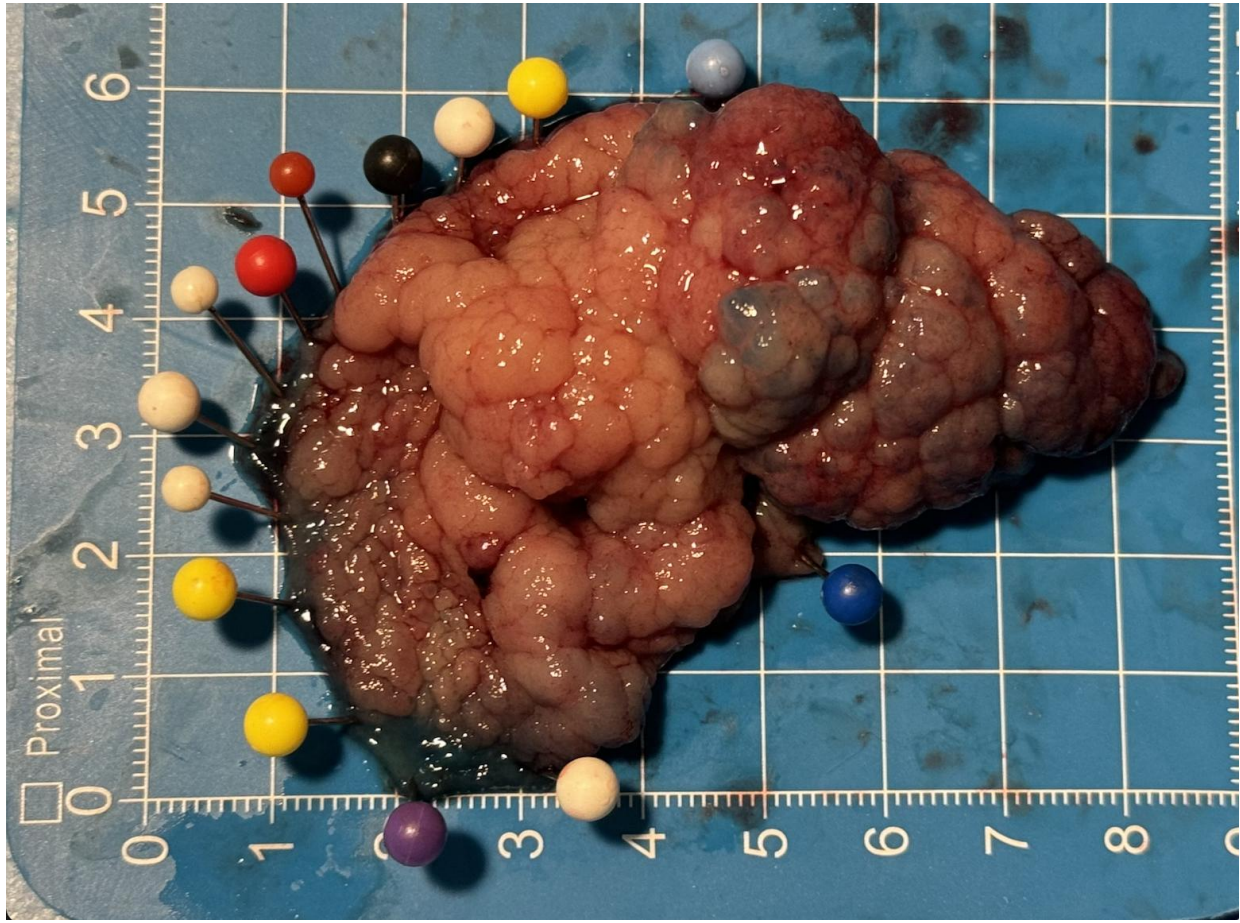

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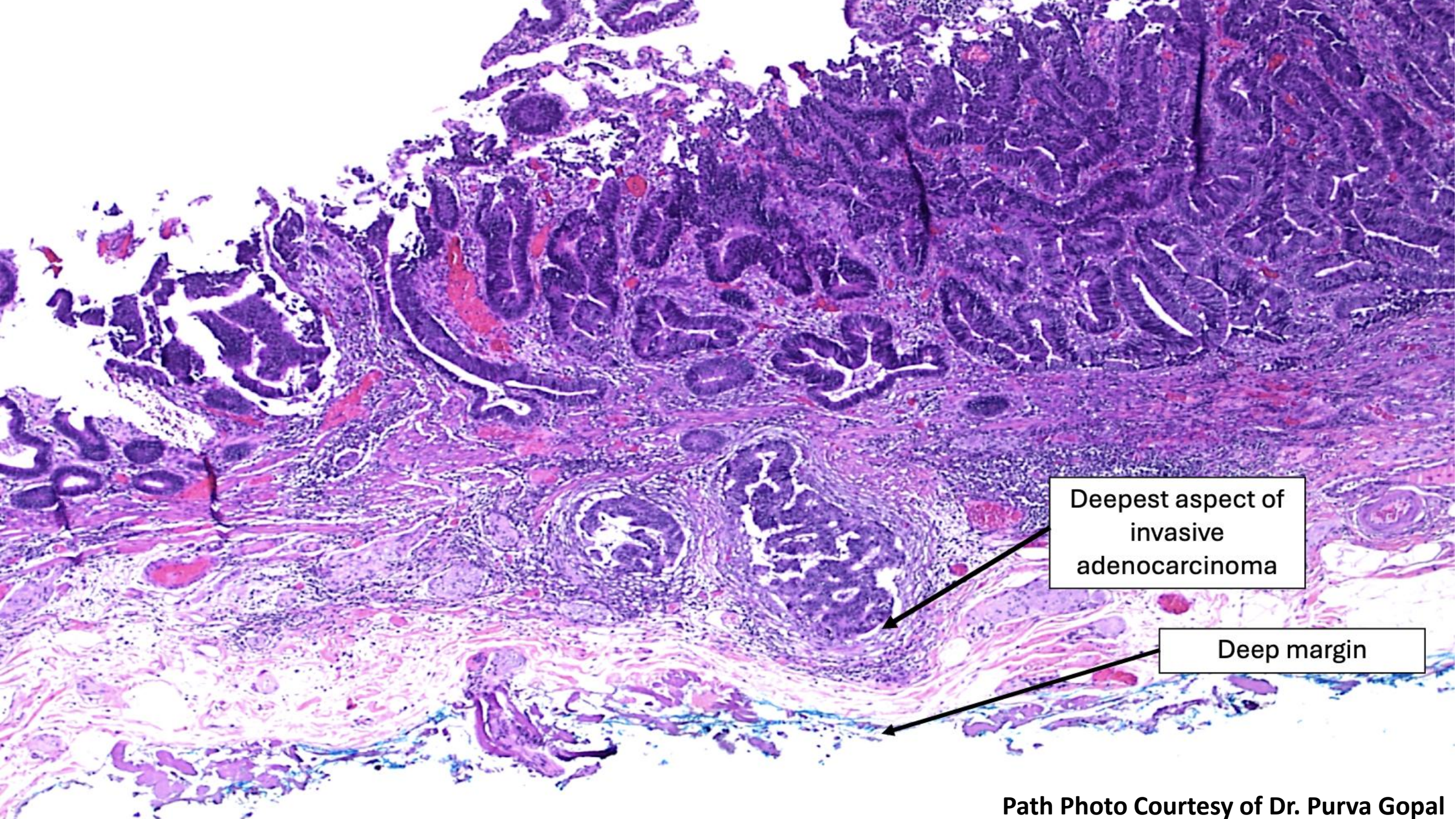
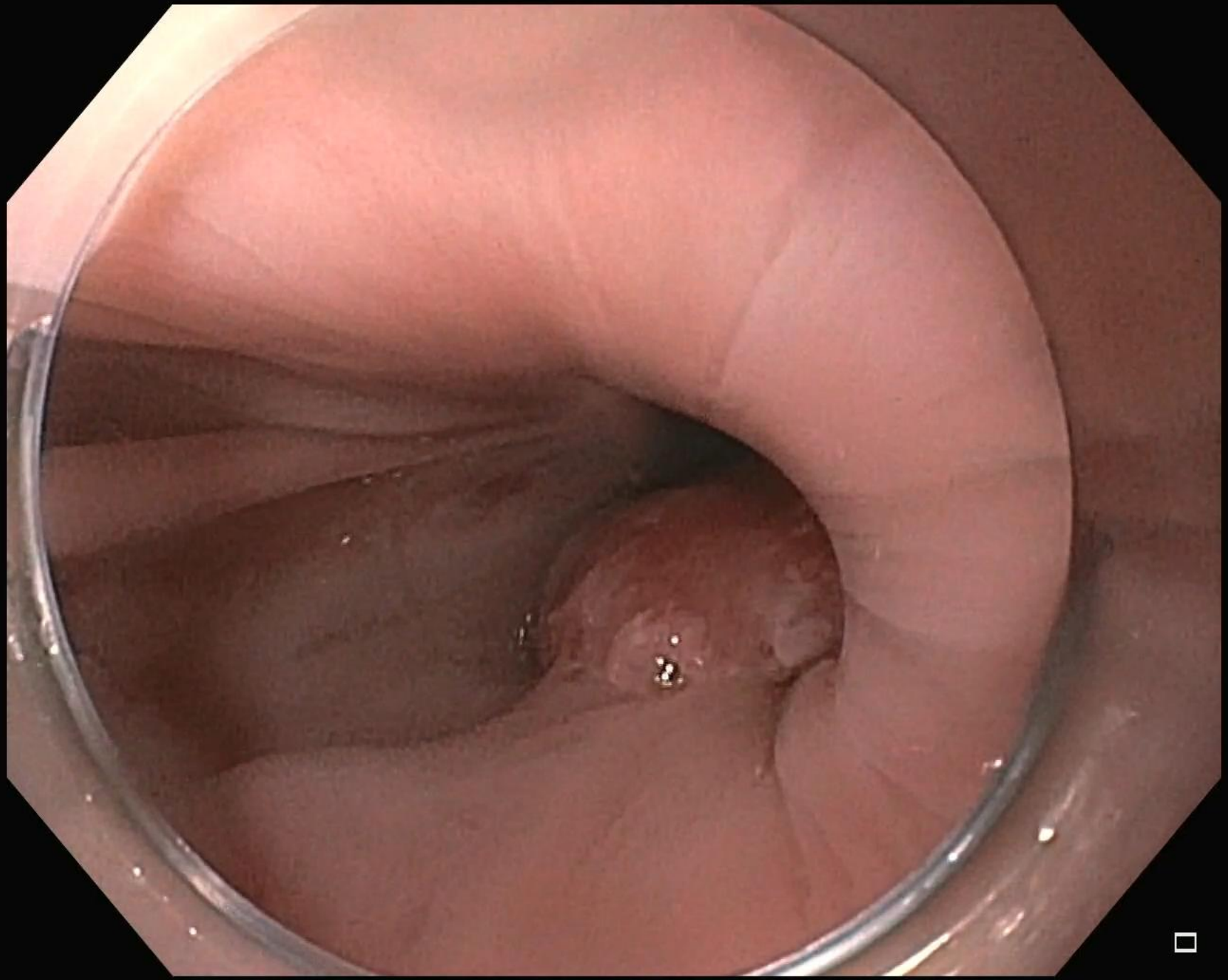


Path Photo Courtesy of Dr. Purva Gopal

Case 2

- 54 yo M with PMH Barrett’s esophagus, Hodgkin's lymphoma and ITP who was noted on OSH EGD to have a fungating mass at 35-37 cm from the incisors, involving the gastroesophageal junction
  - Biopsy with Invasive moderately differentiated adenocarcinoma in background of Barretts with high grade dysplasia
- Referred to UTSW Surgical Oncology for consideration of esophagectomy
- Referred from Surgical Oncology to our clinic to evaluate for ESD



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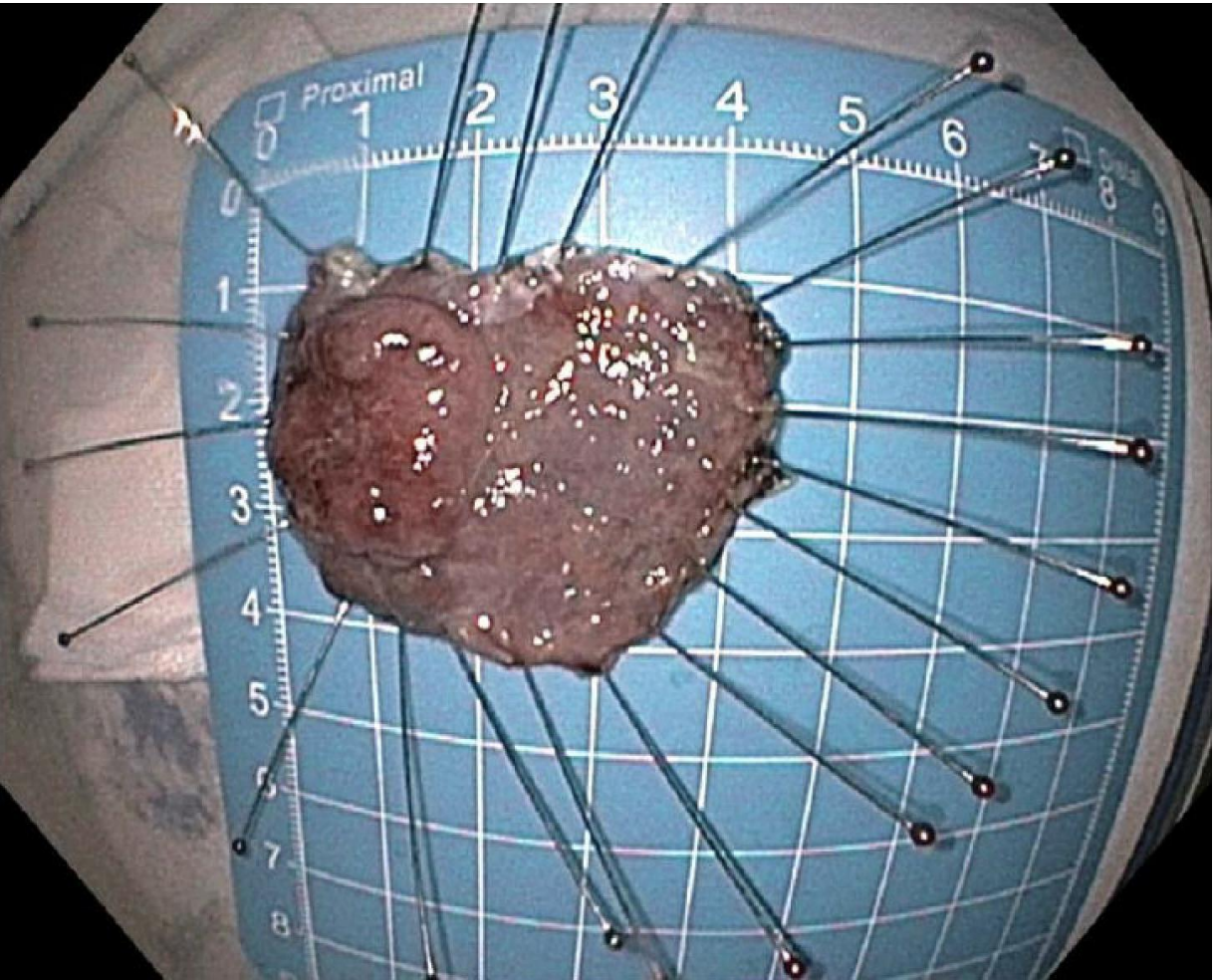

Pathology:

- Intramucosal adenocarcinoma in the background of dysplasia and Barrett's esophagus
- Margin is negative for dysplasia or carcinoma

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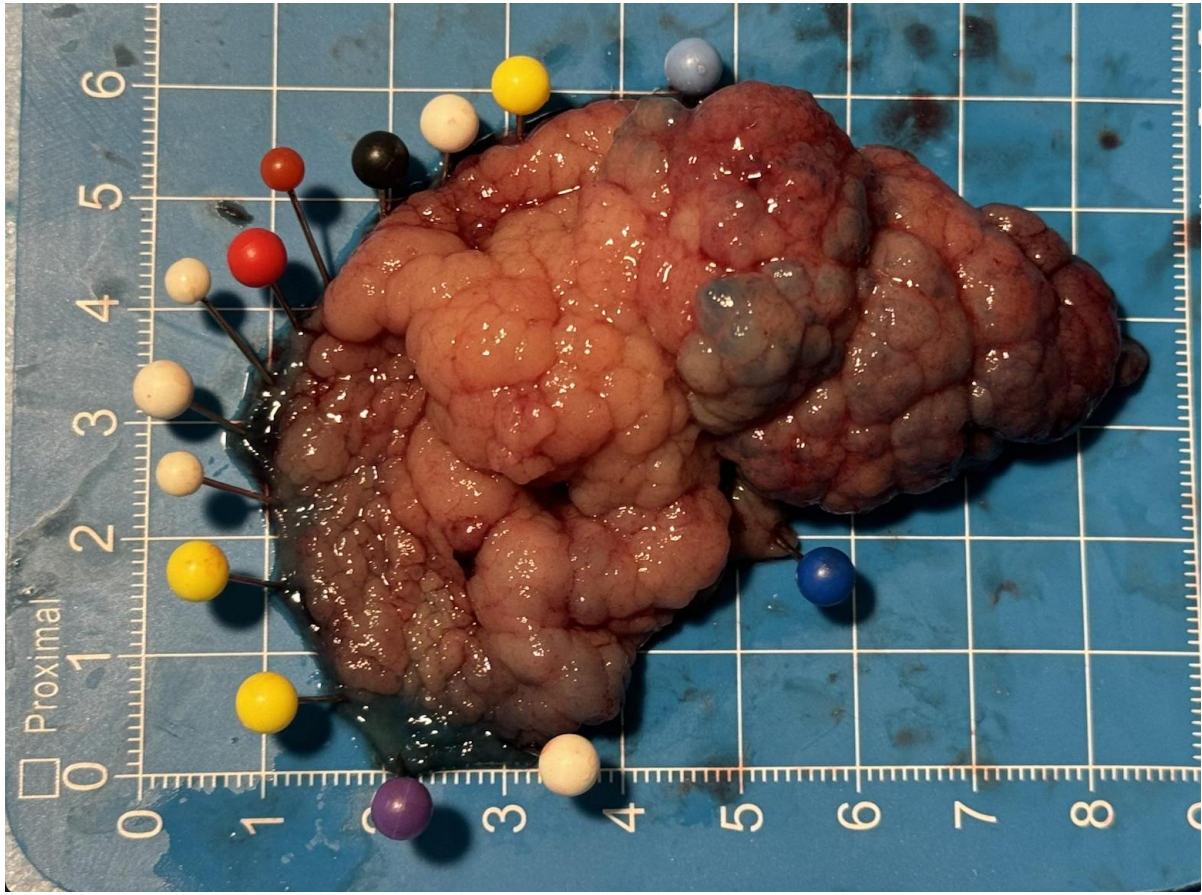

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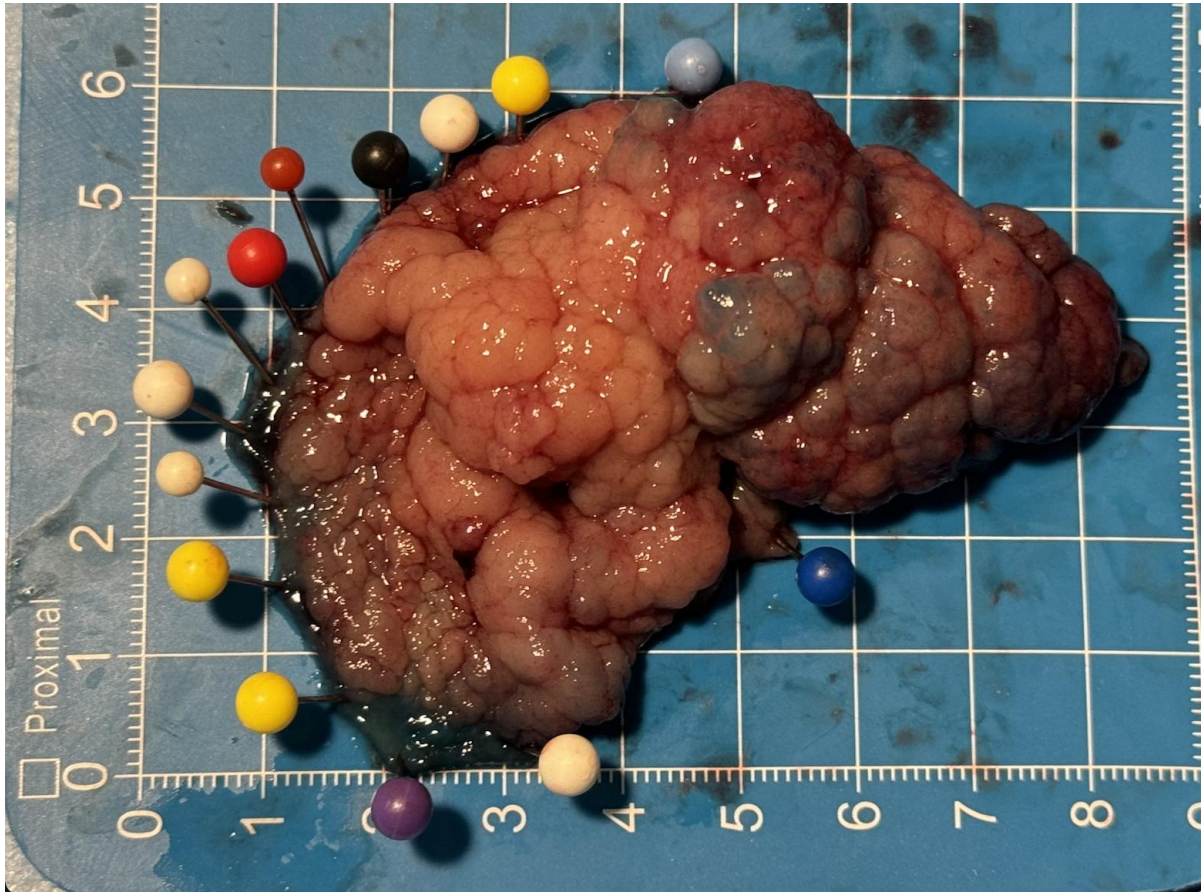

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Esophageal EMR vs ESD

- Multicenter Retrospective Study Across 8 Academic Centers (7 in US, 1 in Brazil)
- Endoscopic Resection of advanced lesions in Barrett's (HGD & Adenocarcinoma)
  - Compared EMR vs ESD
- Curative Resection Rates: 31% EMR vs 64% ESD ($p < 0.001$)
- No significant difference in perforation or bleeding rates

Endoscopic submucosal dissection vs. endoscopic mucosal resection for early Barrett's neoplasia in the West: a retrospective study

Mejia Perez et al. Endoscopy 2022

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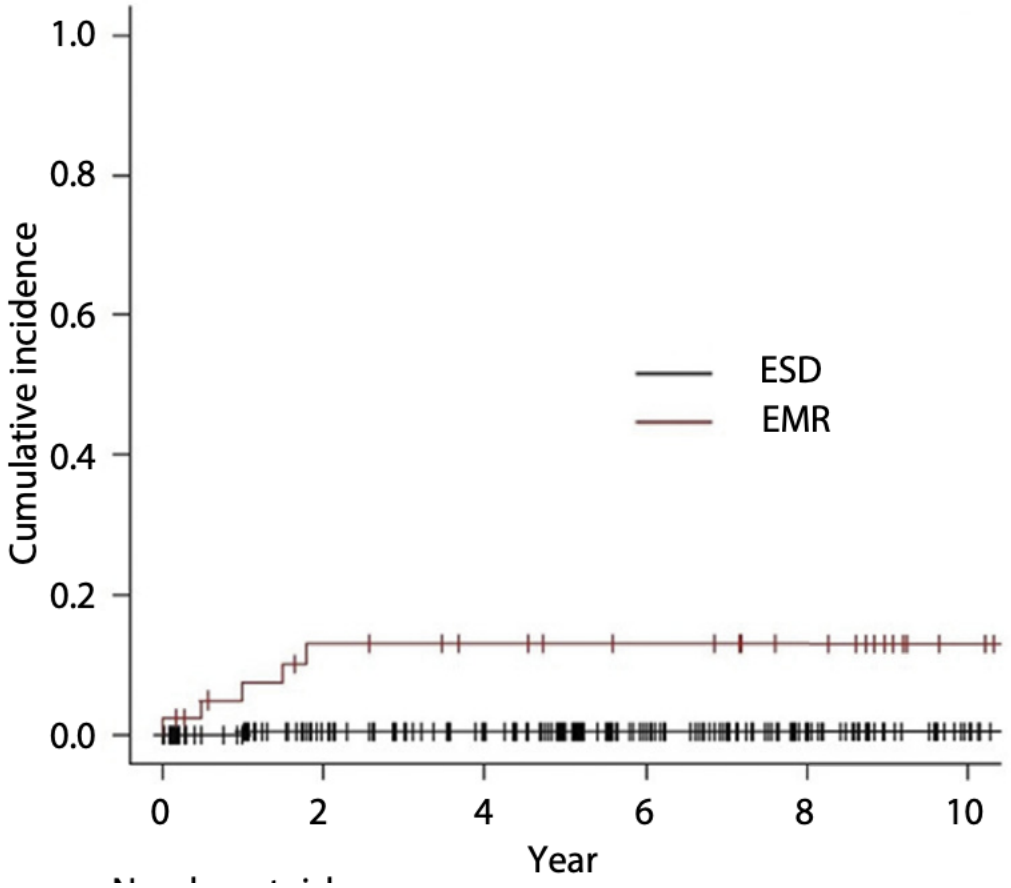
Esophageal EMR vs ESD



- Retrospective multicenter study from Japan
- Looked at all GEJ adenocarcinomas that underwent endoscopic resection (EMR or ESD) and monitored for local recurrence rates

5 Year Cumulative Incidence of Local Recurrence:

13% EMR vs 0.5% ESD (p<0.001)

Abe S et al. GIE 2019

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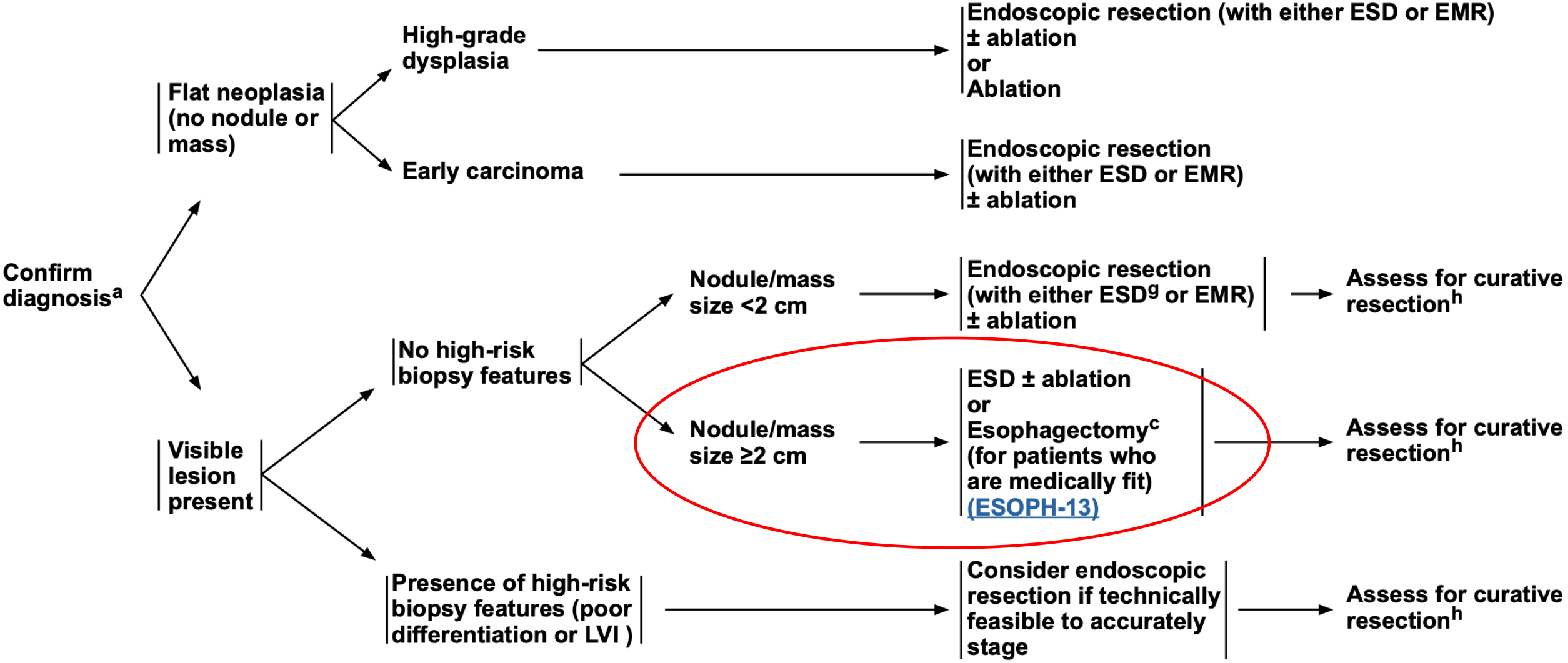
NCCN Guidelines Version 5.2024
Esophageal and Esophagogastric Junction Cancers

PRINCIPLES OF ENDOSCOPIC STAGING AND THERAPY

Endoscopic Therapy for Early-Stage Esophageal High-Grade Dysplasia (HGD)/Adenocarcinoma[5,6]



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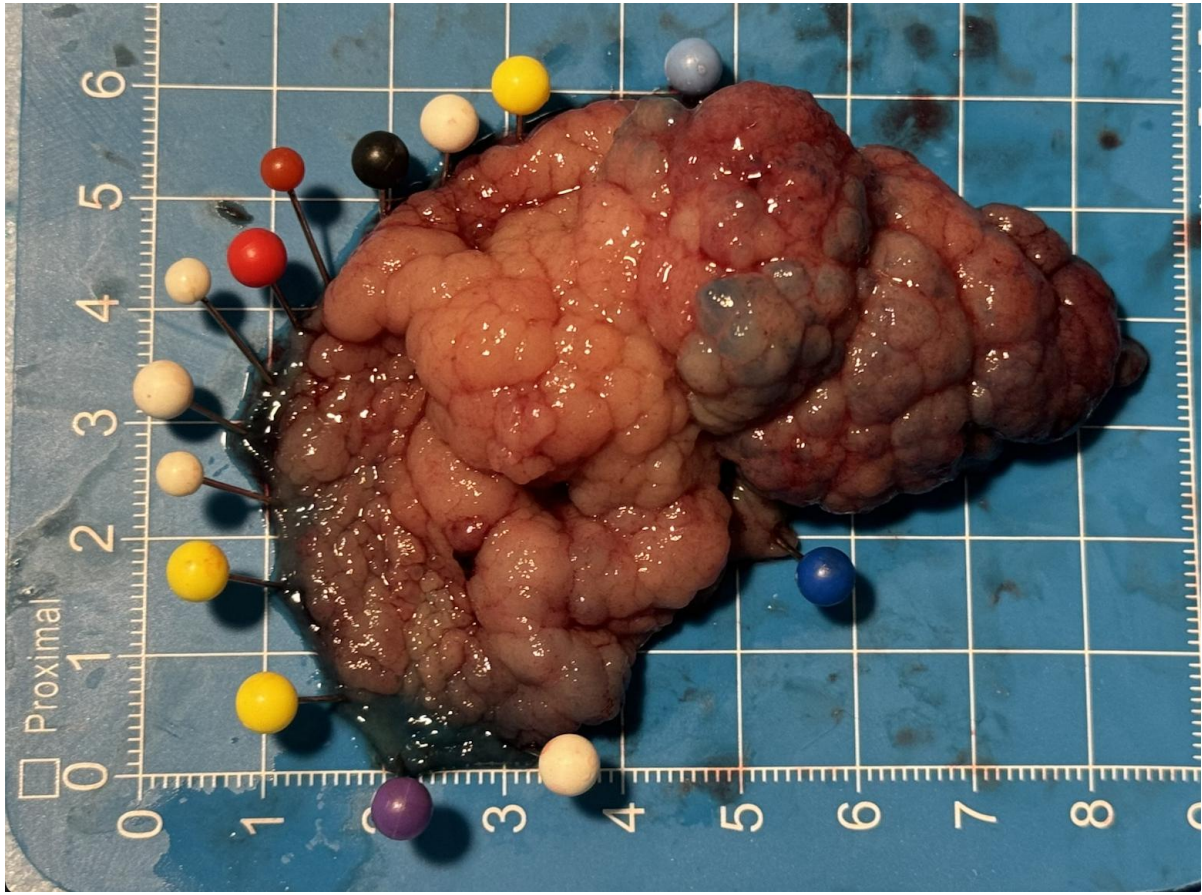

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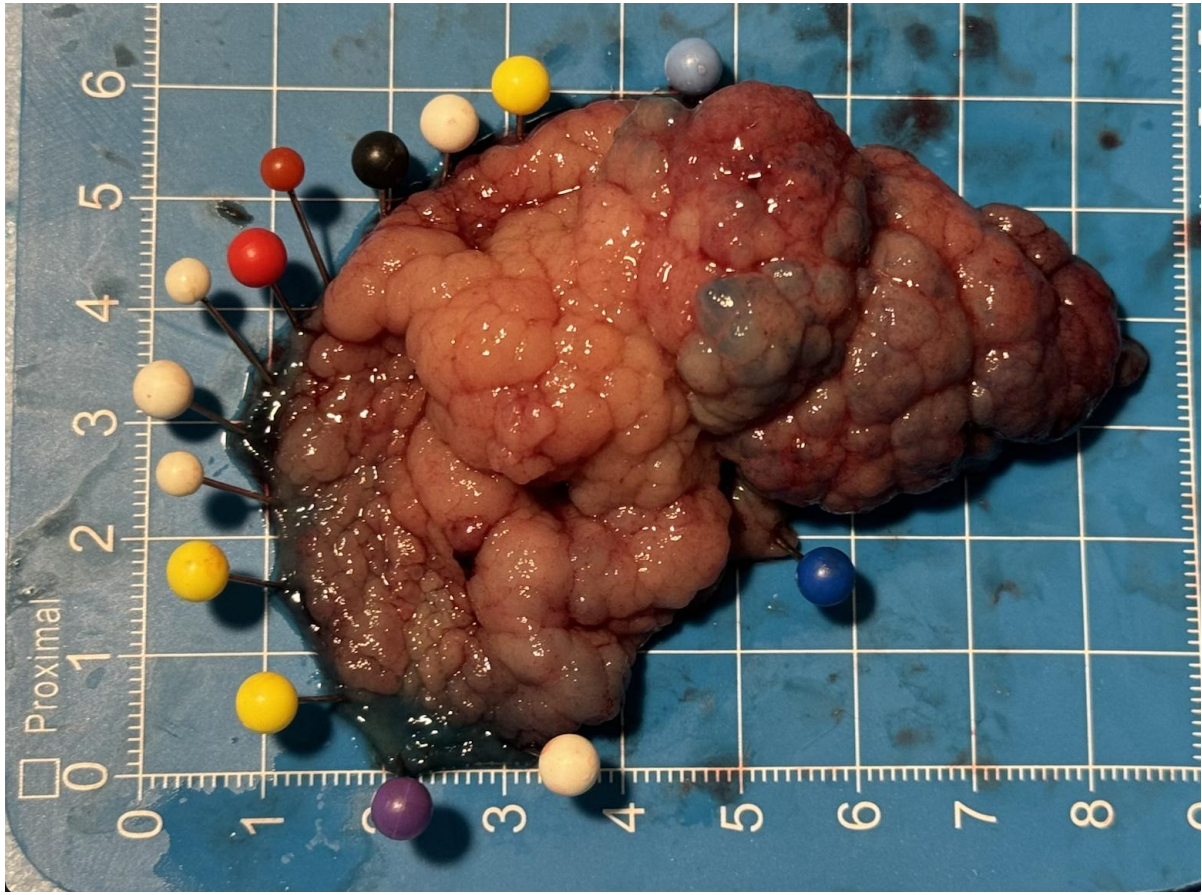

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Case 3

- 62 yo F with h/o CAD (s/p open heart surgery 2021 and porcine valve, on ASA & Plavix), PAD, SLE, gastric sleeve who underwent EGD at OSH with concern for a malignant tumor in the prepyloric region
  - Biopsy positive for at least intramucosal adenocarcinoma
  - EUS at OSH suggestive of invasion into the submucosa

- Referred to UTSW Surgical Oncology Clinic

- Referred from Surgical Oncology to our clinic for consideration of ESD

Case 3

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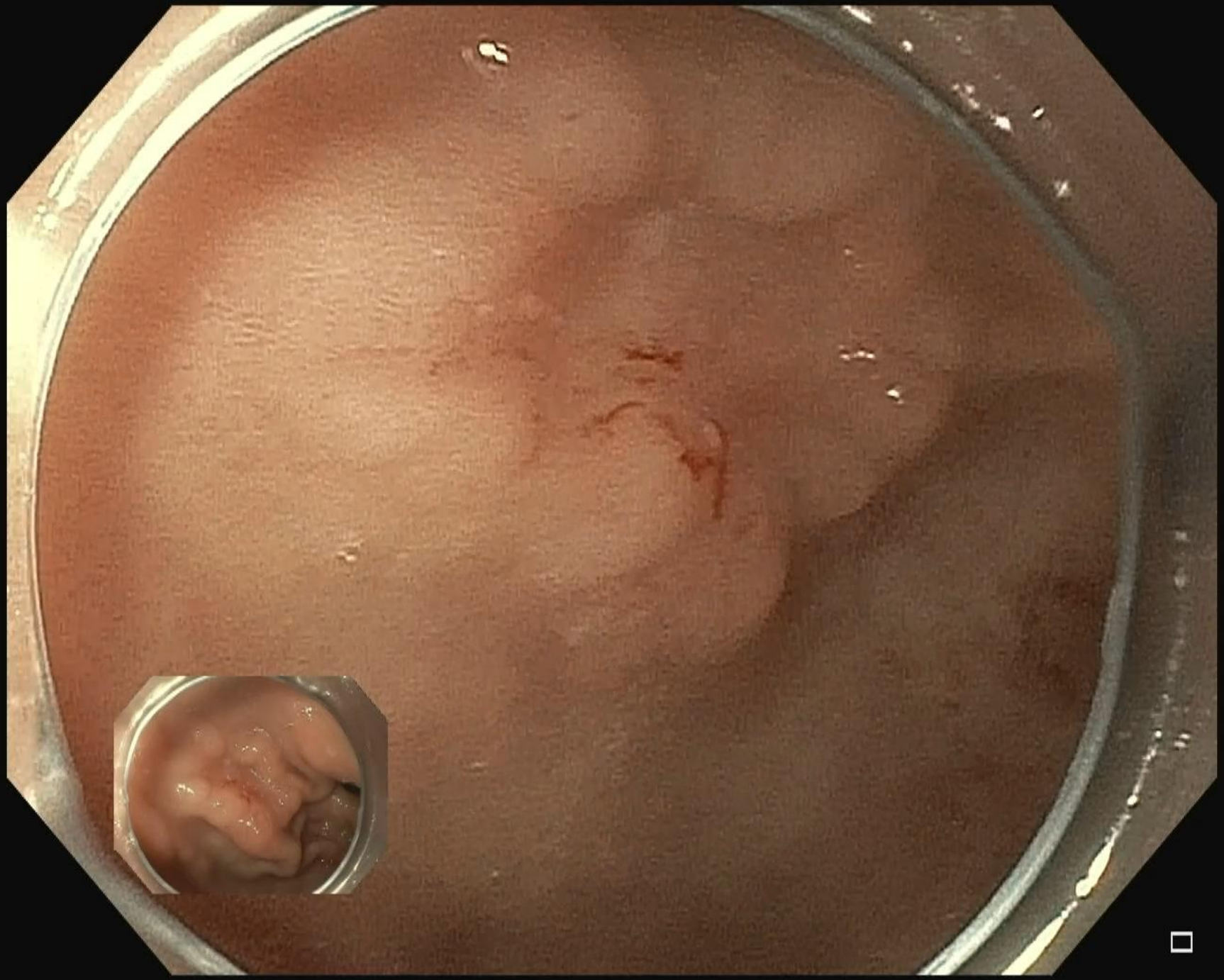

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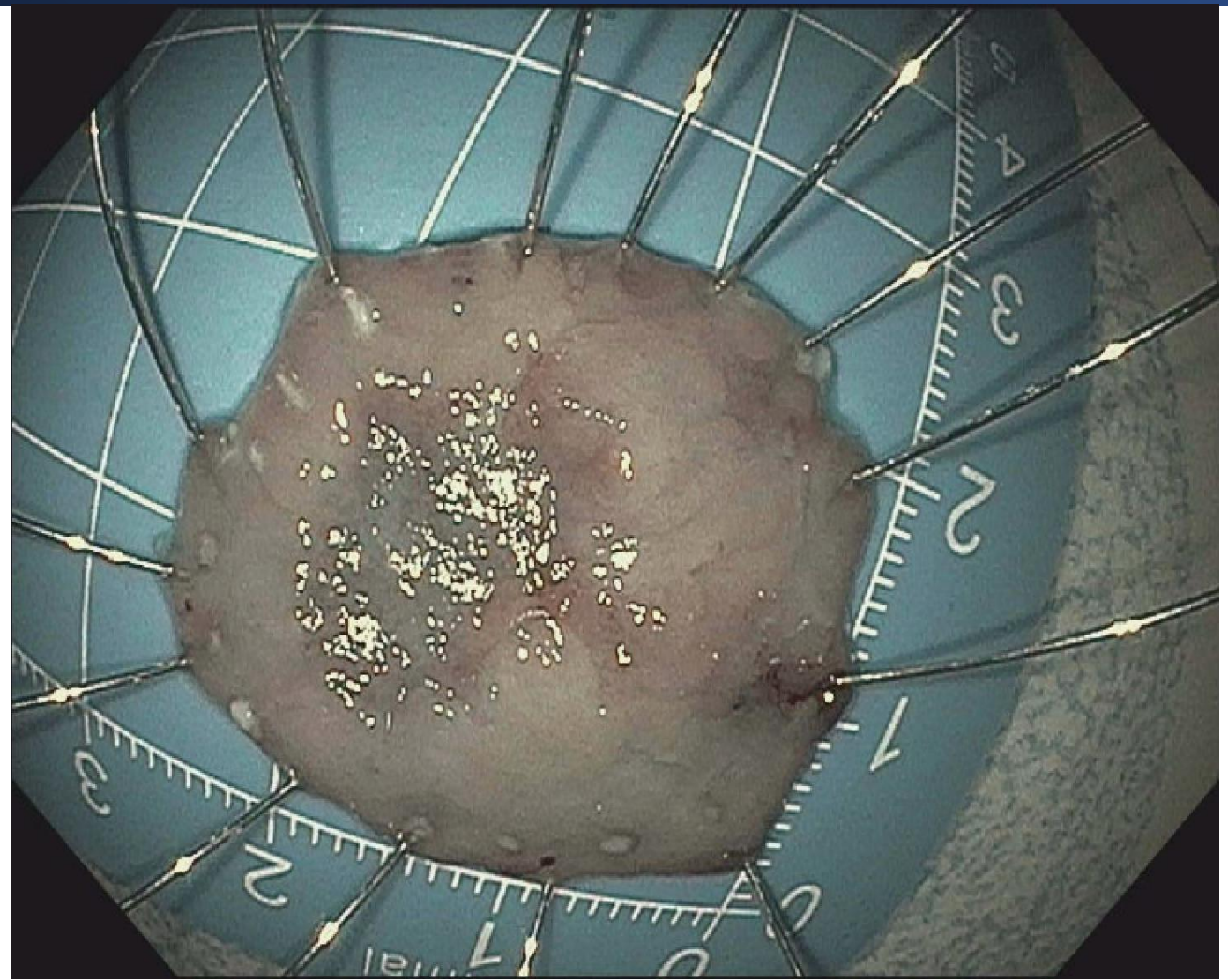


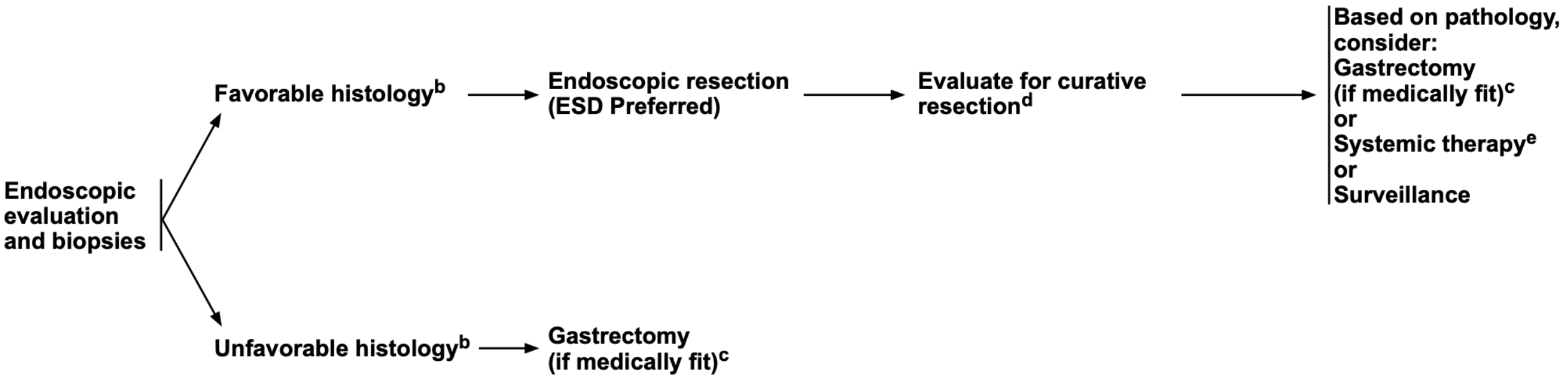
Pathology:

- Invasive adenocarcinoma, well to moderately differentiated, arising in the background of intestinal metaplasia with high-grade dysplasia
- Tumor invades submucosa
- Lateral and deep margins of resection negative for dysplasia and/or carcinoma

- Slides reviewed with pathology in tumor board and confirmed < 500 microns invasion into submucosa

PRINCIPLES OF ENDOSCOPIC STAGING AND THERAPY

Endoscopic Therapy for Early-Stage Gastric Adenocarcinoma[a,9,10]



[a] Endoscopic features suggestive of deep submucosal invasion include converging folds, irregular surface pattern, and ulceration in a large gastric mass.
[b] Unfavorable histologic features include: poorly differentiated or diffuse type (compared to intestinal) histology.
[c] Principles of Surgery (GAST-C).
[d] The resected endoscopy specimen should be evaluated by a pathologist with expertise in gastrointestinal pathology. Curative endoscopic resection features include: submucosal invasion <500 µm, but without poorly or undifferentiated pathology, and without lymphovascular invasion.

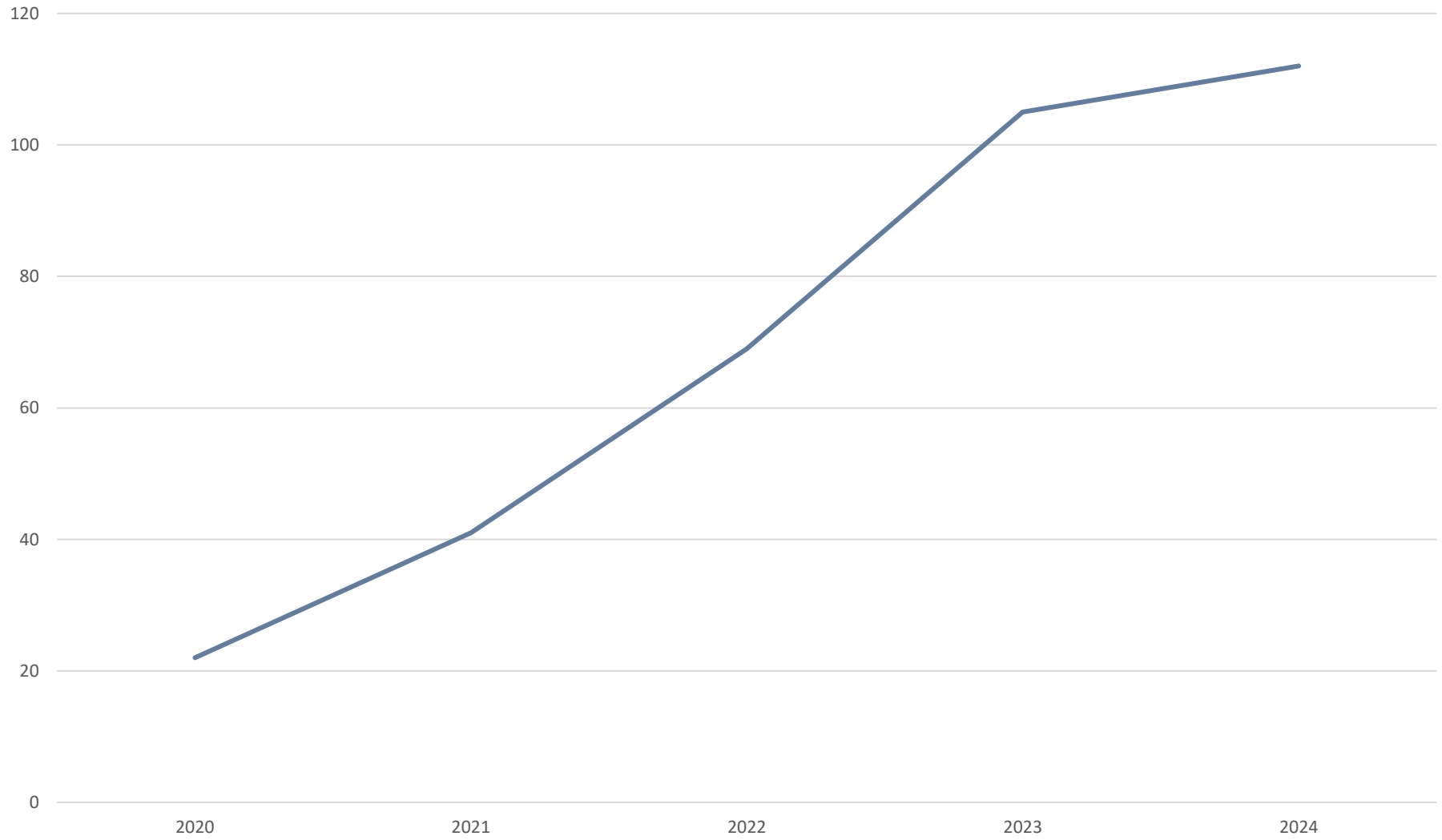
Potential Barriers to ESD

- Lack of Dedicated Billing Code
- Very Time Intensive & Highly Technical
- Steep Learning Curve

My ESD Training

- Observation of Cases During Advanced Endoscopy Fellowship
- Basic ESD Course in San Diego with explant pig stomachs x 2
- Live Pig Labs x 4 at UTSW
- Advanced ESD Course in Orlando x 2
- Training & Proctoring with Increasing Independence over 2.5 Years
- Visiting Japanese Experts x 3

ESD Volumes at UT Southwestern



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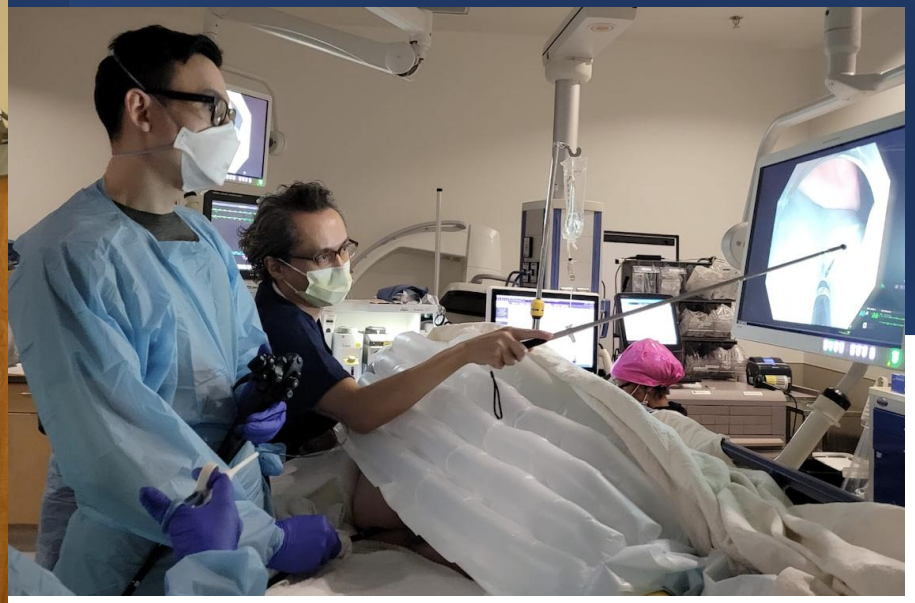

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Bonus Case

- 73 yo AAM with h/o ESRD on HD, HCV Cirrhosis, HLD, HTN who presented with hypoxic respiratory failure (now resolved) but since noted to have elevated LFTs.
- AST 182, ALT 53, Alk Phos 146, T bili 10
- Blood cultures: E. coli bacteremia
- CT with filling defect concerning for choledocholithiasis

ERCP

Final Diagnosis

A. Gastric polyp, biopsy:
-Invasive adenocarcinoma, moderately to poorly differentiated, intestinal type, arising from high-grade dysplasia

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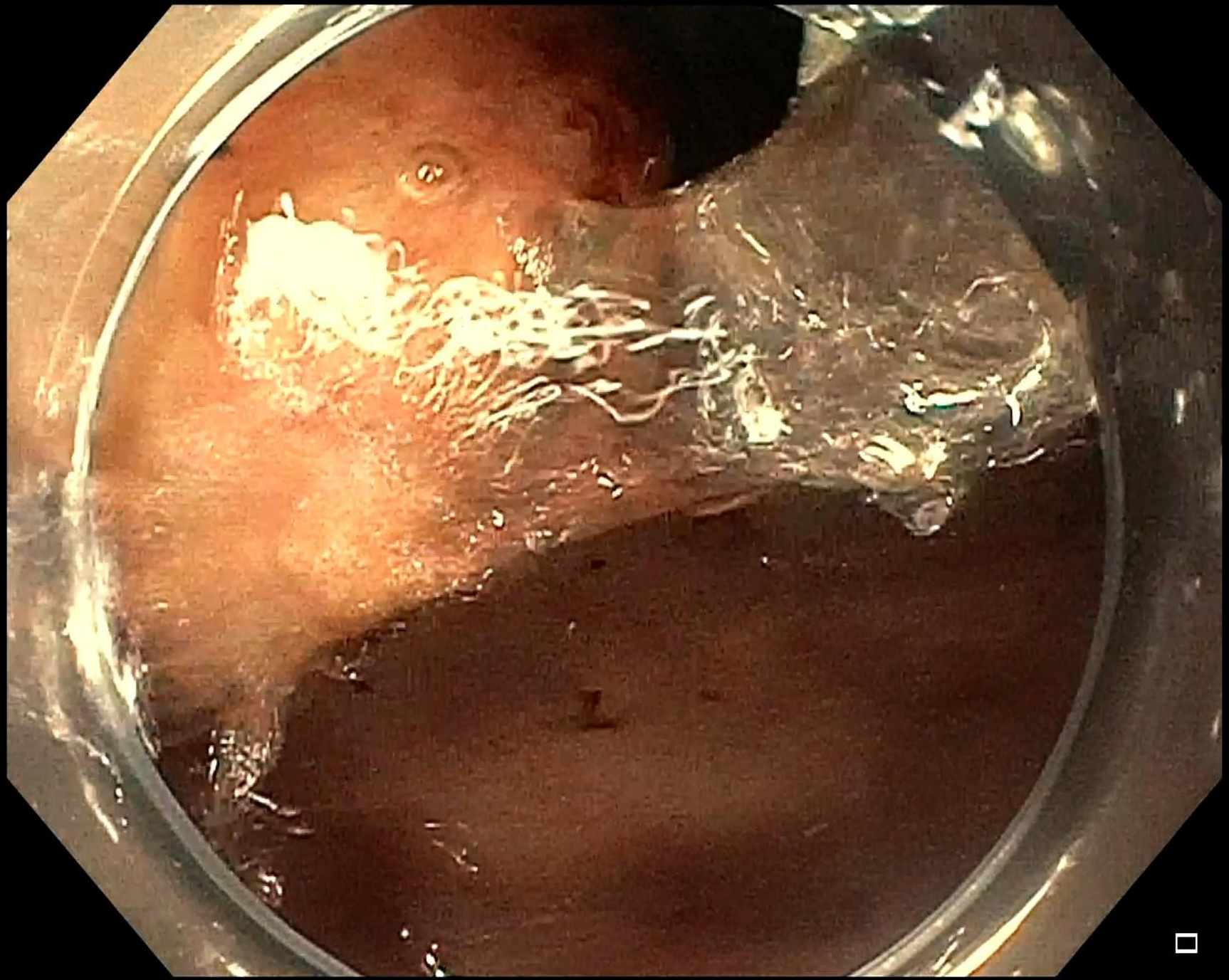
Japanese Gastric Cancer Guidelines

Depth	Ulceration		Differentiated type		Undifferentiated type	
M	UL0	Tumor diameter	≤ 2cm	> 2cm	≤ 2cm	> 2cm
		Incidence of nodal metastasis	0% (0/437)	0% (0/493)	0% (0/310)	2.8% (6/214)
		95% confidence interval	0~0.7%	0~0.6%	0~0.96%	1.0~6.0%
	UL1	Tumor diameter	≤ 3cm	> 3cm	≤ 2cm	> 2cm
		Incidence of nodal metastasis	0% (0/488)	3.0% (7/230)	2.9% (8/271)	5.9% (44/743)
		95% confidence interval	0~0.6%	0.3~9.0%	1.2~5.7%	4.3~7.9%
SM1		Tumor diameter	≤ 3cm	> 3cm	Any diameter	
		Incidence of nodal metastasis	0% (0/145)	2.6% (2/78)	10.6% (9/85)	
		95% confidence interval	0~2.6%	0.3~9.0%	5.0~19.2%	

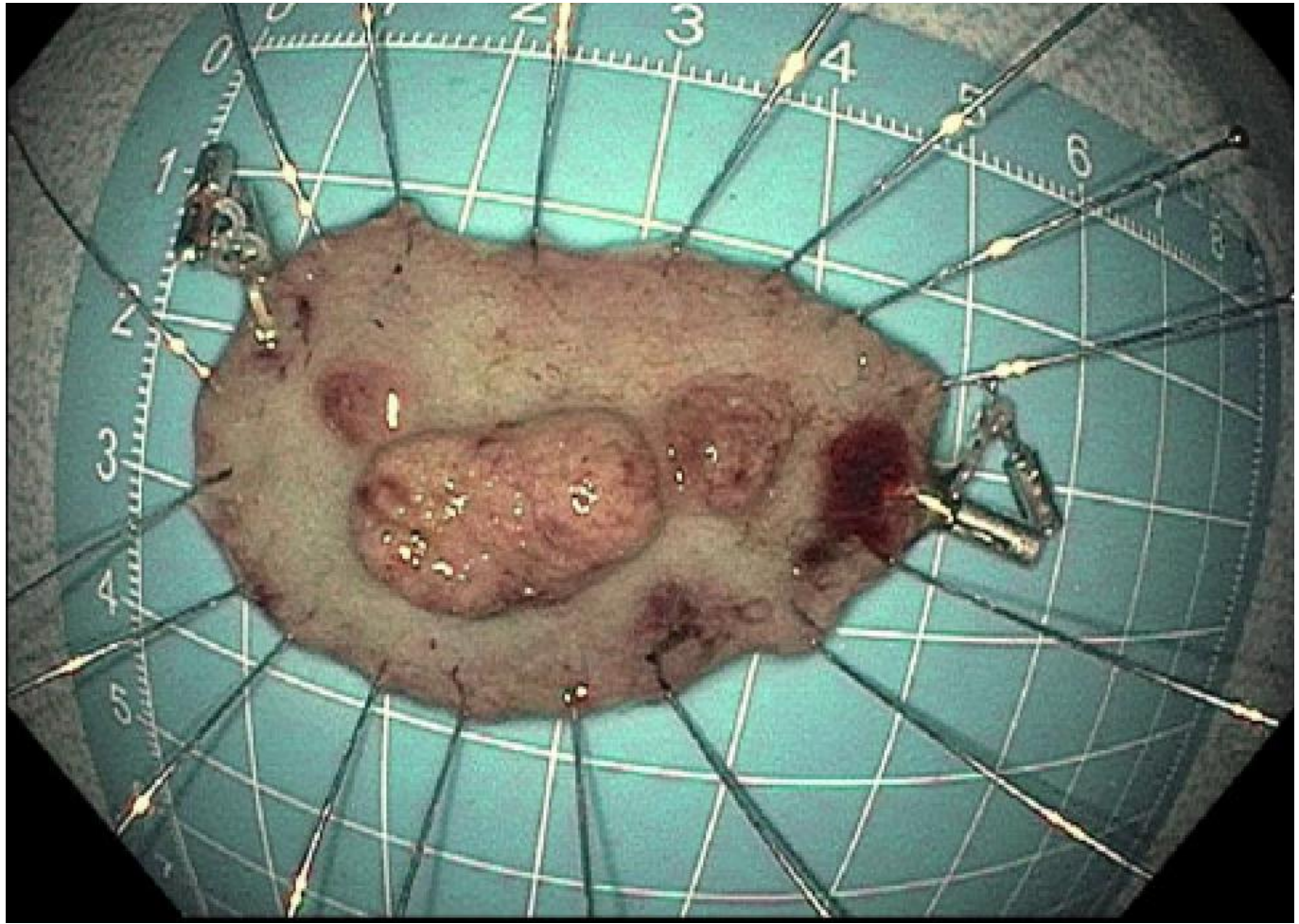
Green zone indicates absolute indication for endoscopic resection, yellow zone indicates expanded indication and red zone indicates relative indication

- Japanese Gastric Cancer Association. Japanese Gastric Cancer Treatment Guidelines 2021 (6th edition). Gastric Cancer. 2023 Jan;26(1):1-25. doi: 10.1007/s10120-022-01331-8. Epub 2022 Nov 7. PMID: 36342574; PMCID: PMC9813208.



Final Diagnosis

A. Stomach, mass, endoscopic submucosal dissection:
– Intramucosal adenocarcinoma, moderately differentiated, intestinal type, arising in a background of gastric adenoma with high-grade dysplasia. (See comment and synoptic form)
– Lateral (peripheral) margin, negative for dysplasia and/or carcinoma (clearance of 10 mm).
– Submucosal base negative for carcinoma (clearance of 2.2 mm).
– Background gastric mucosa with intestinal metaplasia.



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