Endoscopic Advances in Gastrointestinal Oncology

Ishfaq Bhat MD, FASGE

Gastroenterology and Hepatology

University of Nebraska Medical Center

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Disclosures

- No financial disclosures

- Some endoscopic indications may be off label

Objectives

- Review the ***current endoscopic modalities*** available for GI oncology patients in line with NCCN recommendations
- Discuss ***enhanced endoscopy, endoscopic resection, cholangio-pancreatoscopy*** *and* ***interventional EUS*** *procedures* as advancements in management
- Understand the ***multidisciplinary effort*** in management of such patients

The Gastrointestinal Cancers

- Esophageal and EG junction cancer
- Gastric cancer
- Hepatobiliary cancer
- Pancreatic cancer
- Small bowel cancer
- Colon cancer
- Rectal cancer

Nccn.org

Esophageal and EGJ cancers

- **Diagnosis:**

-HDWLE: Mass-location/length/circumference/Siewert class/ Barrett's assessment

-NBI: High risk features (Barrett's, squamous dysplasia)

-Mucosal Biopsies

-Endoscopic Resection

- **Staging**

-EUS: T and N designation

-ER of lesions up to 2 cms, for depth

-EUS FNA of mediastinal/perigastric nodes

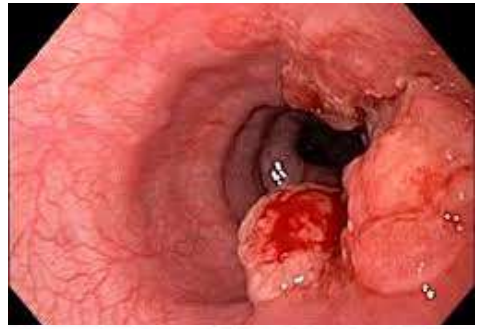
- **Treatment**

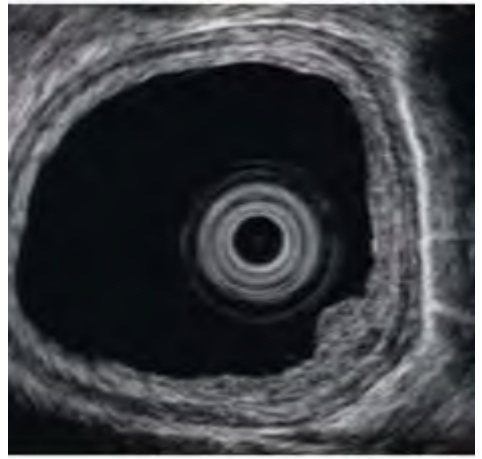
-Primary Rx- Resection and ablation

-Symptoms: Dilation/stenting and feeding gastrostomy/jejunostomy

- **Surveillance**

-Post surgery/resection/ablation





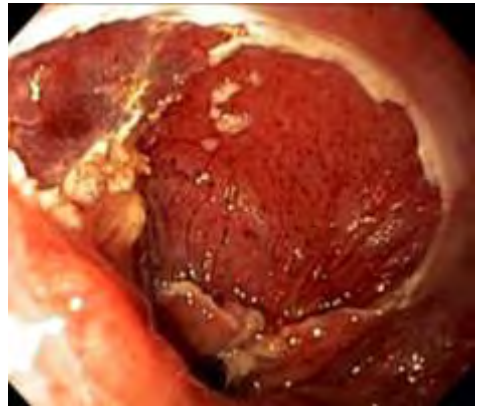
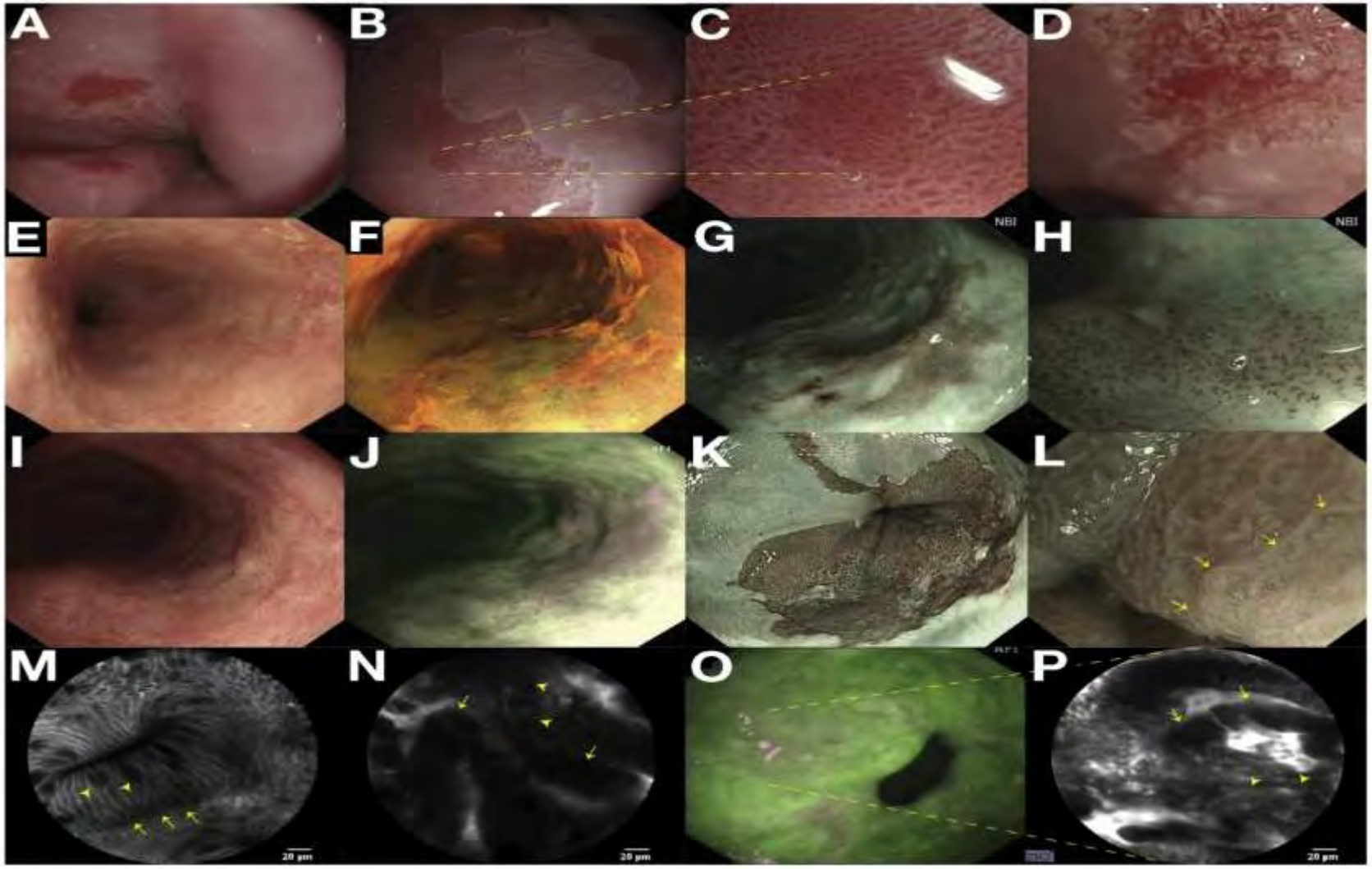


Image Enhanced Endoscopy

- Better detection and characterization of ***pre-neoplastic lesions and early neoplasia***
- Mucosal and vascular pattern may correlate ***to depth of lesion***
- Early detection may lead to ***earlier treatment and better survival***

Advanced Endoscopic Imaging

- *Dye based, Optical and electronic*



diPetro et al Endoscopic Management of Early Adenocarcinoma and Squamous Cell Carcinoma of the Esophagus: Gastroenterology 2018

Evidence for Advanced Imaging Modalities in Detection of Esophageal HGD or Early Cancer

Technique	Type	Disease	Endoscopy features	Sensitivity and specificity[a]	Evidence quality (grade)
Acetic acid (2.5%)	Conventional Chromo	Early EA	Loss of aceto-whitening Irregular mucosal pit	Sens: 92%– 96.6% Spec: 84%–94.6%	Low
Lugol (2%–3%)	Conventional Chromo	Early ESCC	Lugol voiding lesion >5 mm Pink sign	Sens: 80%–100% Spec: 64%– 94%	Moderate
NBI	Electronic Chromo	Early EA	Irregular mucosal pit and microvasculature	Sens: 91%–94.2% Spec: 85%–94.4%	High
		Early ESCC	Brownish area Irregular IPCLs	Sens: 82%–88% Spec: 75%–95%	Moderate
AFI	Electronic Chromo	Early EA	Red/magenta within green background	Sens: 79%–83% Spec: 46%	High
		Early ESCC	Red/magenta within green background	Sens: NA Spec: NA	Low
CLE	Endoscopic microscopy	Early EA	Cellular and architectural changes	Sens: 90%: 95% Spec: 67%–92%	High
		Early ESCC	Surface maturation score IPCL and cell morphology	Sens: 94%– 95.7% Spec: 90%	Low

diPetro et al Endoscopic Management of Early Adenocarcinoma and Squamous Cell Carcinoma of the Esophagus: Screening, Diagnosis, and Therapy Gastroenterology 2018

Endoscopic Resections

-Curative:

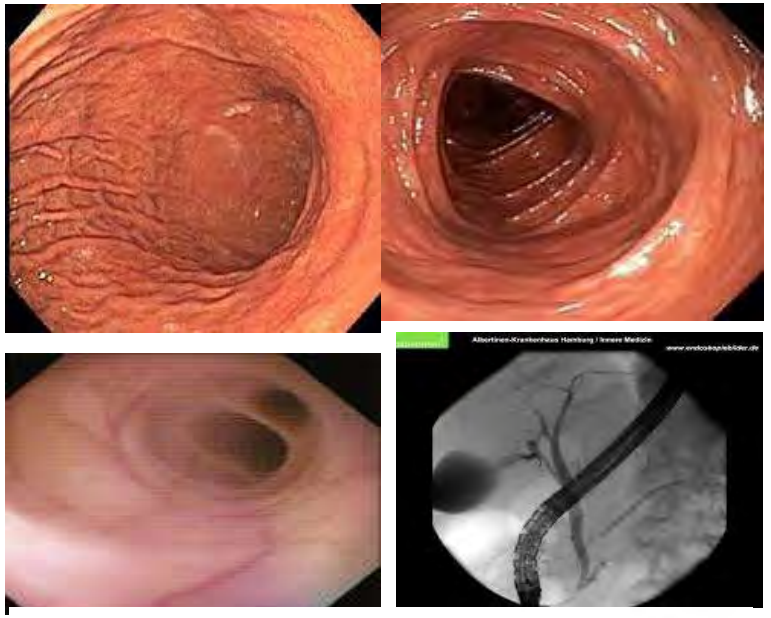
- Endoscopic Mucosal Resection (EMR)
- **Endoscopic submucosal dissection (ESD)**
- Endoscopic Full thickness resection (EFTR) (precancer lesions)
- Submucosal Tunneling and endoscopic resection (STER) (non cancer tumors)

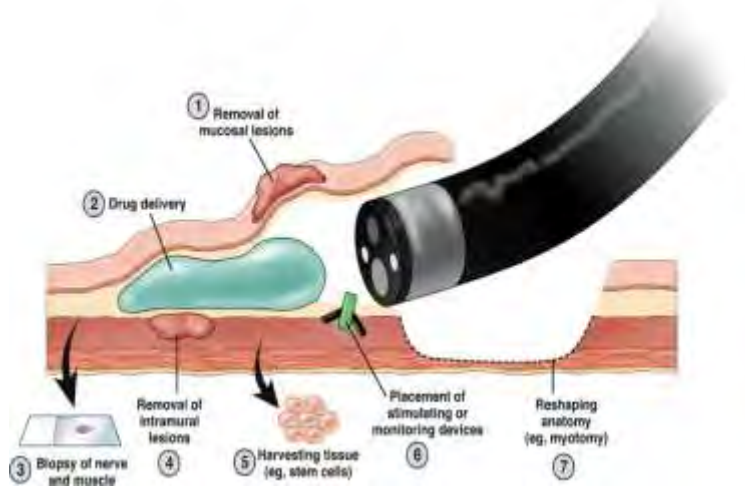
-Palliative:

- Endoscopic RFA
- Endoscopic Cryotherapy
- Endoscopic debulking

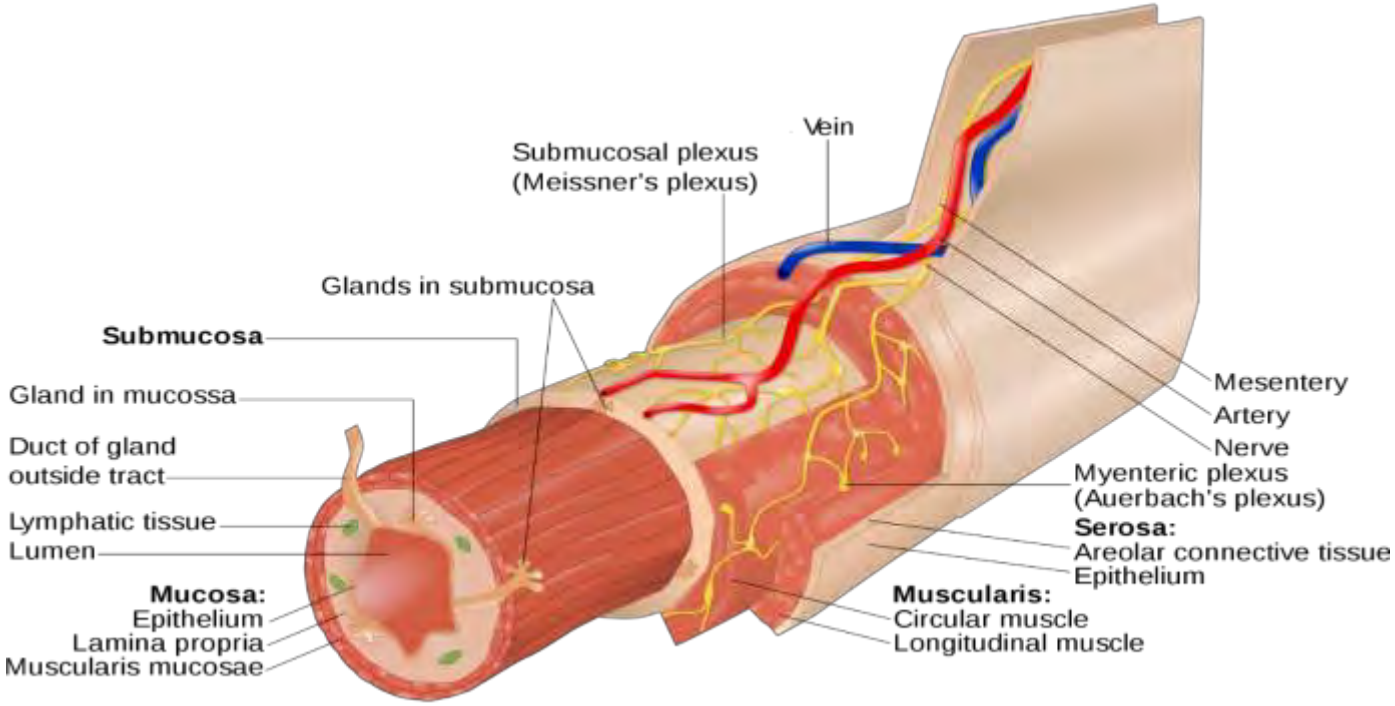
The Third Space

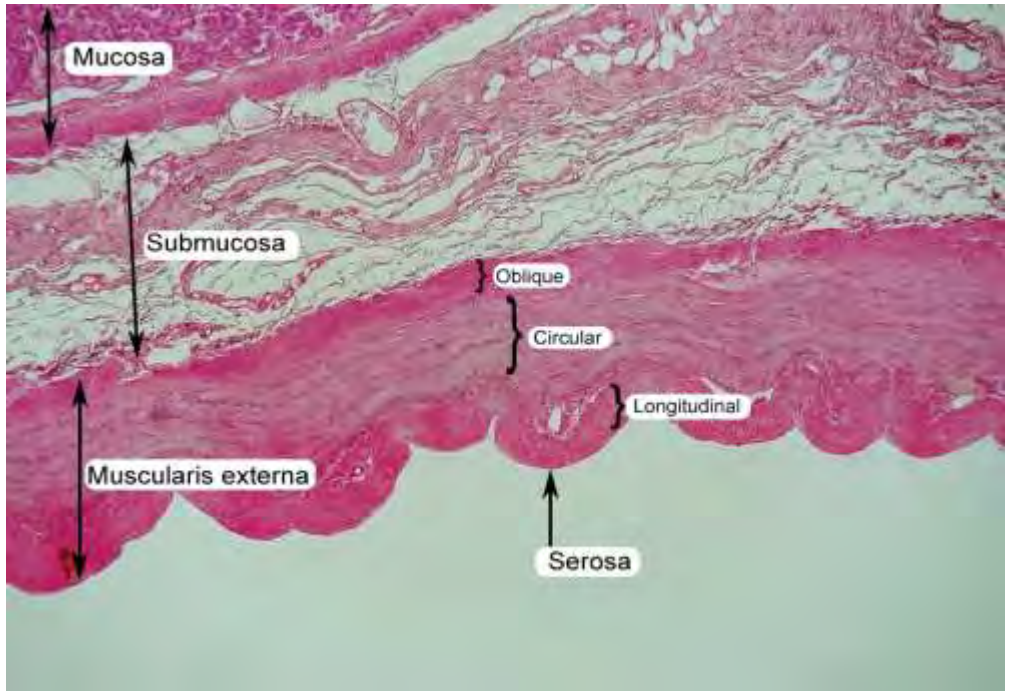
- First space: *GI luminal endoscopy*
- Second space: *Pancreato-biliary endoscopy*
- Third space: **Intramural (Submucosal) Endoscopy**



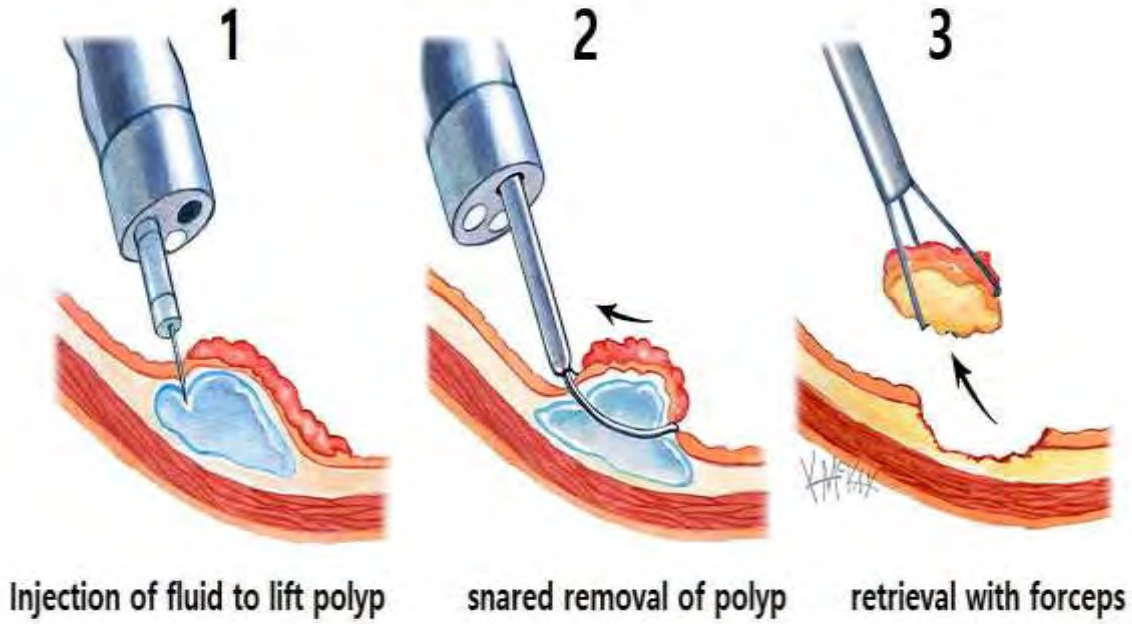


The *Submucosa*

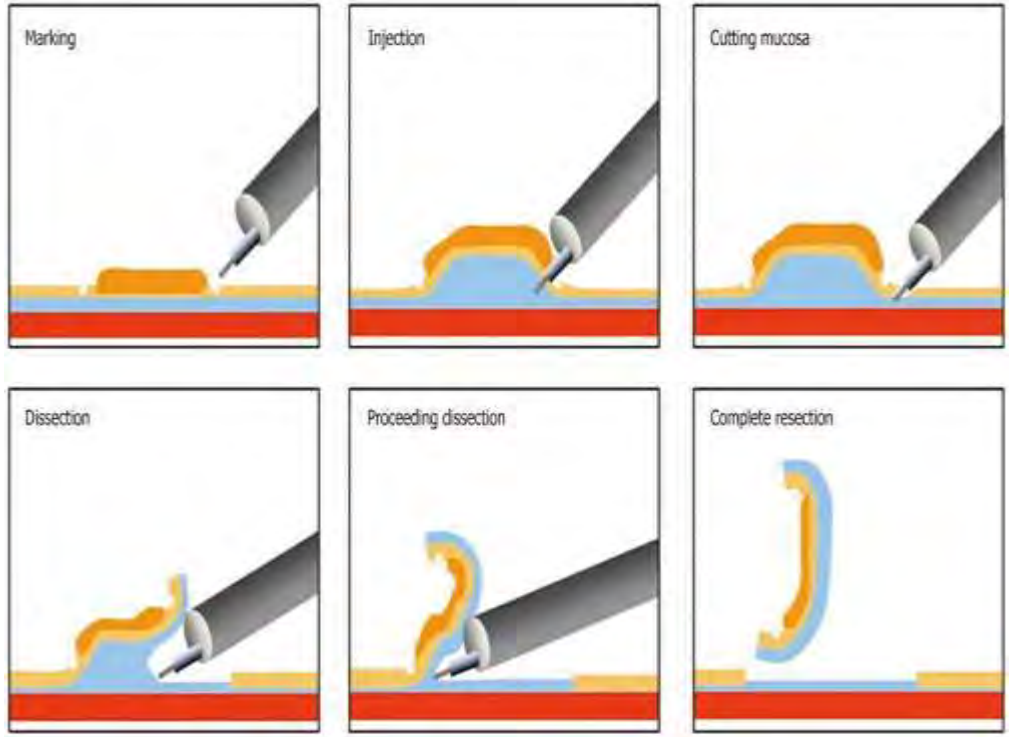




Endoscopic Resection (ER)

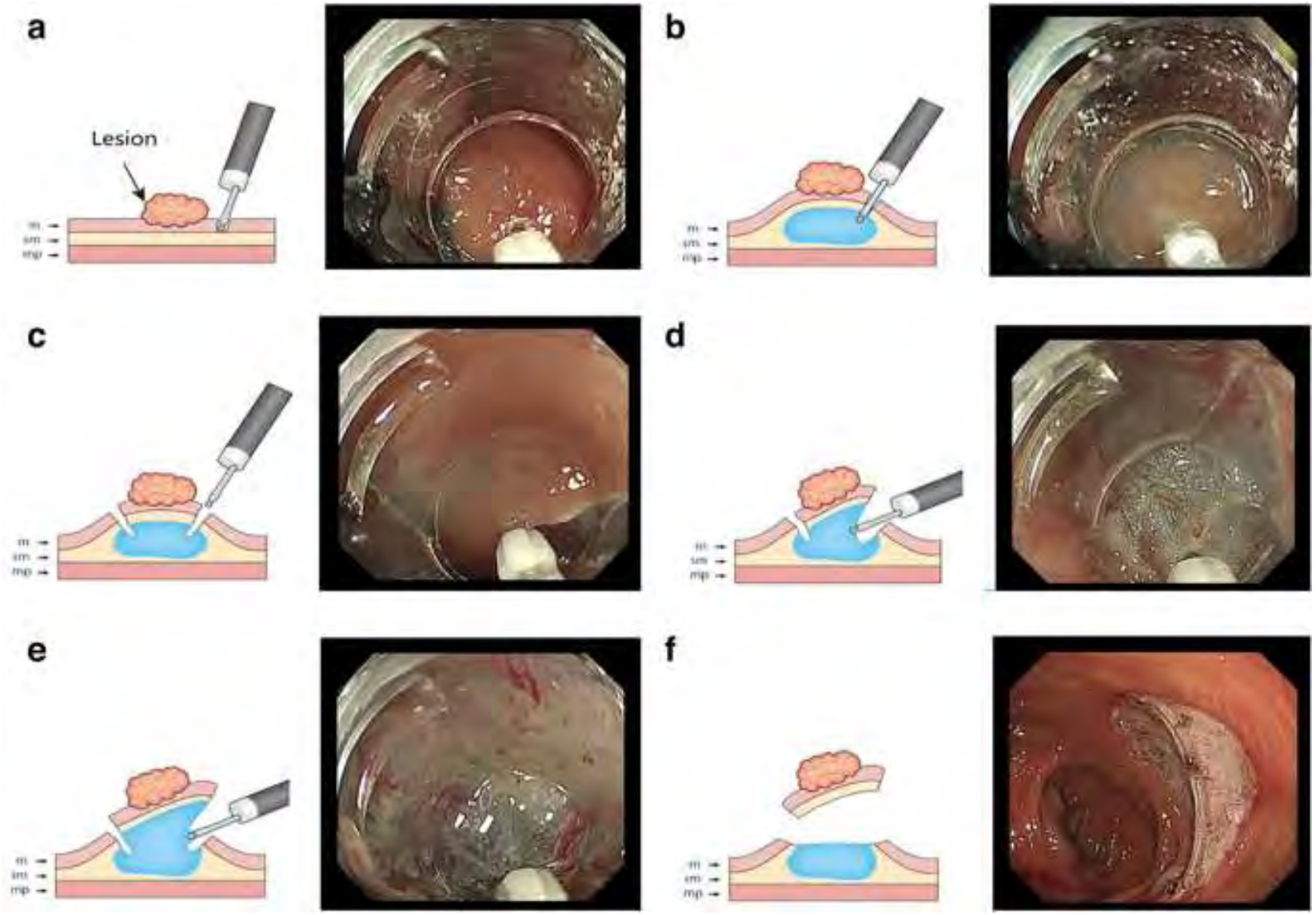


Endoscopic Mucosal Resection

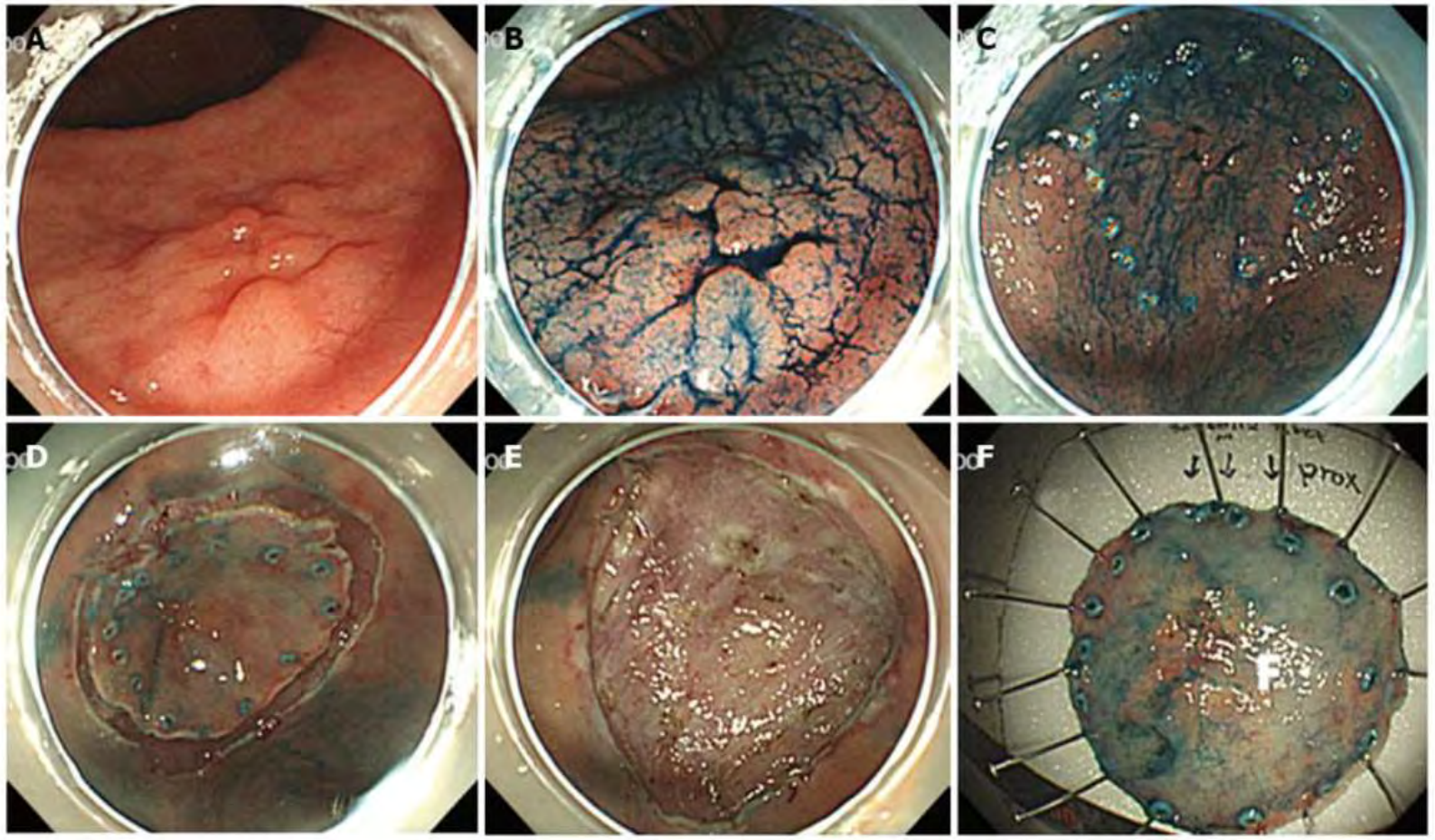


Endoscopic Submucosal Dissection

Endoscopic Submucosal Dissection



Endoscopic Submucosal Dissection (ESD)



Yang Won Min et al; World J Gastroenterol. Apr 28, 2014; 20(16): 4566-4573

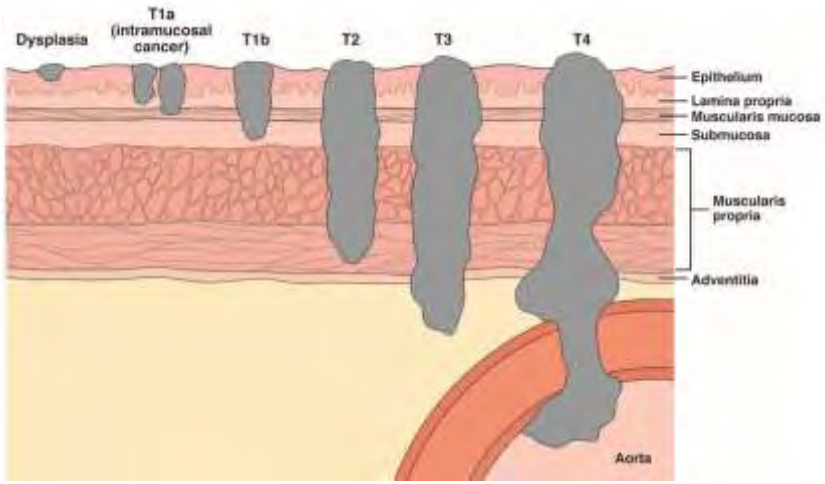
Outcomes of ESD vs EMR

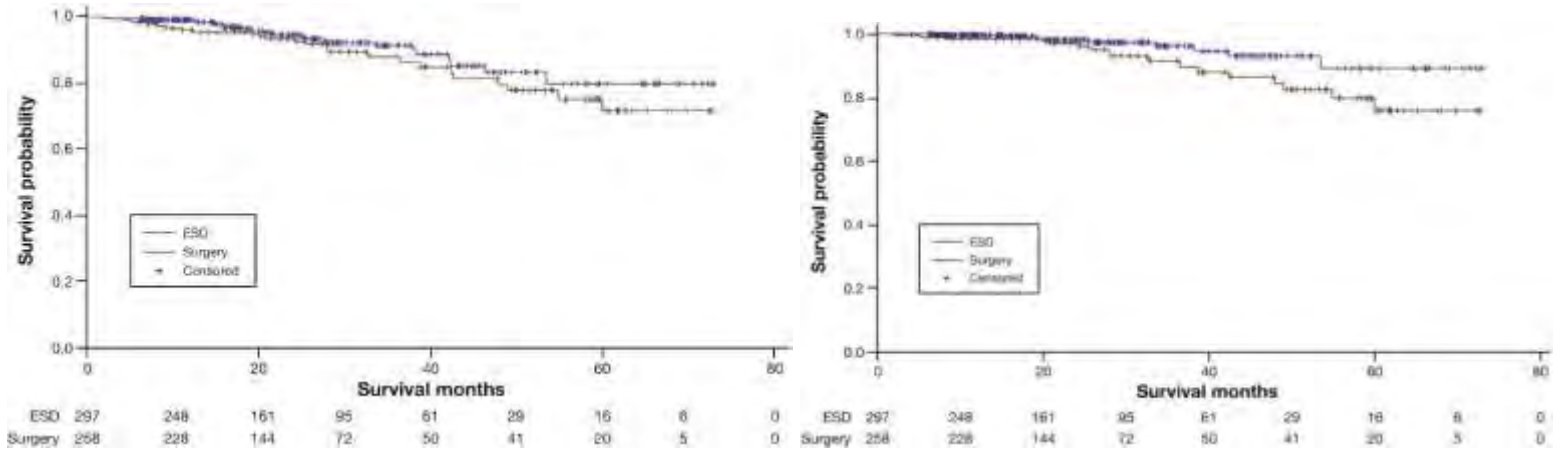
- Higher rate of en-bloc resection (85%)
- Higher rate of R0 resection (75%)
- Lower rate of recurrence (1%)
- *Longer procedure time for ESD*
- *Higher risk of perforation (5%)*
- Bleeding risk similar to EMR

Bhat and Pleskow: Is Endoscopic Submucosal Dissection of Early Esophageal Cancer Ready for Prime Time? July 25, 2018DOI:https://doi.org/10.1016/j.cgh.2018.07.027

Endoscopic therapy over surgical approach

- Organ preservation
- Safety- Low complication rate
- Outpatient procedures
- Economic- Low cost
- LOS: Early return to work
- *Comparable outcomes in early cancers in most situations ?*

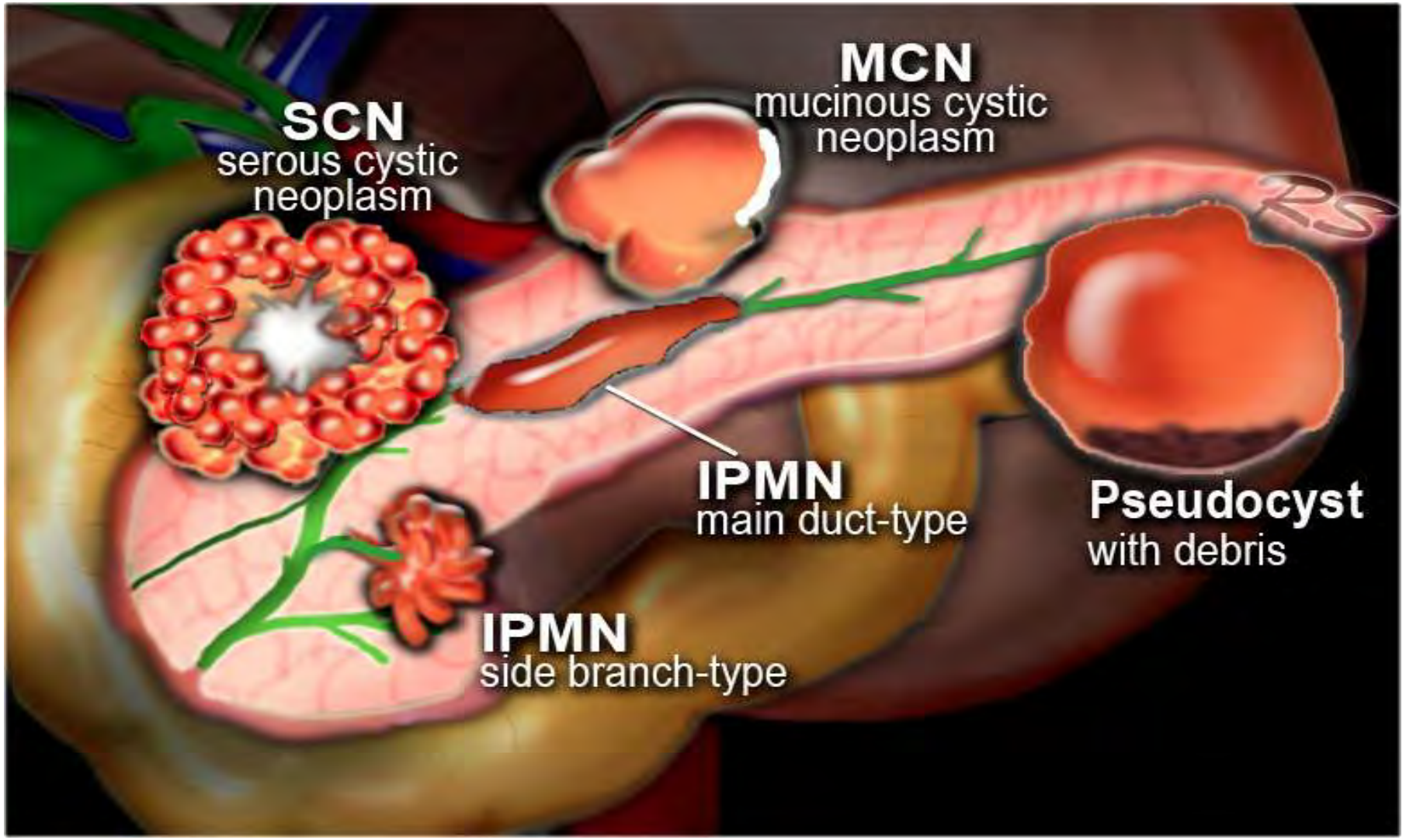




Zhang et al Outcomes of Endoscopic Submucosal Dissection vs Esophagectomy for T1 Esophageal Squamous Cell Carcinoma in a Real-World Cohort. Clin Gastro and hep 2018

- Pancreas

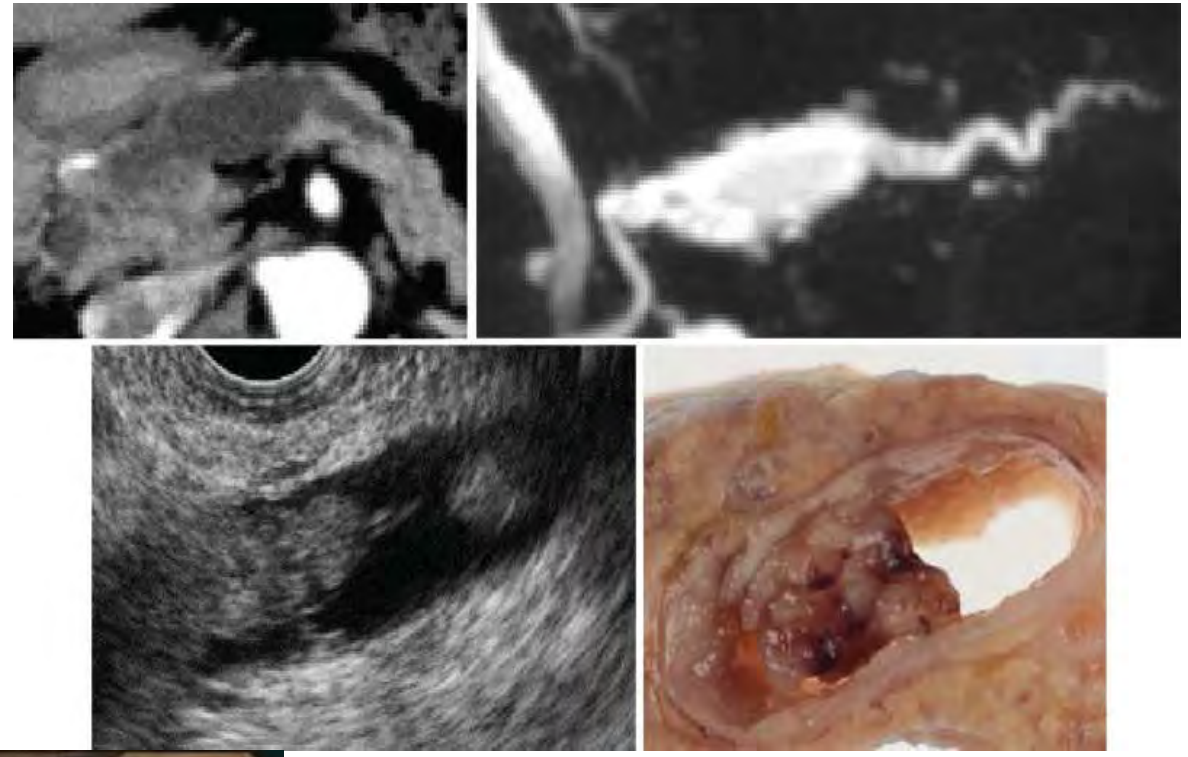
Cystic Pancreatic Neoplasms

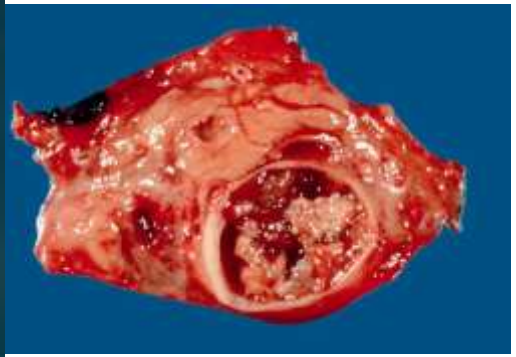


Intraductal Papillary Mucinous Neoplasm (IPMN)

- Dilated duct(s)
- Gastric (70%), intestinal (20%), **pancreatobiliary (<10%)** and oncocytic (<5%) histology
- Worrisome features- Mural nodules/size/PD dilation
- **Endoscopic ultrasound (EUS) is a key modality for the evaluation of suspected pancreatic cystic neoplasms**
- Resection recommended

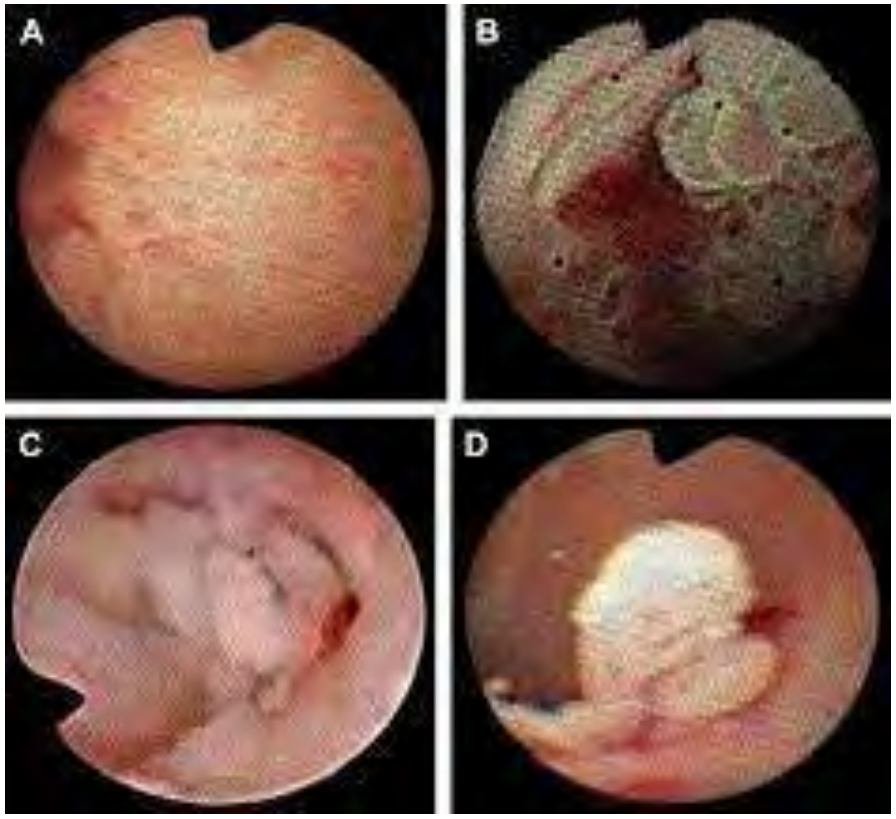
- Need for follow up surveillance
- For BD-IPMN Surveillance, in the absence of high-risk features, is based on size of the cyst





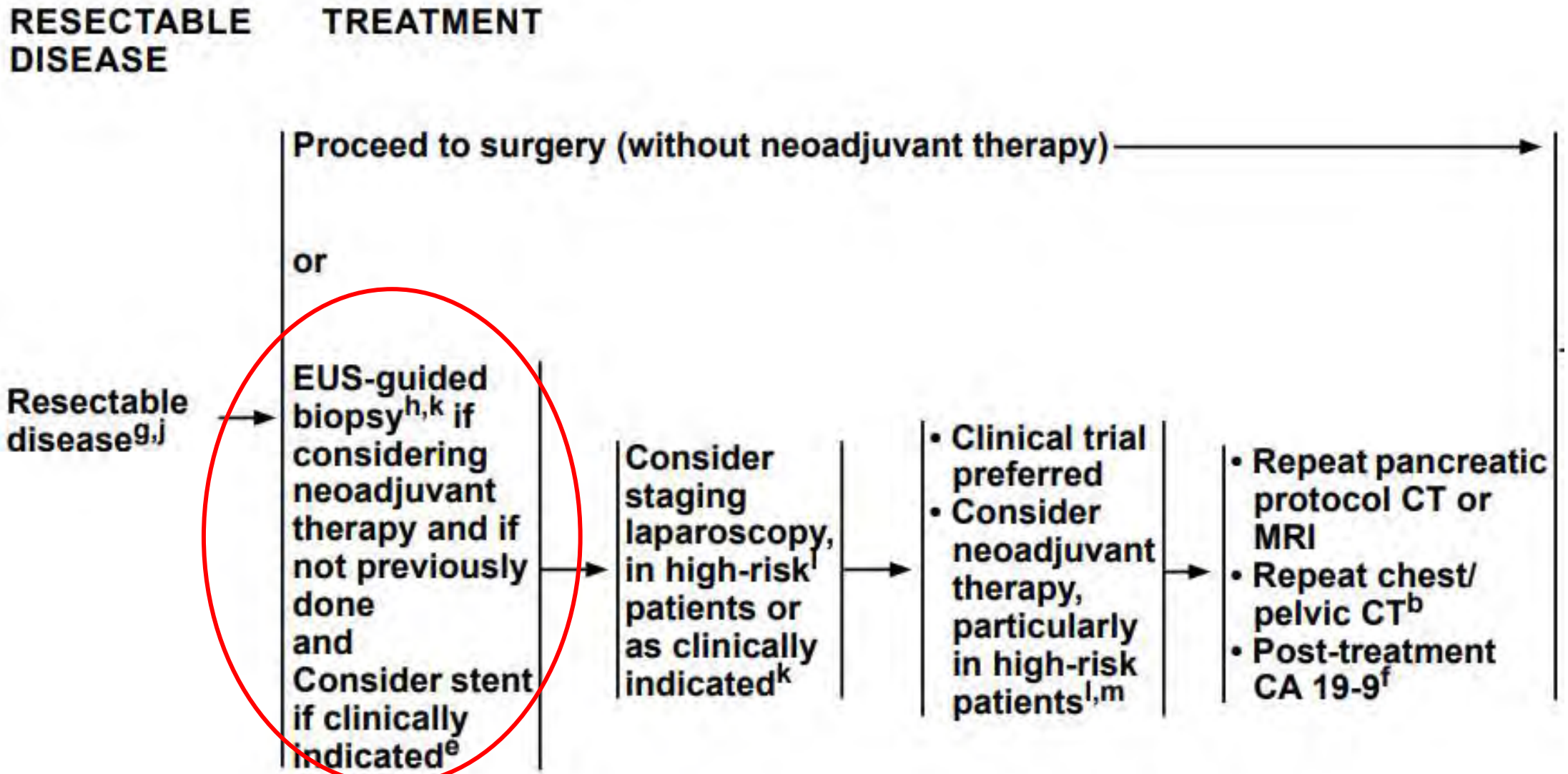
Intraductal Pancreatoscopy

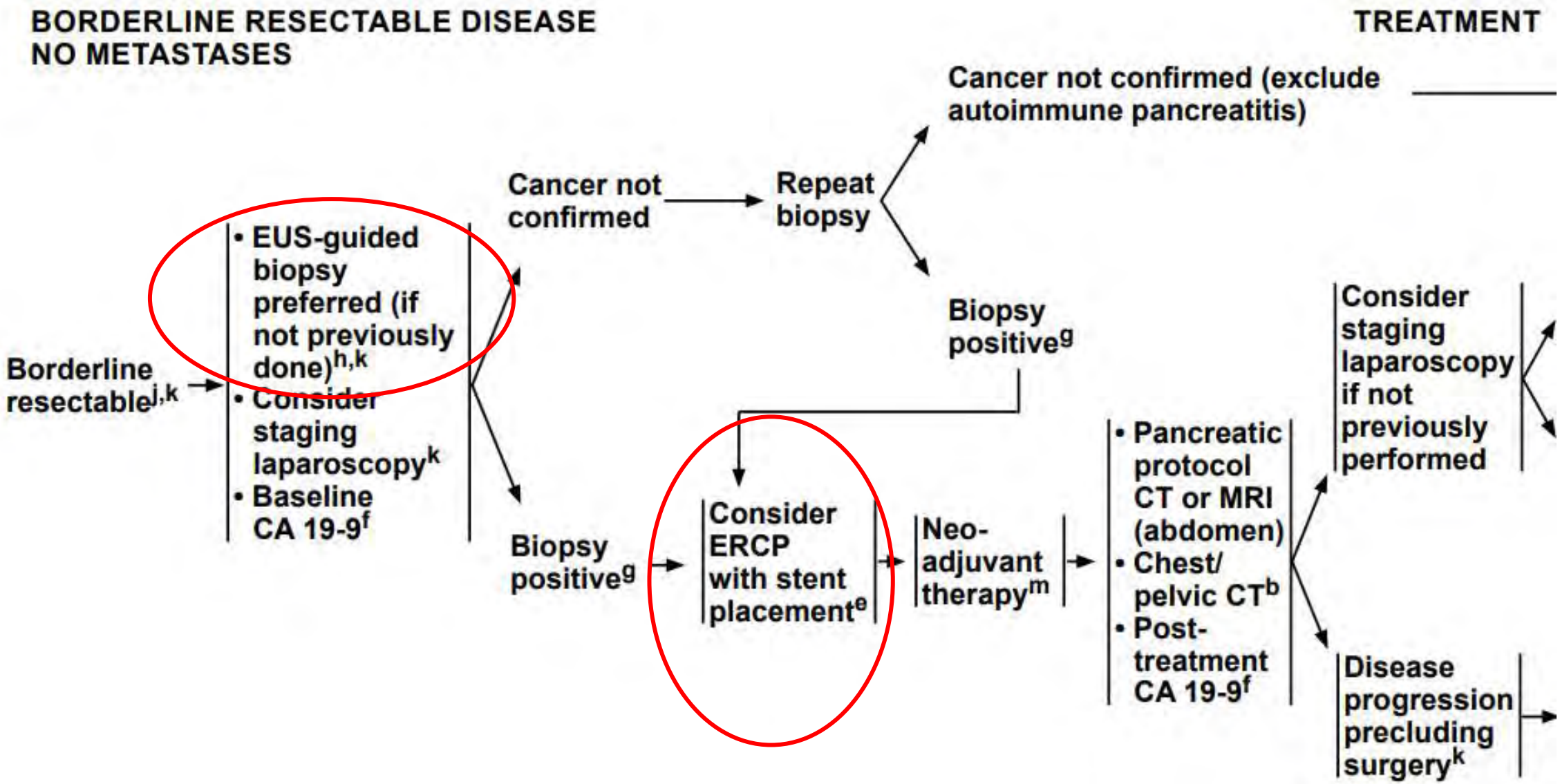
Evaluation of indeterminate pancreatic stricture; Pre operative planning for IPMN

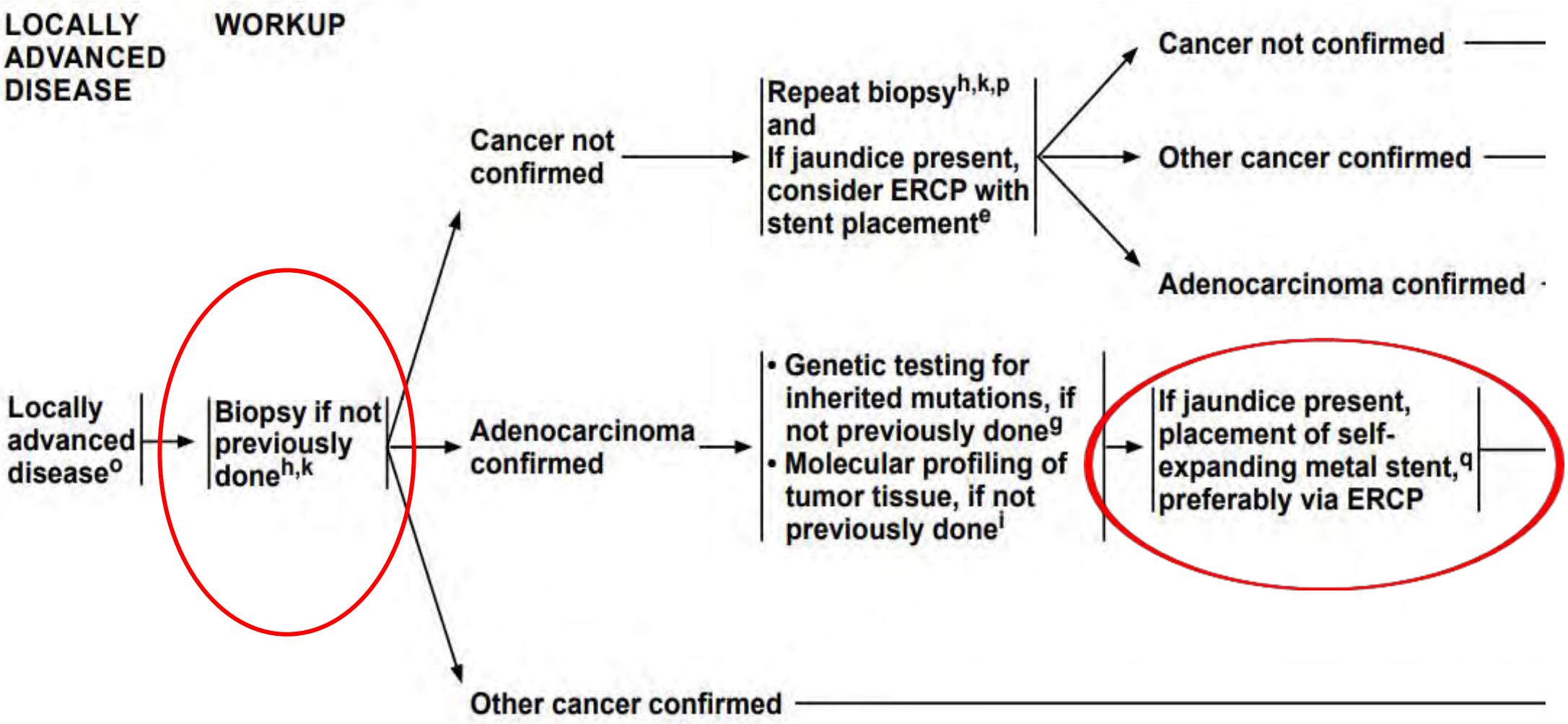


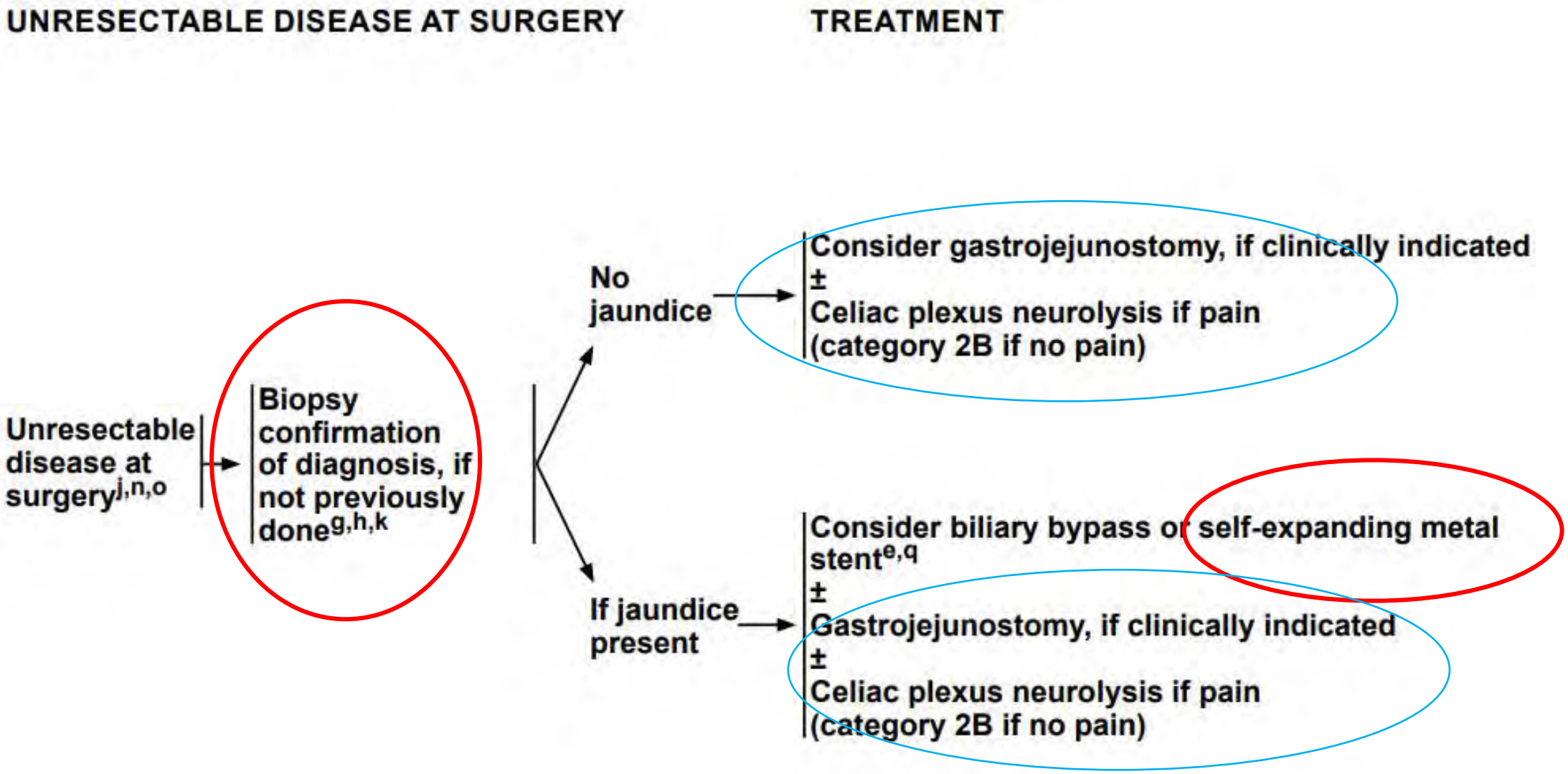
Direct POPS and Single operator probe based pancreatoscopy– Main duct IPMN

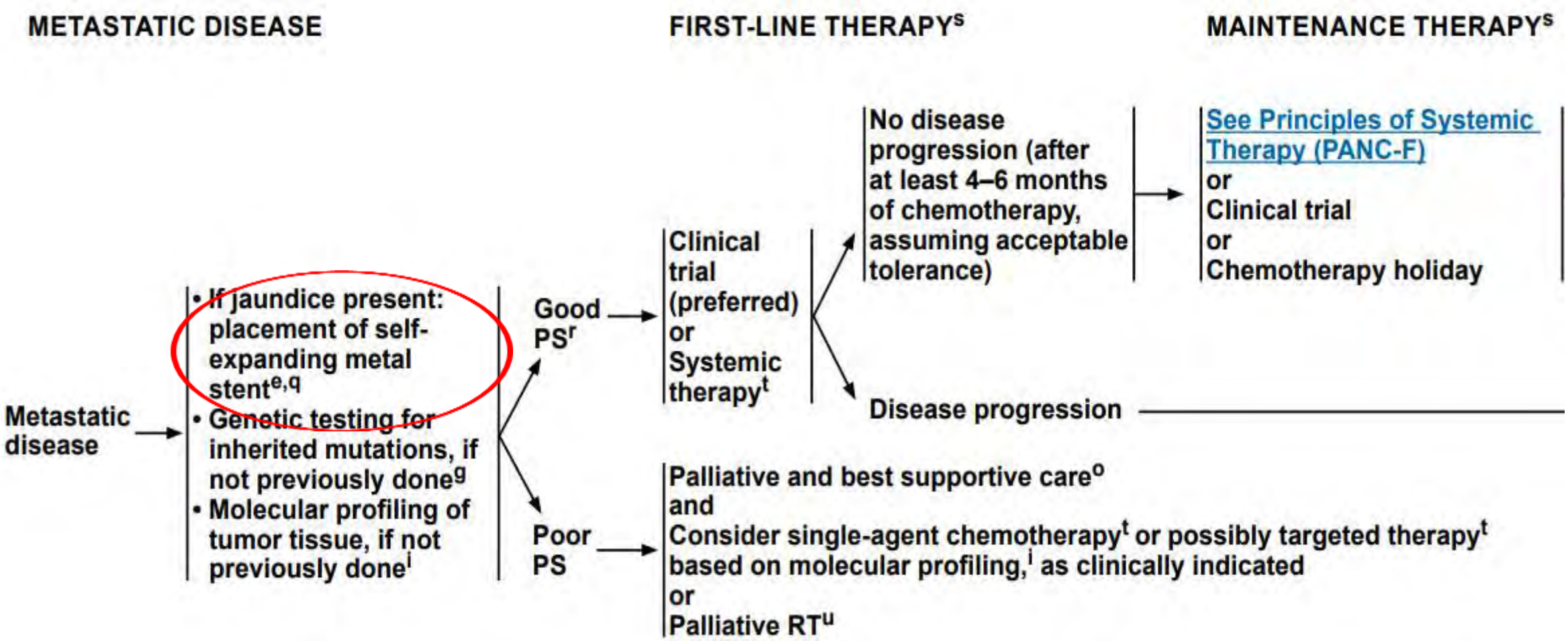
Pancreatic cancer




BORDERLINE RESECTABLE DISEASE
NO METASTASES
TREATMENT
Borderline resectable[j,k]
• EUS-guided biopsy preferred (if not previously done)[h,k]
• Consider staging laparoscopy[k]
• Baseline CA 19-9[f]
Cancer not confirmed
Repeat biopsy
Cancer not confirmed (exclude autoimmune pancreatitis)
Biopsy positive[g]
Biopsy positive[g]
Consider ERCP with stent placement[e]
Neo-adjuvant therapy[m]
• Pancreatic protocol CT or MRI (abdomen)
• Chest/pelvic CT[b]
• Post-treatment CA 19-9[f]
Consider staging laparoscopy if not previously performed
Disease progression precluding surgery[k]

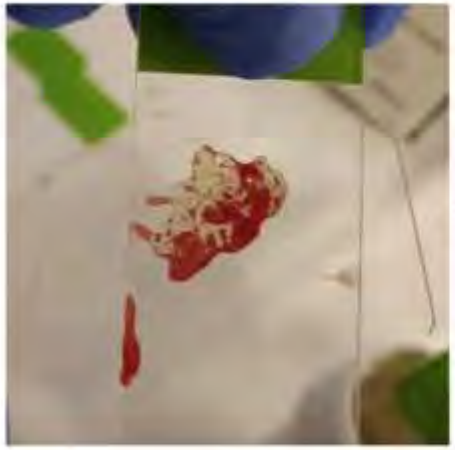

LOCALLY ADVANCED DISEASE
WORKUP
Locally advanced disease[o]
Biopsy if not previously done[h,k]
Cancer not confirmed
Repeat biopsy[h,k,p] and If jaundice present, consider ERCP with stent placement[e]
Cancer not confirmed
Other cancer confirmed
Adenocarcinoma confirmed
Adenocarcinoma confirmed
• Genetic testing for inherited mutations, if not previously done[g]
• Molecular profiling of tumor tissue, if not previously done[i]
If jaundice present, placement of self-expanding metal stent,[q] preferably via ERCP
Other cancer confirmed


UNRESECTABLE DISEASE AT SURGERY
TREATMENT
Unresectable disease at surgery[j,n,o]
Biopsy confirmation of diagnosis, if not previously done[g,h,k]
No jaundice
Consider gastrojejunostomy, if clinically indicated
±
Celiac plexus neurolysis if pain
(category 2B if no pain)
If jaundice present
Consider biliary bypass or self-expanding metal stent[e,q]
±
Gastrojejunostomy, if clinically indicated
±
Celiac plexus neurolysis if pain
(category 2B if no pain)


METASTATIC DISEASE
FIRST-LINE THERAPY[s]
MAINTENANCE THERAPY[s]
Metastatic disease
• If jaundice present: placement of self-expanding metal stent[e,q]
• Genetic testing for inherited mutations, if not previously done[g]
• Molecular profiling of tumor tissue, if not previously done[i]
Good PS[r]
Poor PS
Clinical trial (preferred) or Systemic therapy[t]
No disease progression (after at least 4–6 months of chemotherapy, assuming acceptable tolerance)
See Principles of Systemic Therapy (PANC-F)
or
Clinical trial
or
Chemotherapy holiday
Disease progression
Palliative and best supportive care[o]
and
Consider single-agent chemotherapy[t] or possibly targeted therapy[t] based on molecular profiling,[i] as clinically indicated
or
Palliative RT[u]

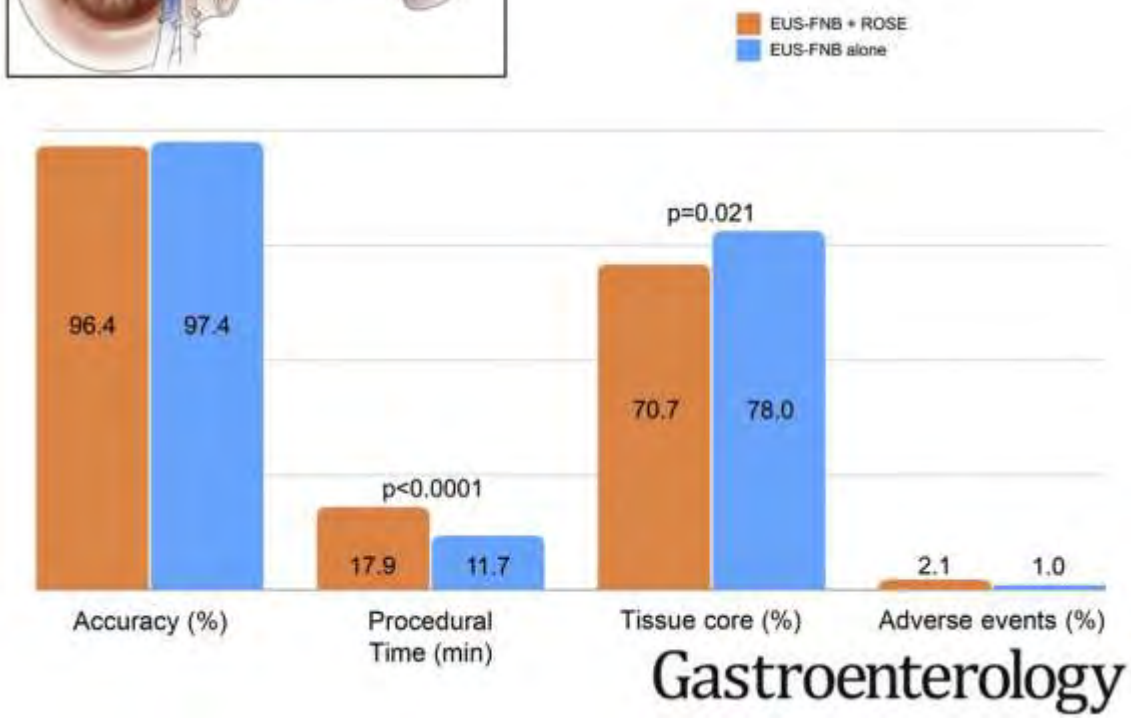
EUS Biopsy

EUS-FNB + Rapid on-site evaluation



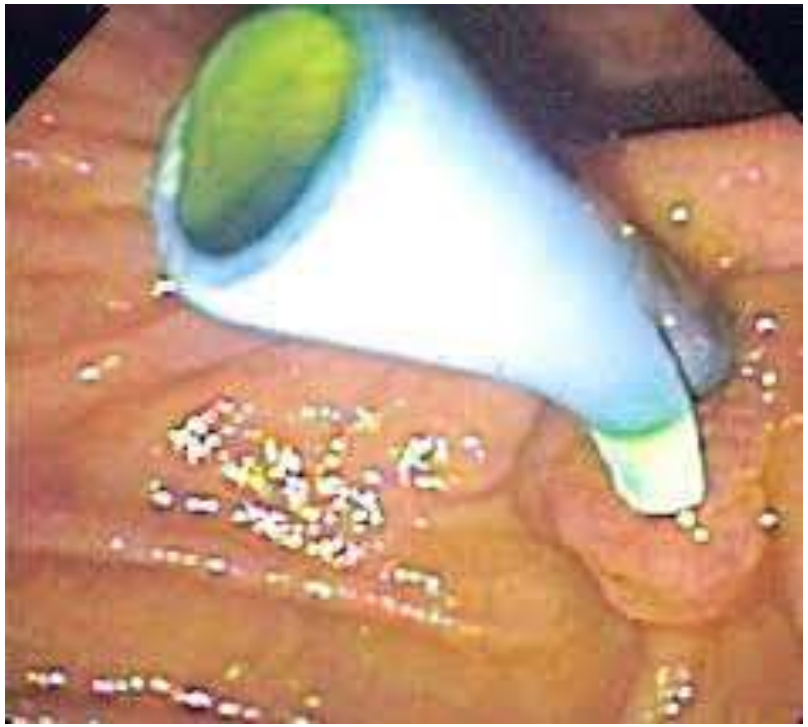
vs

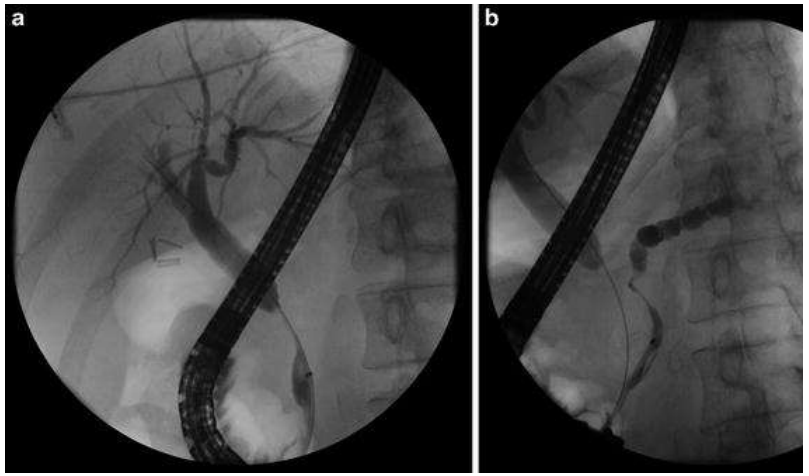
EUS-FNB alone



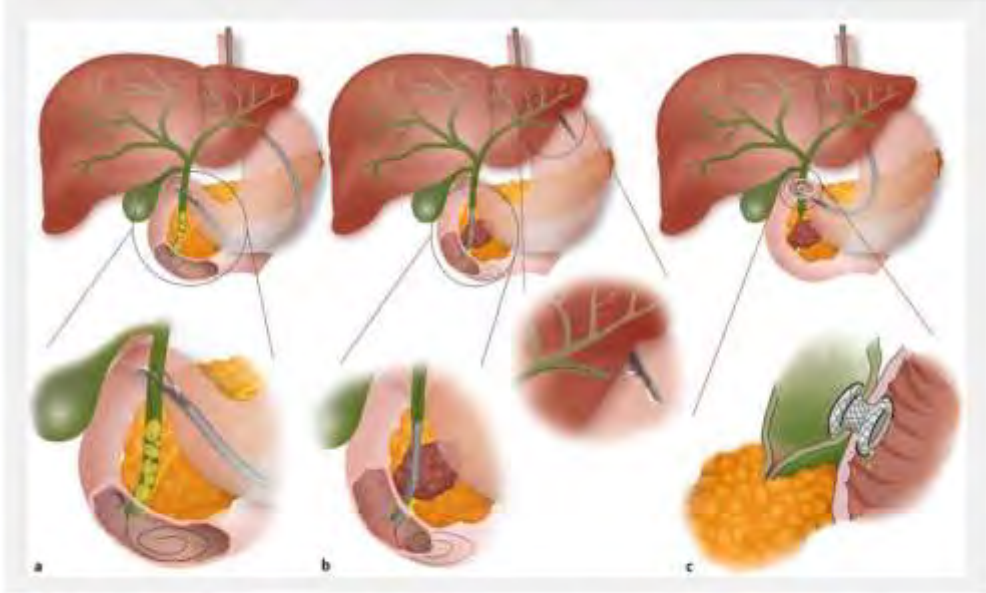
Crino et al Gastroenterology 2021

Biliary Stenting

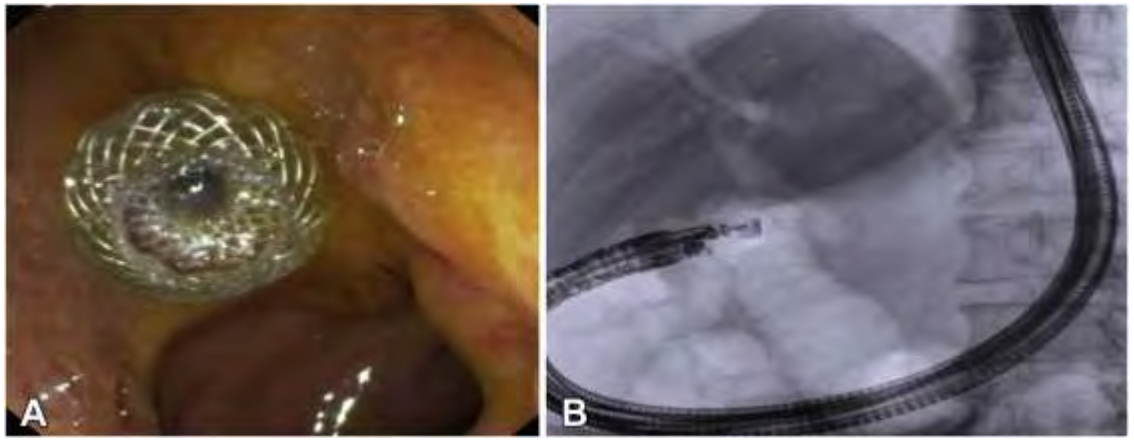


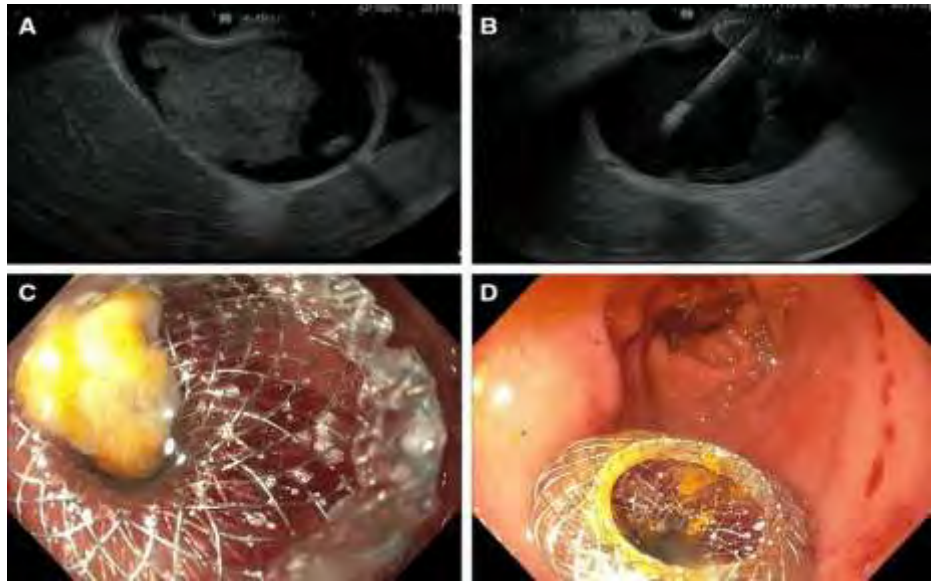


EUS Biliary Drainage



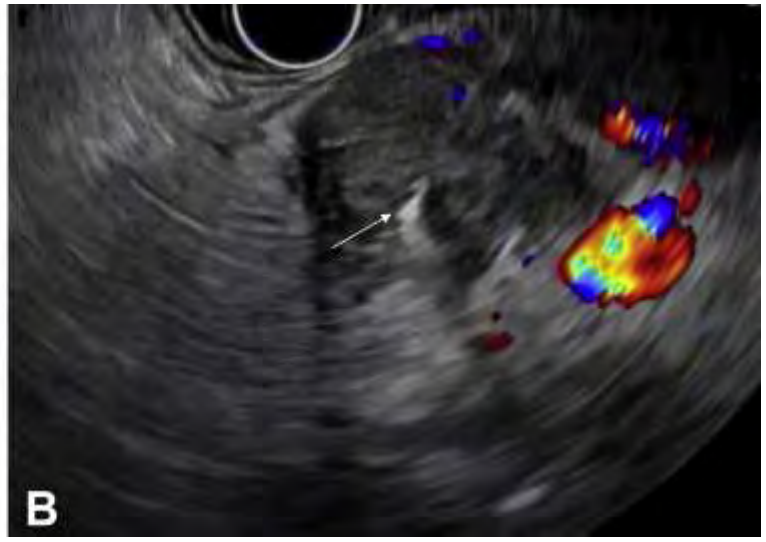
► Fig. 1a–c Illustrations of therapeutic endoscopic ultrasound (EUS) interventions of the pancreaticobiliary and gastrointestinal tract showing: **a** EUS-assisted rendezvous (biliary); **b** EUS-guided antegrade stenting; **c** EUS-guided choledochoduodenostomy. Source: Martha Meisen.





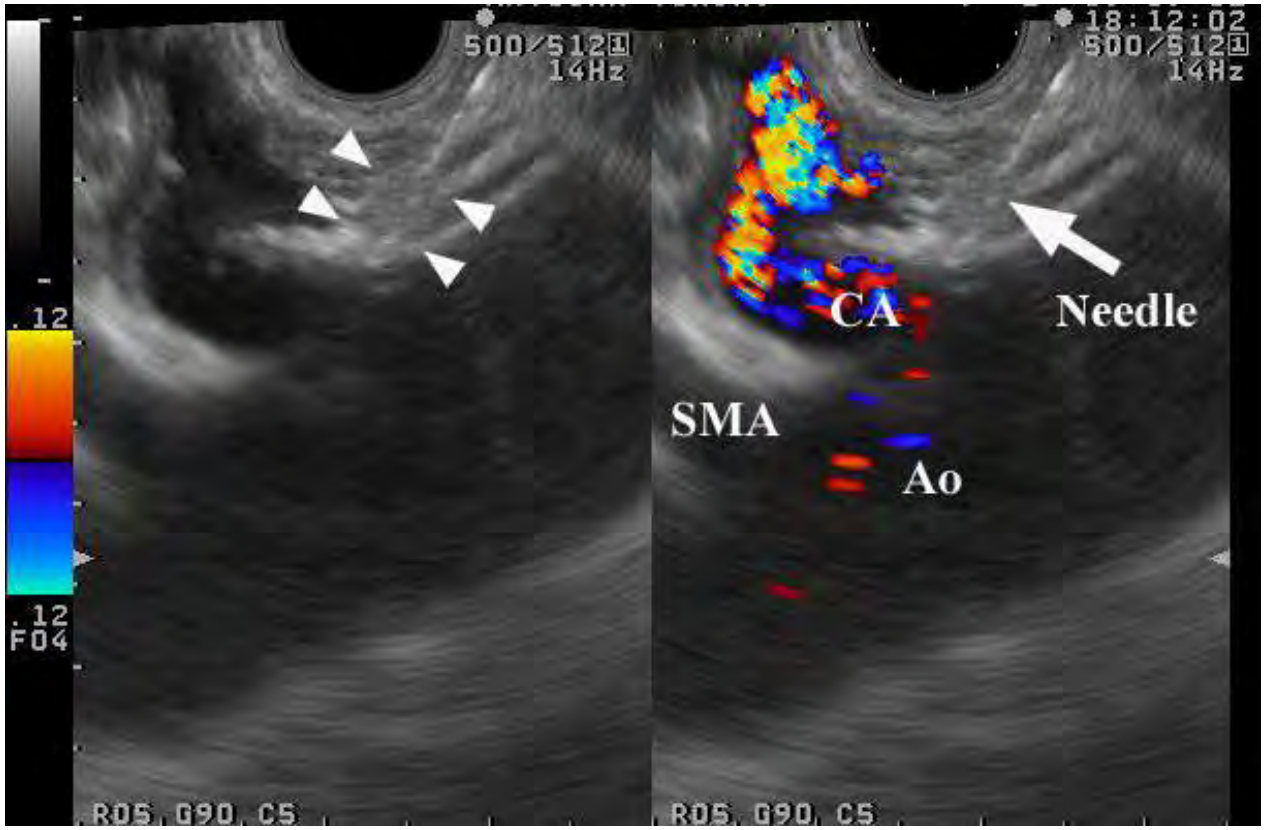
Issa et al Endoscopy 2021

EUS- Fiducial Marker Placement



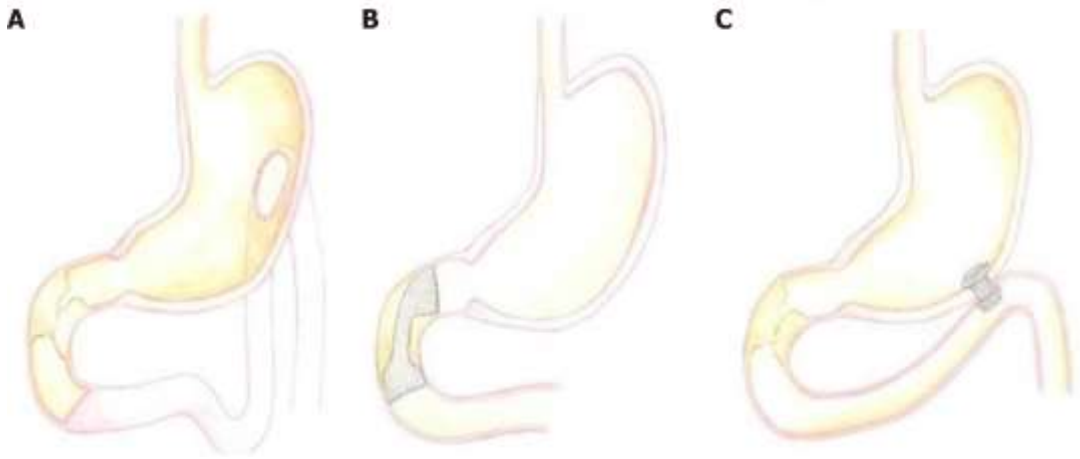
EUS- Celiac Plexus Neurolysis

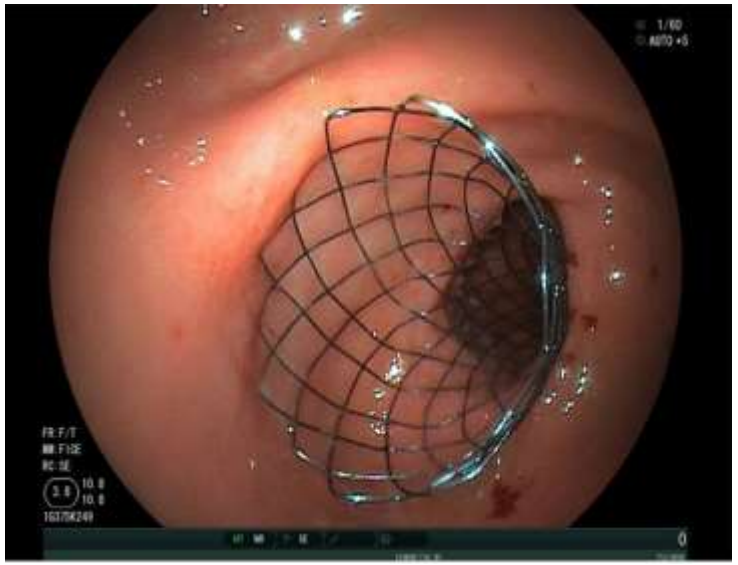
Figure 1. The celiac plexus.

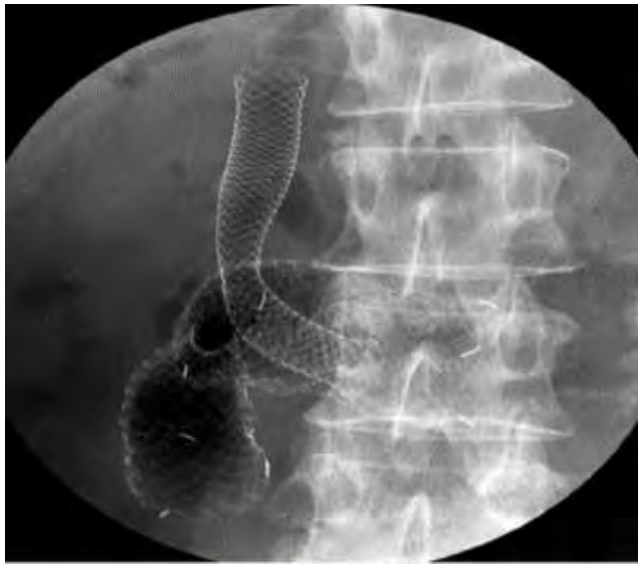


- Overall response rate to EUS-CPN was 68% (95% CI 61%-74%) at week two and 53% (95% CI 45%-62%) at week four (*Kouloris et al Pancreatology 2021*)

Malignant Gastric Outlet Obstruction- Duodenal stenting





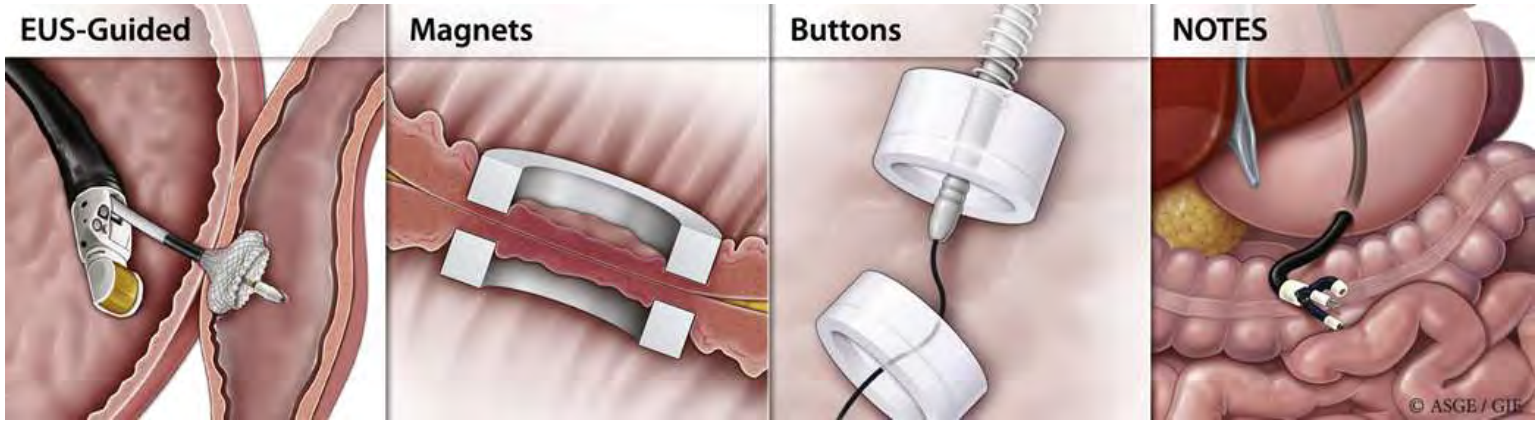


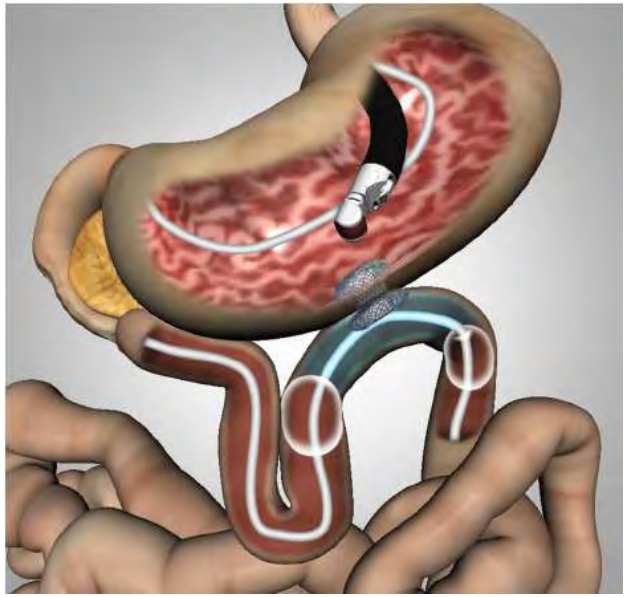
Duodenal SEMS placement in GOO
-Technical success→ 93%- 97%
-Clinical success of →84% to 93%

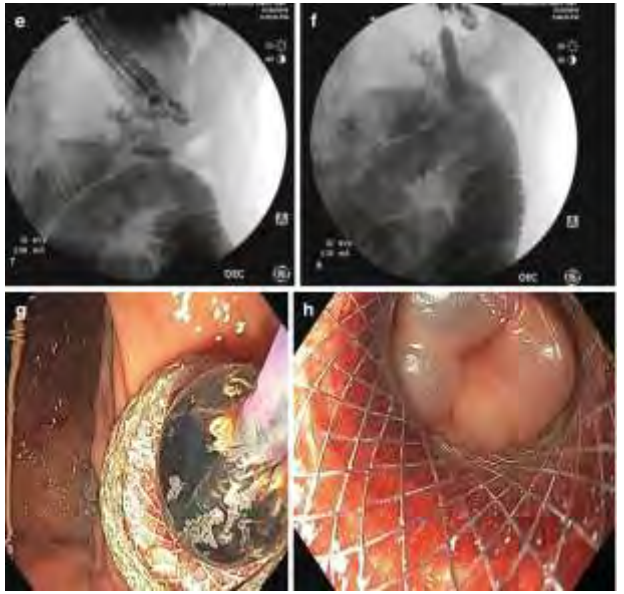
Endoscopic Gastrointestinal anastomosis

- Bypassing malignant, benign gastric outlet obstruction
- Providing access to the pancreato-biliary tree in Roux-en-Y gastric bypass,
- Relieving pancreato-biliary symptoms in afferent loop syndrome.

- *Less invasive, less expensive than surgical approaches, result in improved outcomes, and more appealing to patients and providers*

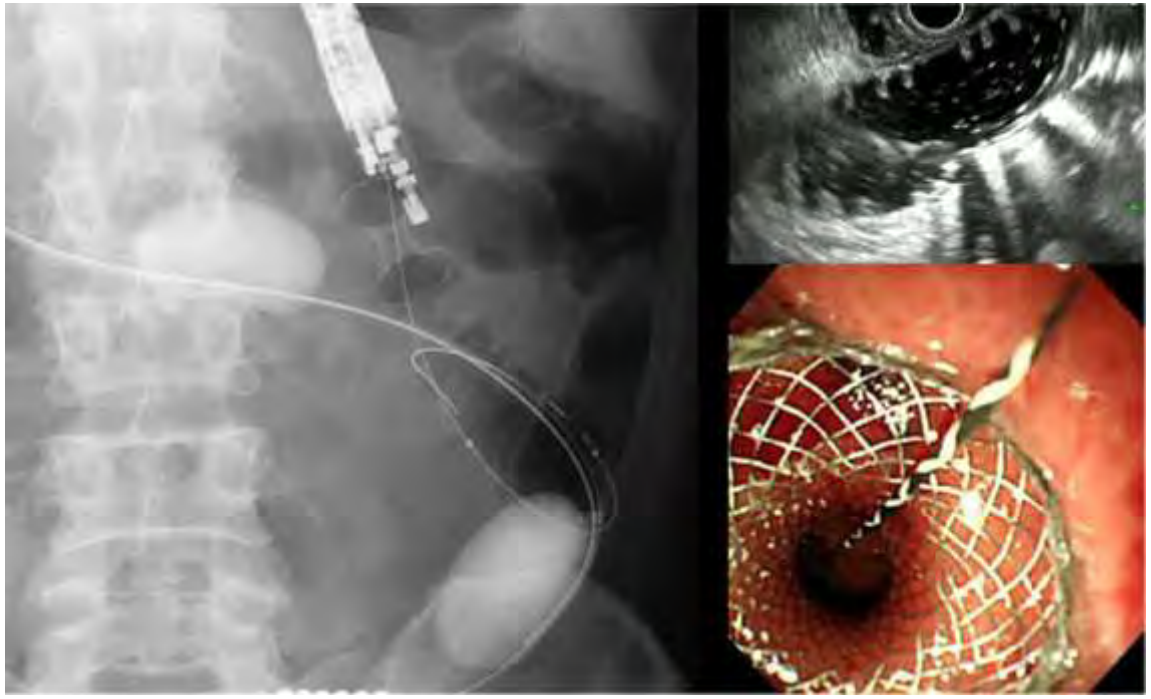






Marache et al Gastrointestinal Endoscopy 2021 9334-46DOI: (10.1016/j.gie.2020.06.057
Khashab et al Therpeutic ultrasound 2019

Gastric Outlet Obstruction- EUS Gastrojejunostomy

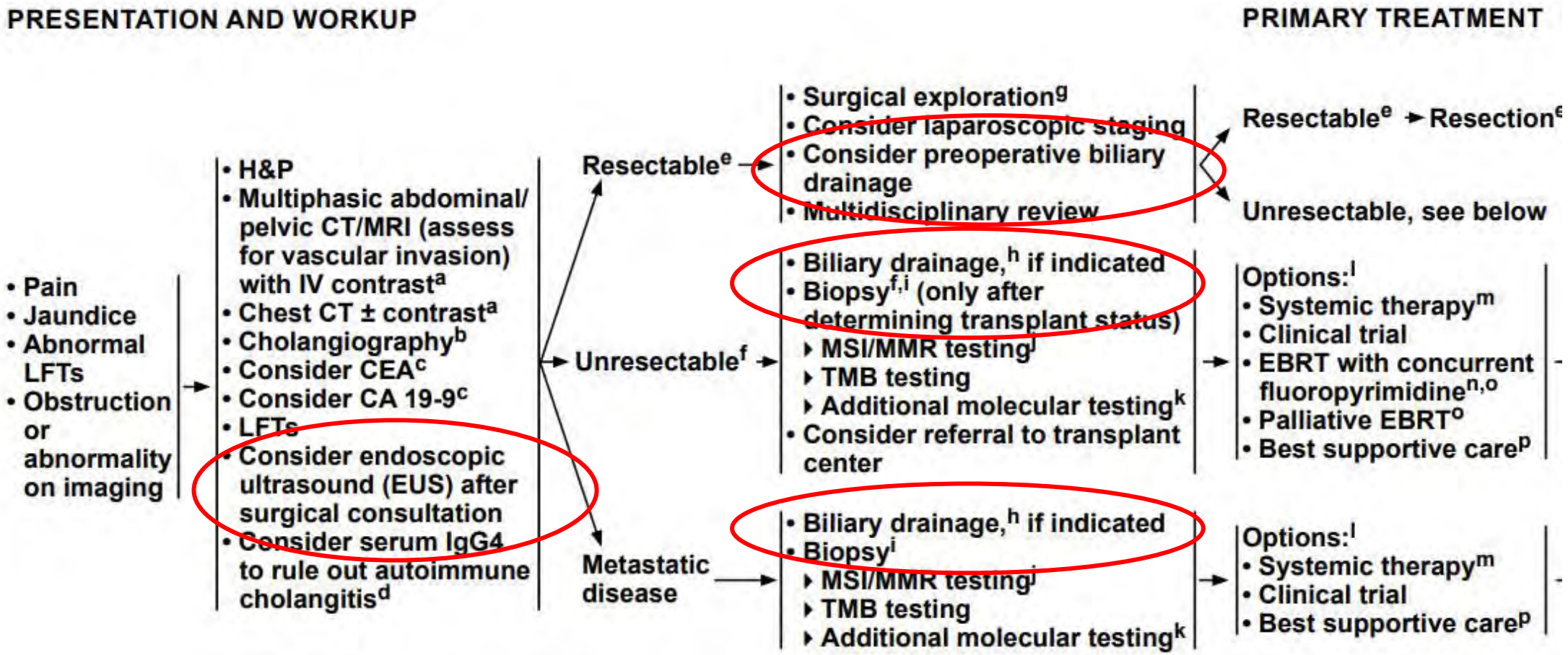


Marache et al Gastrointestinal Endoscopy 2021 9334-46DOI: (10.1016/j.gie.2020.06.057
Khashab et al Therpeutic ultrasound 2019

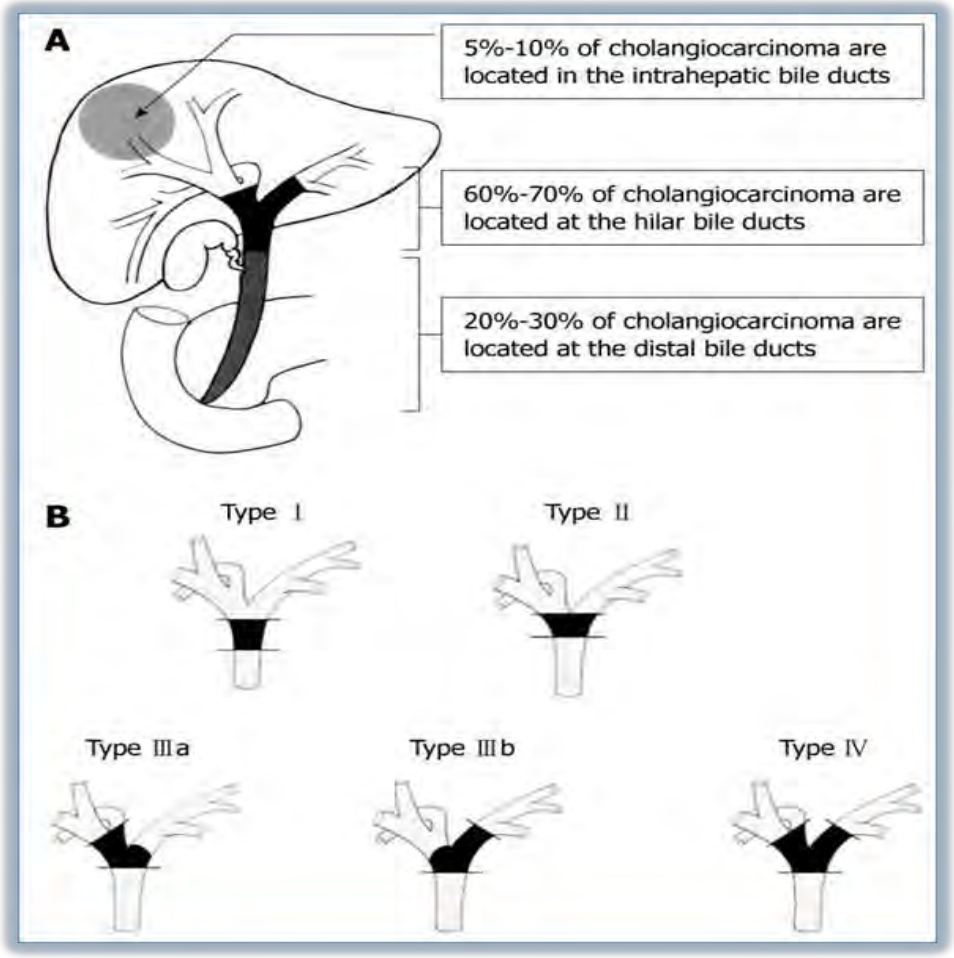
Hepato-Biliary Cancers

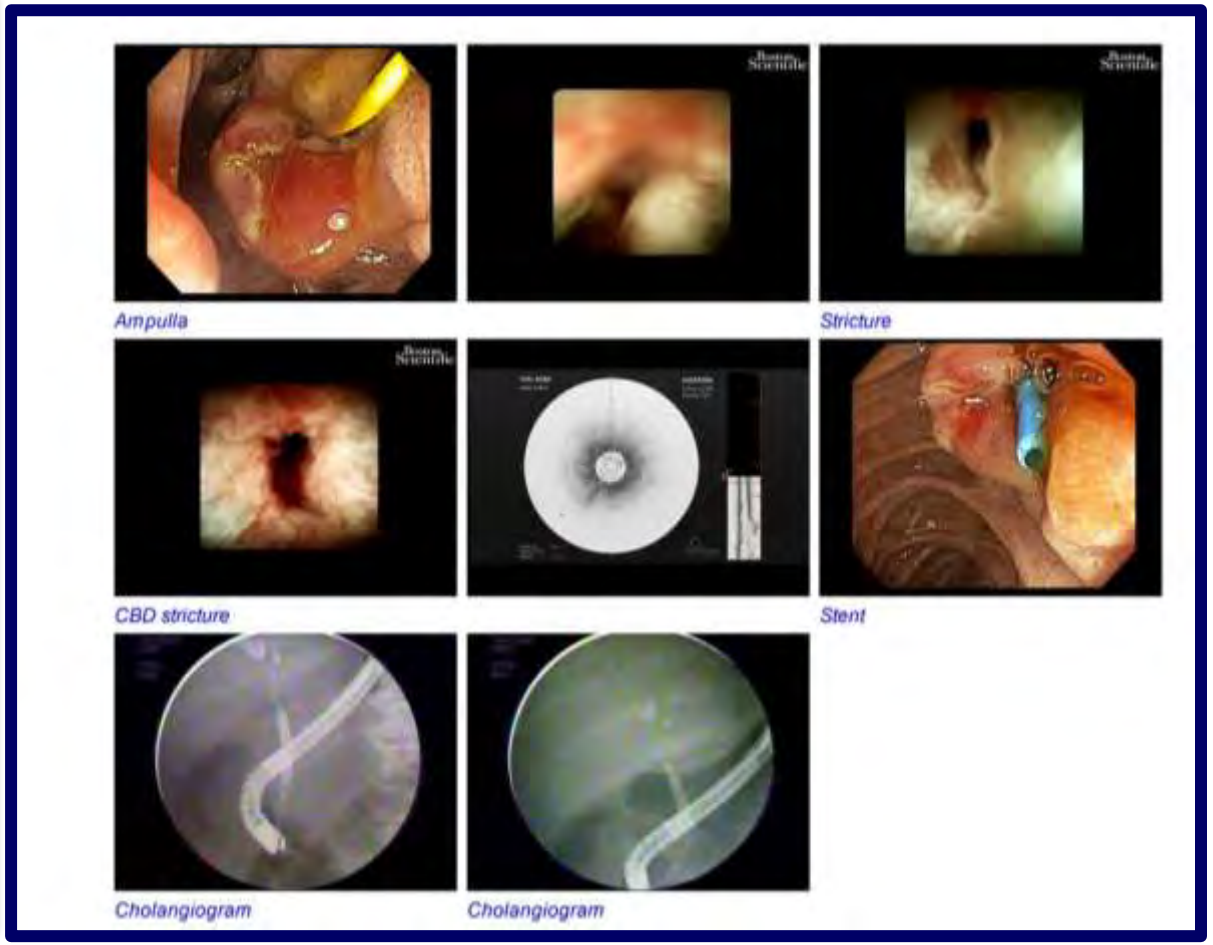
- EUS Biopsy
- Cholangioscopy-Biopsy
- Biliary stenting
- Bilo-digestive stenting (Biliary and bowel obstruction)
- EUS biliary drainage
- Biliary RFA for CCA

Biliary Tract Cancers (GB and extrahepatic CCA)



Biliary Tract Cancers (GB and extrahepatic CCA)





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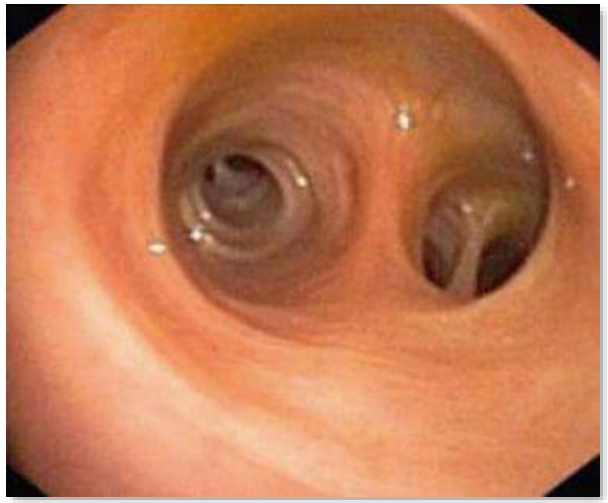
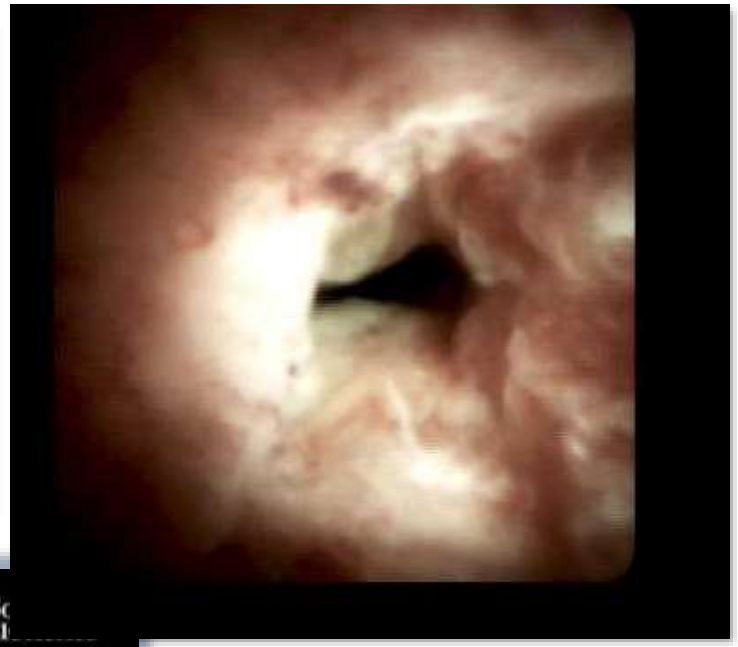
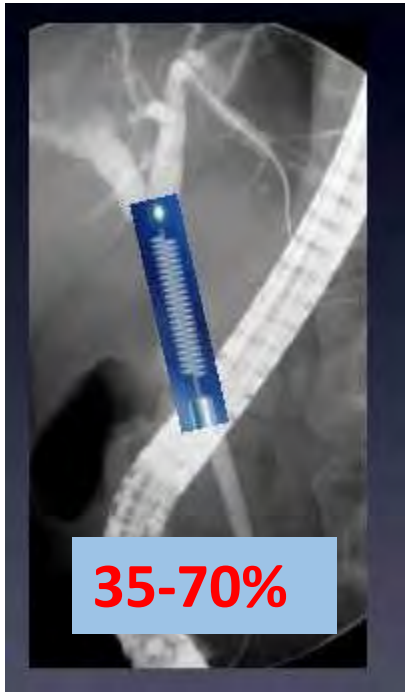
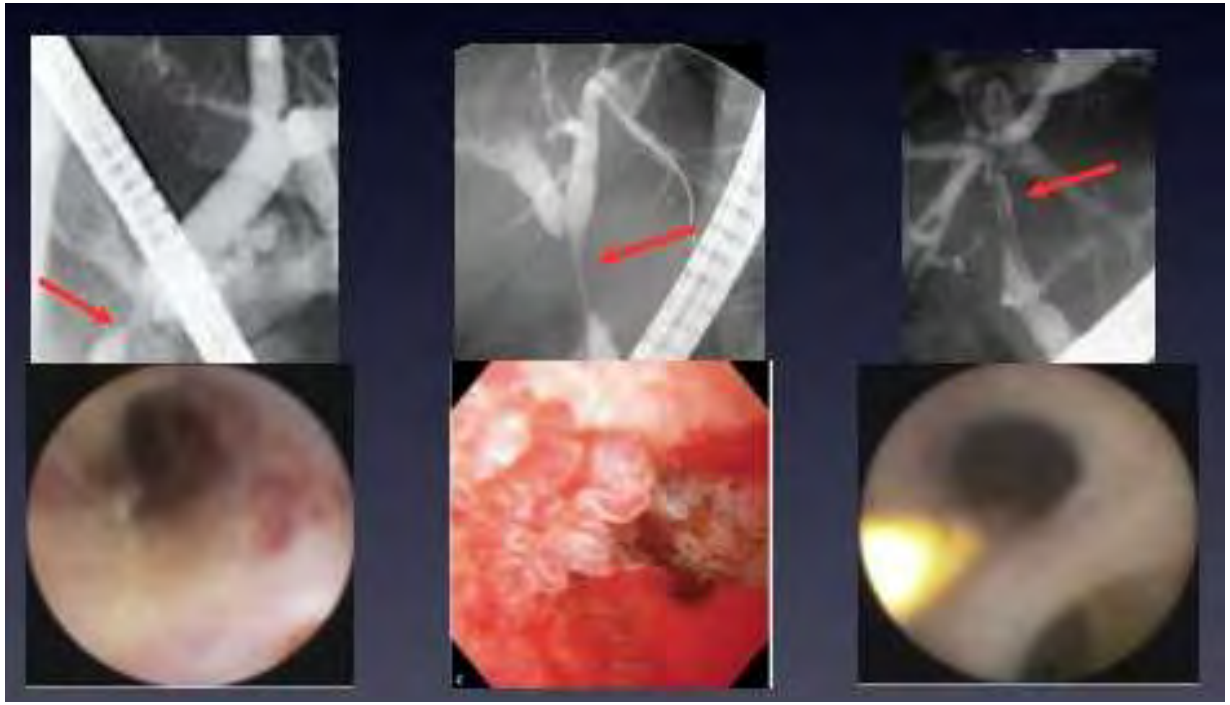




Endoscopic diagnostic yield for extra hepatic CCA

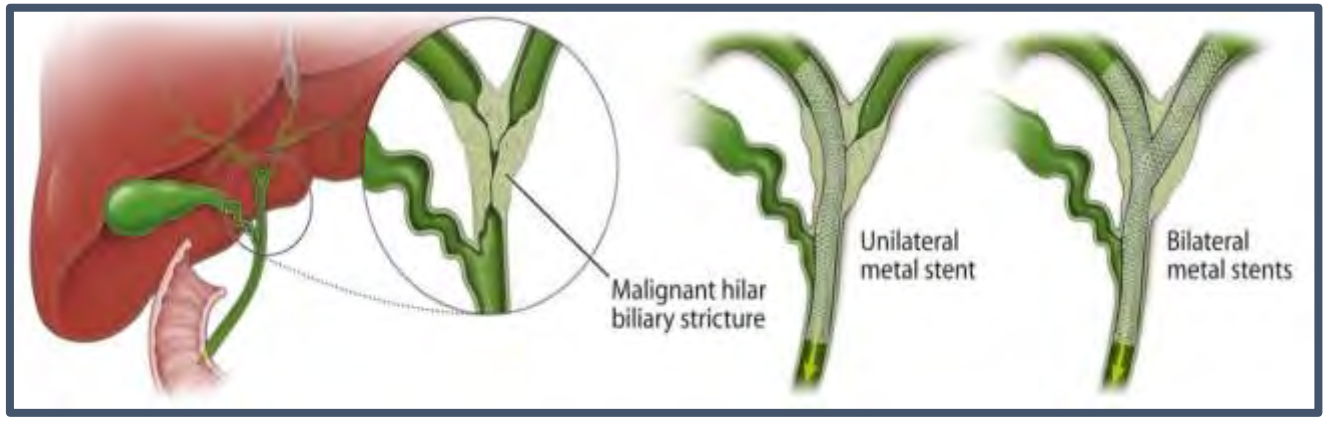


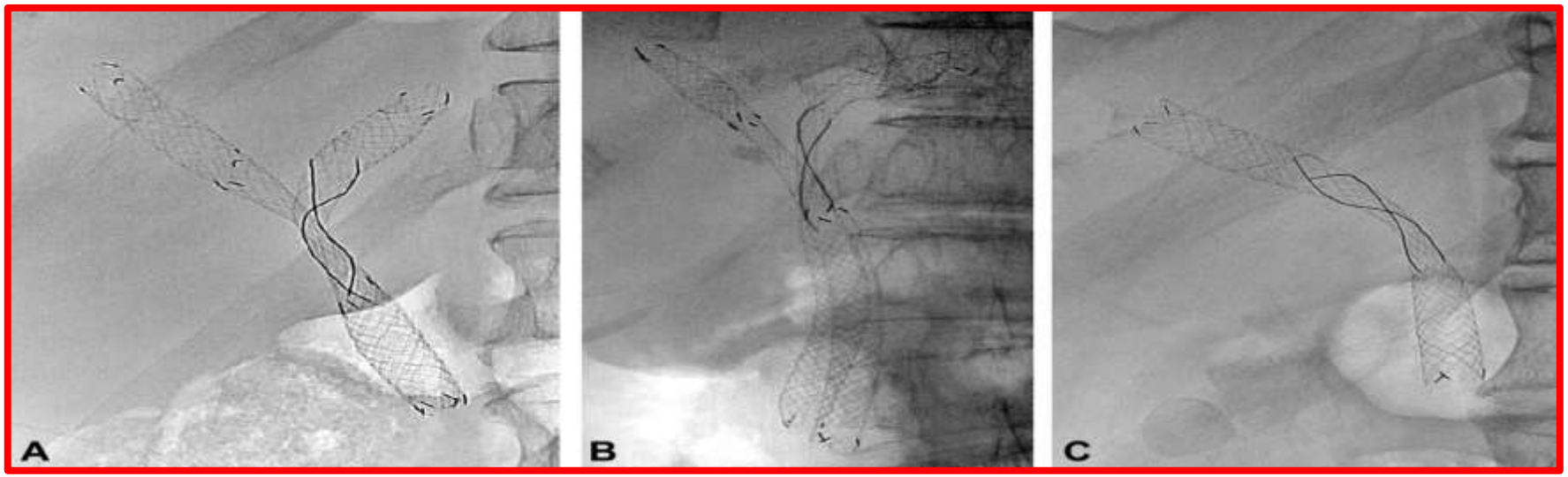


51-100%

Baron TH et al ERCP 2018; Agarwal DK Dig Dis 2016

Biliary Drainage- ERCP

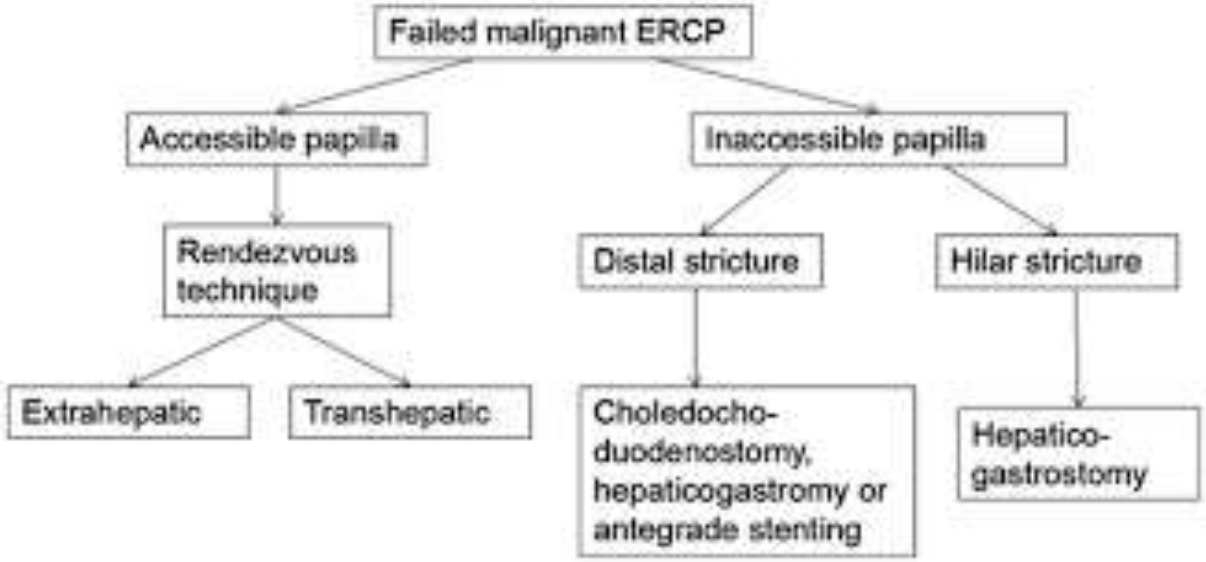


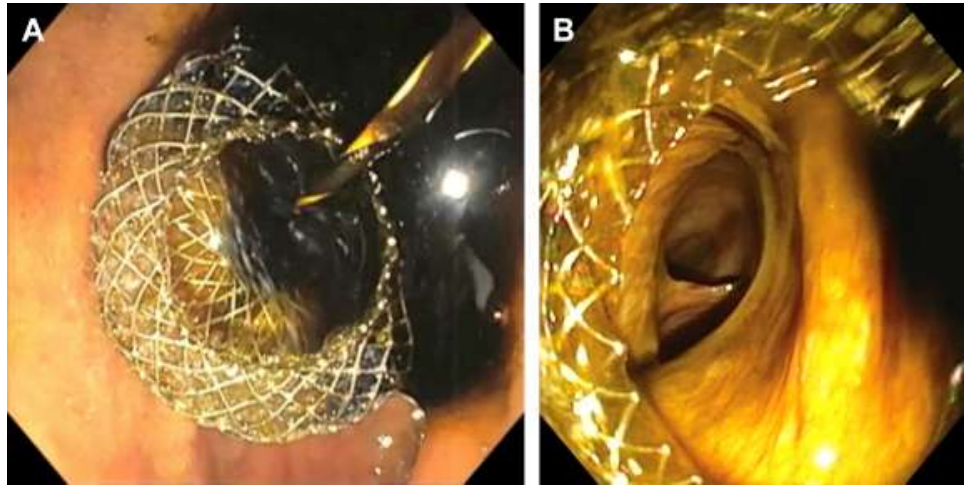


EUS guided biliary drainage

- *Not a primary treatment*
- Considered in case of failure of standard drainage (ERCP)

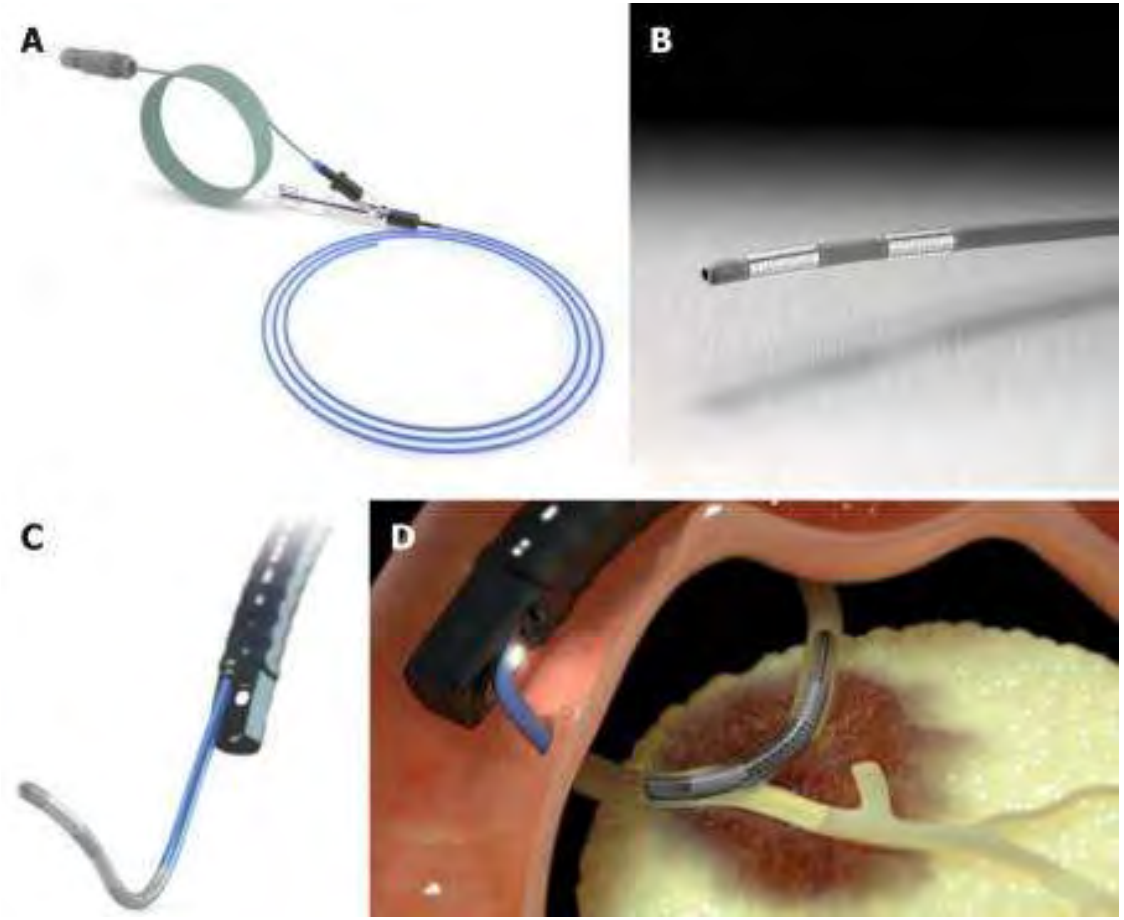
- EUS guided internal rendezvous (70- 80% success rate)
- EUS guided choledocho-duodenostomy (distal obstruction)
- EUS guided hepatico-gastrostomy (Proximal/hilar)





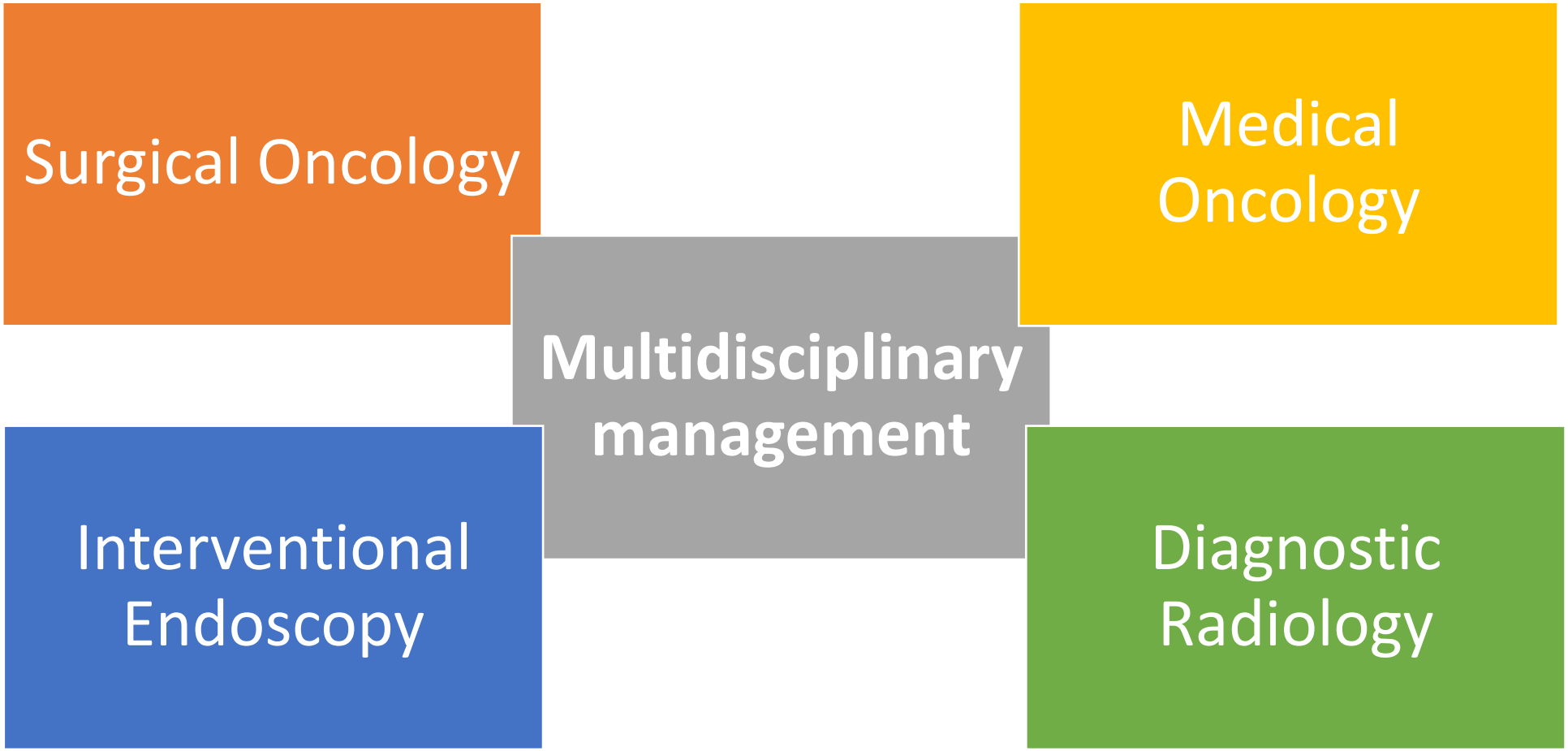
Endoscopic Ablative Treatment of CCA

- Biliary intraductal RFA (easier and equivalent to PDT)
- RFA with stent placement vs stent alone→ median survival 13.2 months (vs 8.3 mo), stent patency 6.8 months (vs 3.4 mo)
- RFA of tumor ingrowth in uncovered SEMS restores biliary drainage



Yang J et al Endoscopy. 2018 Aug;50(8):751-760.

Multi-disciplinary management



Additional References

- WWW. NCCN.ORG
- ASGE Guidelines; ASGE.org/home/resources/guidelines
- European Society of Gastrointestinal Endoscopy (ESGE) Guideline: esge.com
- Baron et al ERCP 2018
- Hawes et al Endosonography 2018
- Uptodate.com

Thank you

- Questions?