

EUS-directed transgastric ERCP (EDGE) in Roux-en-Y Gastric Bypass (RYGB) Patients

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Disclosures

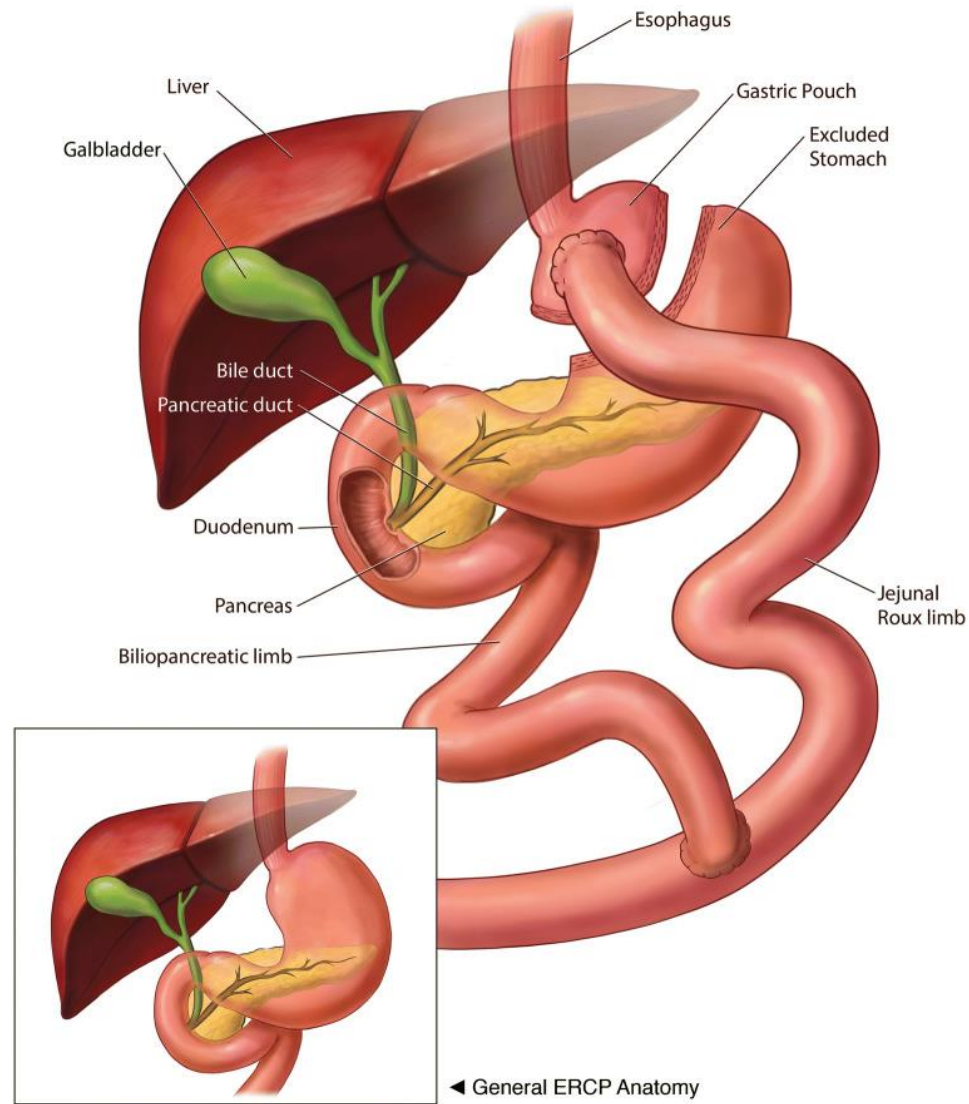
Speaker and Consultant: Ambu, BSCI, ConMed, Cook
Endoscopy, Medtronic, Olympus, W.L. Gore

Objectives

At the end of the presentation, participants should be better able to:

1. Describe the general approaches for EUS-guided access to the pancreaticobiliary tree in patients with RYGB and
2. List the main disadvantages of performing EDGE

Roux-en-Y Gastric Bypass



Options for RYGB ERCP

- Laparoscopic-assisted ERCP
- Device-assisted enteroscopy (e.g., single or double balloon) ERCP
- EUS-guided approaches
 - EDGE

RYGB: EUS-Guided Approaches

- Hepaticoenterostomy
 - Hepatico - gastrostomy, esophagostomy, jejunostomy
- EDGE
 - endoscopic ultrasound-directed transgastric ERCP



GASTROENTEROLOGY IN MOTION

Ralf Kiesslich and Thomas D. Wang, Section Editors

Internal EUS-Directed Transgastric ERCP (EDGE): Game Over

Prashant Kedia, Reem Z. Sharaiha, Nikhil A. Kumta, and Michel Kahaleh

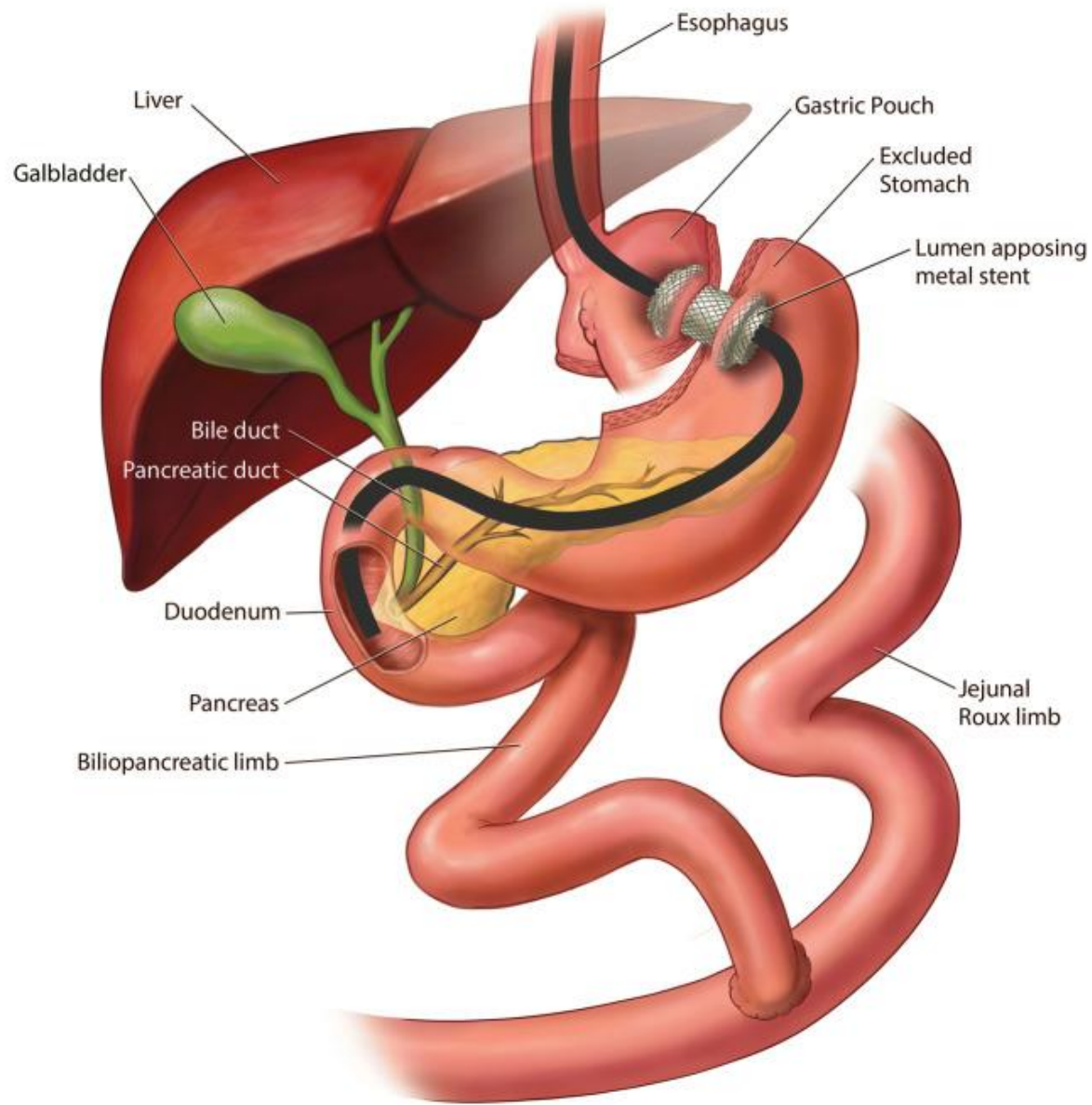
Division of Gastroenterology and Hepatology, Weill Cornell Medical College, New York, New York

Gastroenterology. 2014 Sep;147(3):566-8.0



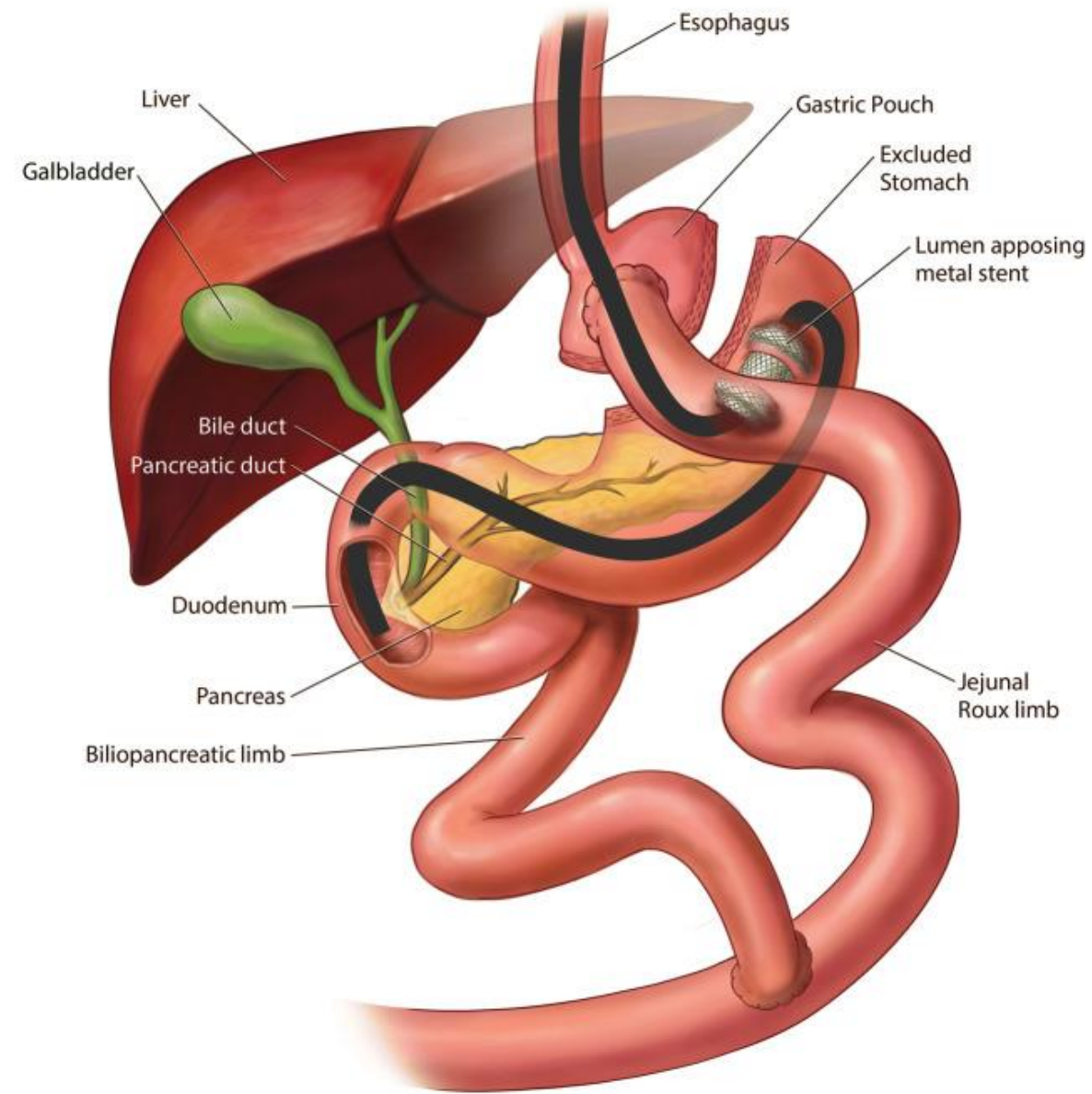
ERCP with Roux-en-y Gastric Bypass Surgery

EDGE (Endoscopic ultrasound Directed transGastric ERCP) - Trans Gastric



ERCP with Roux-en-y Gastric Bypass Surgery

EDGE (Endoscopic ultrasound Directed transGastric ERCP) - Trans Jejunal





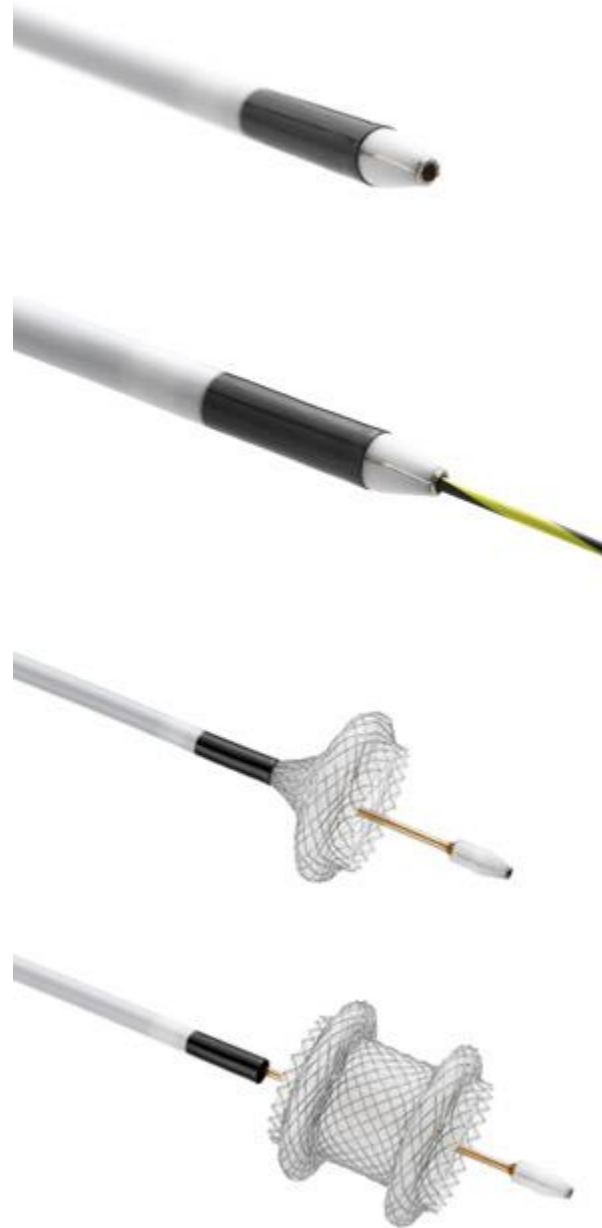
Linear Echoendoscopes



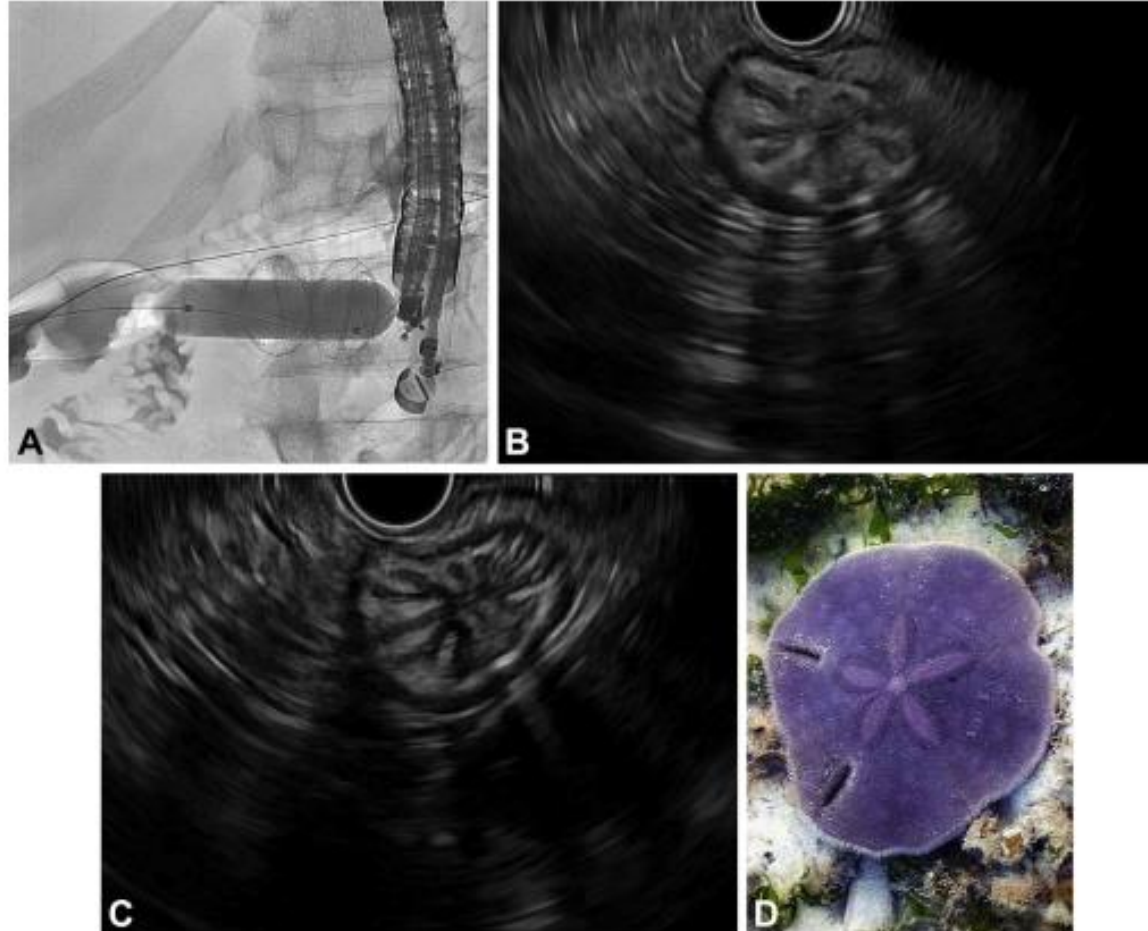
Lumen-apposing metal stents (LAMS)



Diameters used: 15 or 20mm



The sand dollar sign: a reliable EUS image to identify the excluded stomach during EUS-guided gastrogastrostomy



Timing of ERCP After EUS-Guided Anastomosis

- Immediate (Single stage)
 - Balloon dilation of LAMS to 20mm
 - Risk of stent dislodgement / perforation
 - Follow-up upper endoscopy to remove LAMS
- Delayed (Two stage)
 - No dilation of LAMS
 - 2-4 weeks after initial EUS
 - LAMS removed at end of procedure



SEMS Anchoring to Minimize Dislodgement During Single Stage EDGE

- Clips
 - TTS
 - Over-the-scope (Stent-Fix, OVESCO)*
- Suture
- X-Tag™ (BSCI)**

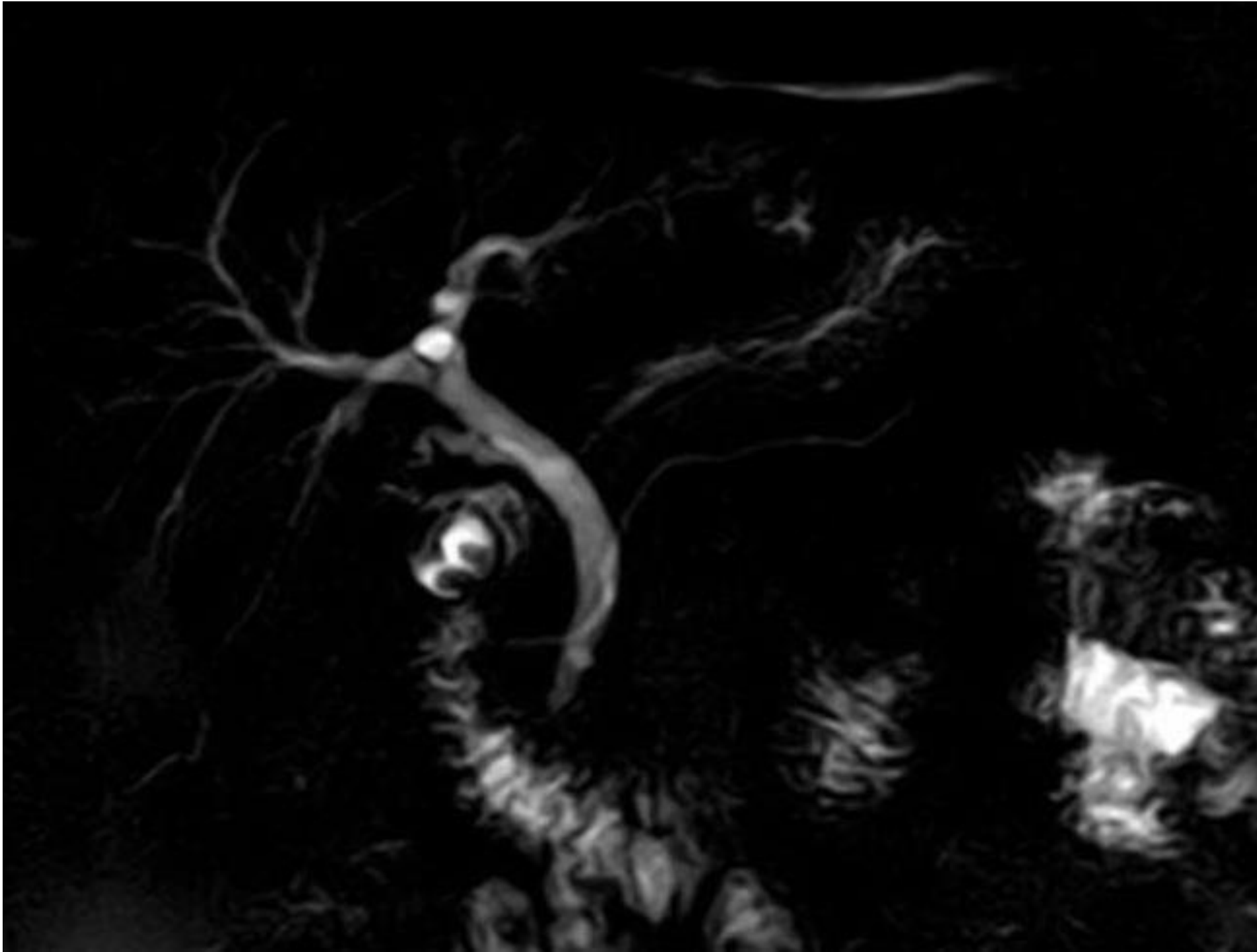
*Dig Endosc. 2025 Feb;37(2):176-182.

**VideoGIE. 2023 Feb 8;8(4):151-154. doi: 10.1016/j.vgie.2022.11.015.



Case

- 56 y.o. woman with documented acute recurrent pancreatitis
- Remote RYGB and cholecystectomy
- No other risk factors for ARP



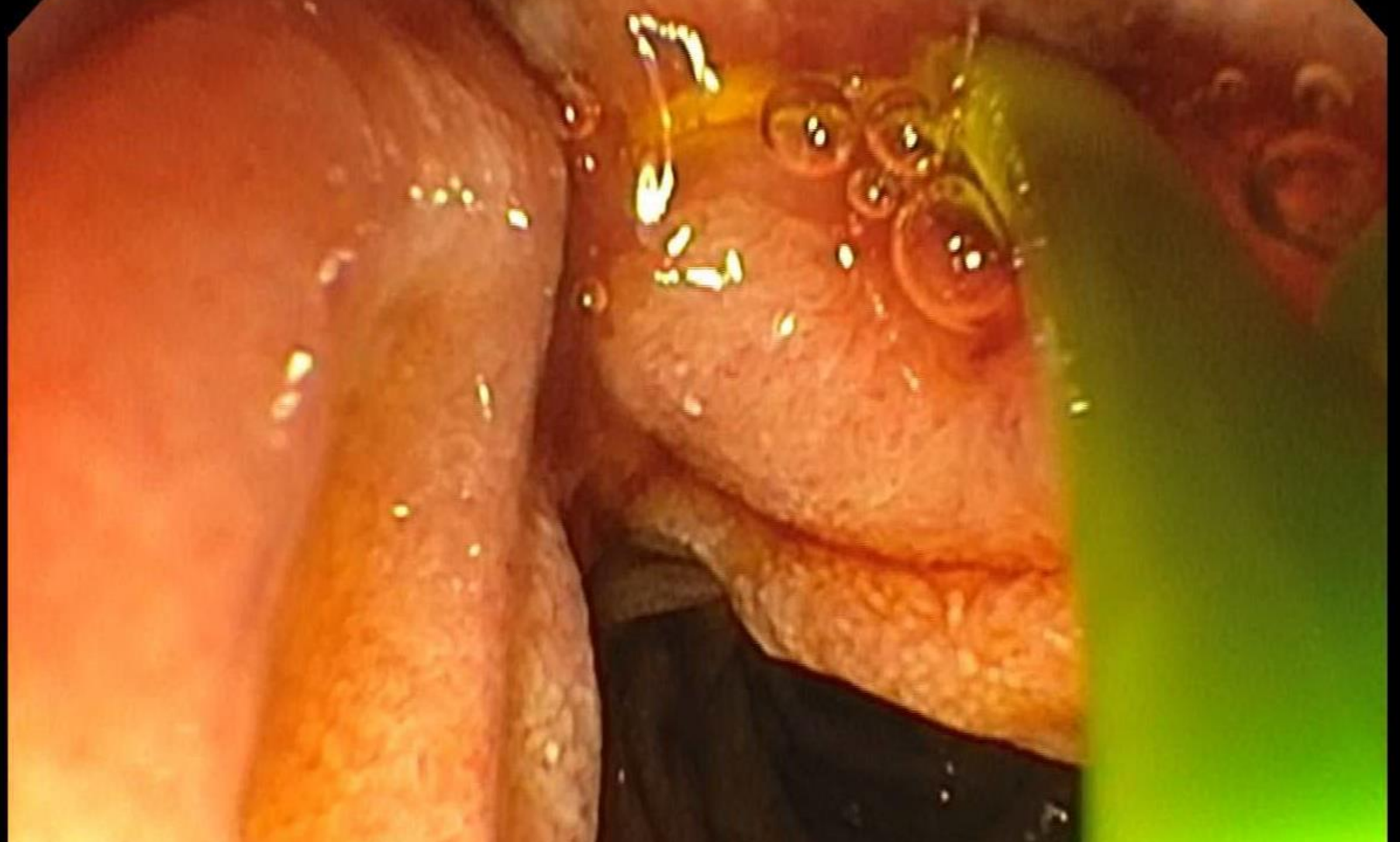


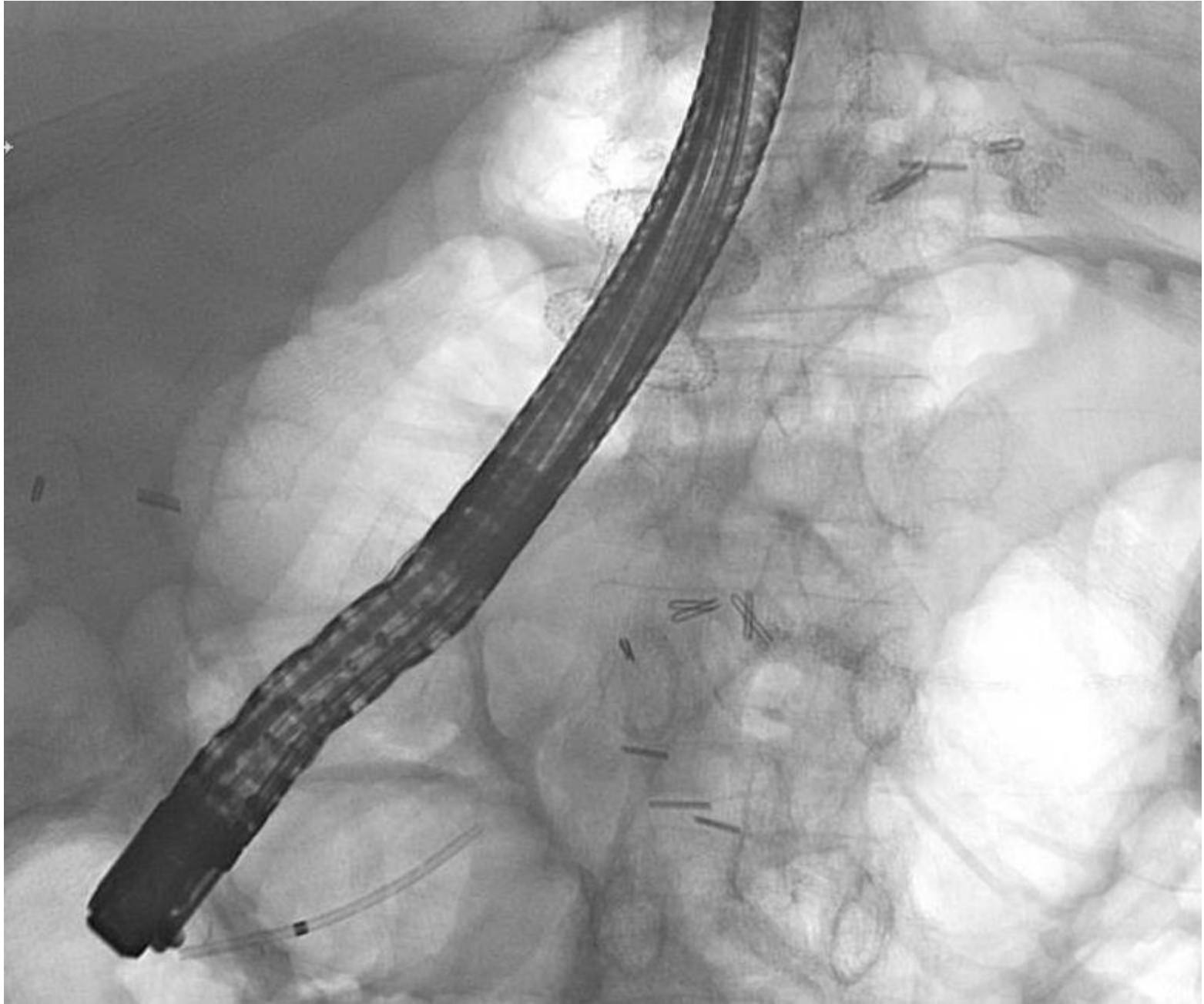












Follow-up

- Five months after procedure doing well
- Upper endoscopy with removal of jejunogastric stent
- Patient remains asymptomatic without pancreatitis or weight regain

Endoscopic ultrasound-directed transgastric ERCP (EDGE): a retrospective multicenter study

Authors

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Endoscopy. 2021 Jun;53(6):611-618.



► **Table 2** Characteristics of the 178 endoscopic ultrasound-directed transgastric endoscopic retrograde cholangiopancreatography (EDGE) procedures performed.

Gastrogastrostomy, n (%)	88 (50.2)¹
Jejunogastrostomy, n (%)	87 (49.7) ¹
Performed in a single session, n (%) ²	88 (49)
Procedure time for combined EUS + ERCP, mean (SD), minutes	92 (47)
15-mm LAMS, n (%)	112 (63)
20-mm LAMS, n (%)	66 (37)
Cold LAMS, n (%)	14 (8)
Hot LAMS, n (%)	164 (92)
Stent anchored with suture placement, n (%)	29 (16)
Overall technical success, n (%)	175 (98)



► **Table 3** Closure techniques and method of testing for a fistula in the 153 patients who underwent lumen-apposing metal stent (LAMS) removal.*

LAMS dwell time, median (IQR), days	35 (22 – 54)
Endoscopic closure techniques at LAMS removal, n (%)	
▪ No treatment	31 (20)
▪ APC alone	55 (36)
▪ Endoscopic suturing	57 (37)
▪ Through-the-scope clip	7 (5)
▪ Over-the-scope clip	3 (2)
Fistula testing, n (%)	
▪ Underwent EGD or UGI series to detect fistula	90 (59)
▪ Diagnostic studies positive for persistent fistula	9 (10)



► **Table 4** Adverse events following endoscopic ultrasound-directed transgastric endoscopic retrograde cholangiopancreatography (EDGE).

Adverse event	n	Severity*	Management
Perforation	6	Severe (1)	Laparoscopic surgical closure (1)
		Moderate (2)	Closed endoscopically (1) Conservative management (1)
		Mild (3)	Closed endoscopically (3)
Symptomatic pneumoperitoneum	3	Severe (2)	Laparoscopic decompression (2)
		Mild (1)	Needle decompression, no further intervention (1)
LAMS migration, intraprocedural	2	Severe (1)	Hypotension, intubation, ICU stay (1)
		Mild (1)	Procedure aborted (1)
LAMS misdeployment requiring bridging stent	9	Moderate (1)	Bridging stent placed and procedure completed (9)
		Mild (8)	
LAMS migration, delayed	2	Mild (2)	No intervention required (2)
Bleeding requiring red cell transfusion	2	Moderate (2)	Transfusions of 2 units and 3 units; EGD performed, with no active bleeding in either case (2)
Post-ERCP pancreatitis	3	Mild (3)	Conservative management (3)
Cholangitis	1	Moderate (1)	Intravenous then oral antibiotics (1)

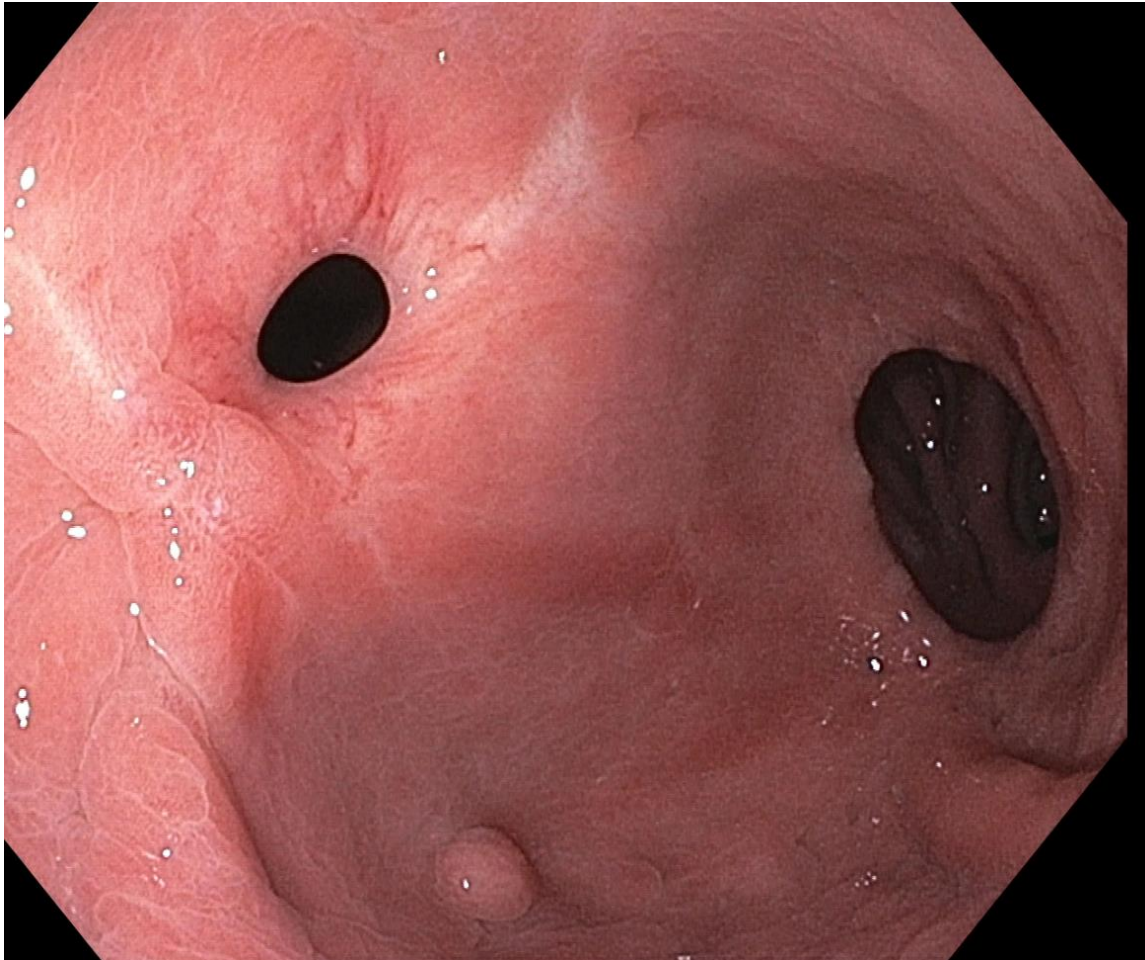
LAMS, lumen-apposing metal stent; ICU, intensive care unit; EGD, esophagogastroduodenoscopy; ERCP, endoscopic retrograde cholangiopancreatography.



EDGE: Pros and Cons

- PROS
 - Standard devices /approaches for ERCP
 - Superior success rates to enteroscopy-assisted ERCP
- CONS
 - Difficult to impossible if prior sleeve gastrectomy
 - LAMS mis-deployment
 - LAMS dislodgment during one-stage EDGE
 - Persistent fistula after LAMS removal

Persistent Fistula



- Weight regain
- Abdominal pain
- GERD
- Ulceration

A systematic review of technical factors associated with persistent fistula after endoscopic ultrasound-directed transgastric endoscopic retrograde cholangiopancreatography in patients with Roux-en-Y gastric bypass

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RESULTS

- 398 patients post-EDGE
- 78 (19.6%) had PF
- No association between PF and location of the fistula (gastrogastric vs jejunogastric) or whether ERCP was performed at the time of fistula creation or later
- 20 mm LAMS had higher PF than 15 mm
- Passive (spontaneous) fistula closure after stent removal was associated with PF formation relative to active closure.
- The association between stent dwell time and PF was not statistically significant

Closure Techniques after LAMS Removal

- APC alone or followed by
- Endoscopic suture closure
- X-Tack closure



Other Endoscopic Ultrasound-directed Transgastric Intervention (EDGI) (Non-ERCP)

- Any indication for access to the excluded stomach and duodenum
- Assessment of Severe GI bleeding
- PEG placement
- Resection of duodenal or gastric lesions
- EUS diagnostic and therapeutic
 - Biopsy of pancreatic masses
 - Gallbladder drainage
 - Pseudocyst drainage



Conclusions

- EDGE is increasingly being performed for access to the excluded stomach and duodenum in RYGB patients
- EDGE is an alternative to laparoscopic-assisted and enteroscopy-assisted ERCP
- Stent dislodgement and persistent fistula are concerns
- Closure of fistula at time of LAMS removal appears to decrease the rate of persistent fistula over removal alone
- EDGI can be used in RYGB patients for a variety of non-ERCP related indications

Thank You



Photo credit: Sam Kittner '85