EUS guided biliary access and drainage

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ERCP

Advantages

- Well established
- Many tools

- Transpapillary biliary /transpancreatic decompression
- Drain
- Remove stones
- Ductal endoscopy and therapy

Disadvantages

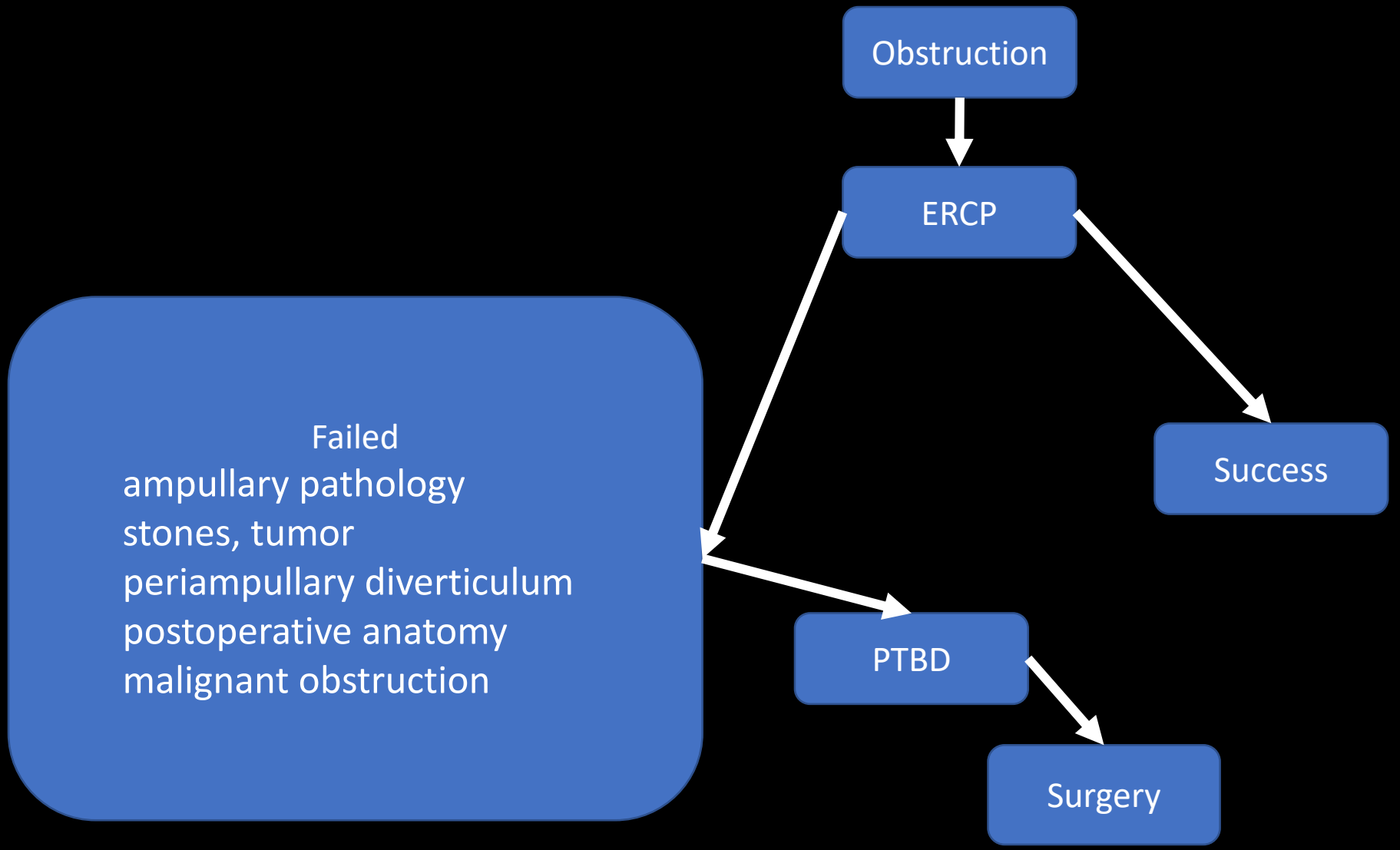
- Pancreatitis
- Bleeding
- Perforations
- Infections

- Need to pass into the duodenum to get access
- Trans-papillar route
- Failure to cannulate 5-10%

Gastrointest Endosc. 2010 Dec;72(6):1175-84, 1184.e1-3. doi: 10.1016/j.gie.2010.07.047.

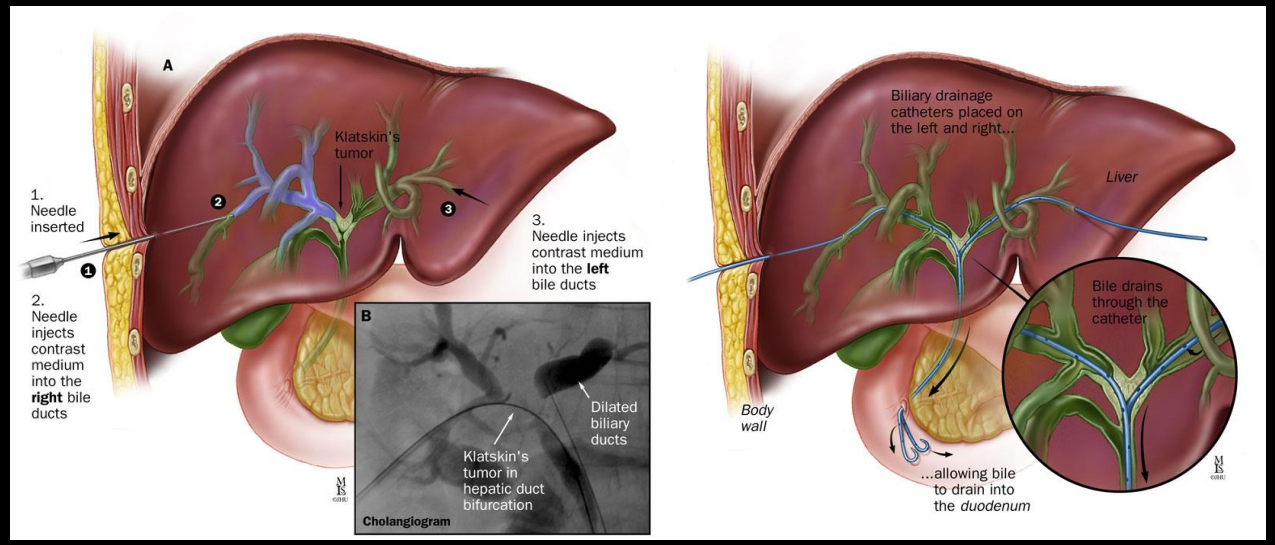
Nationwide, population-based data from 11,074 ERCP procedures from the Swedish Registry for Gallstone Surgery and ERCP.

Enochsson L[1], Swahn F, Arnelo U, Nilsson M, Löhr M, Persson G.


Obstruction
ERCP
Success
Failed
ampullary pathology
stones, tumor
periampullary diverticulum
postoperative anatomy
malignant obstruction
PTBD
Surgery

When trans-papillary route is not possible

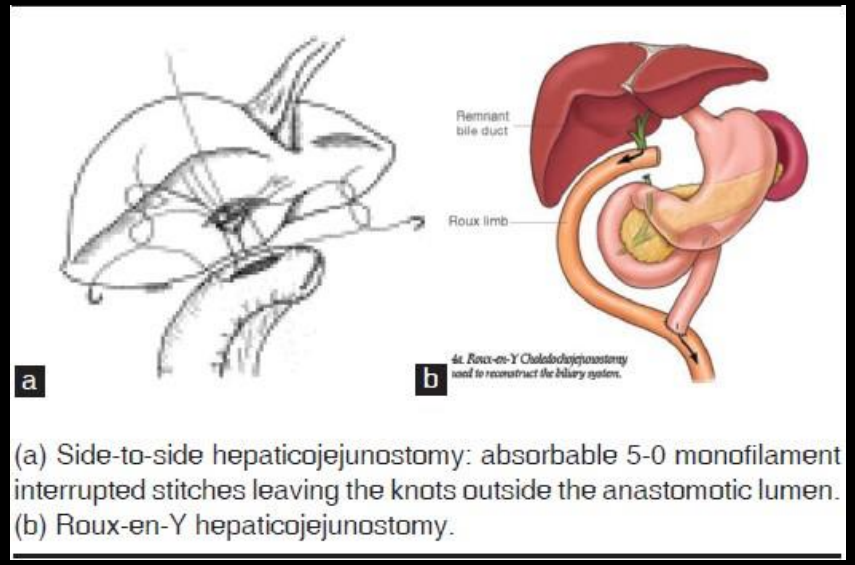
- Per cutaneous trans hepatic biliary drainage (PTBD)
- High success rate
- Adverse events 20-77%
  - Fistula formation,
  - longer recovery time
  - Infection
  - pain and discomfort



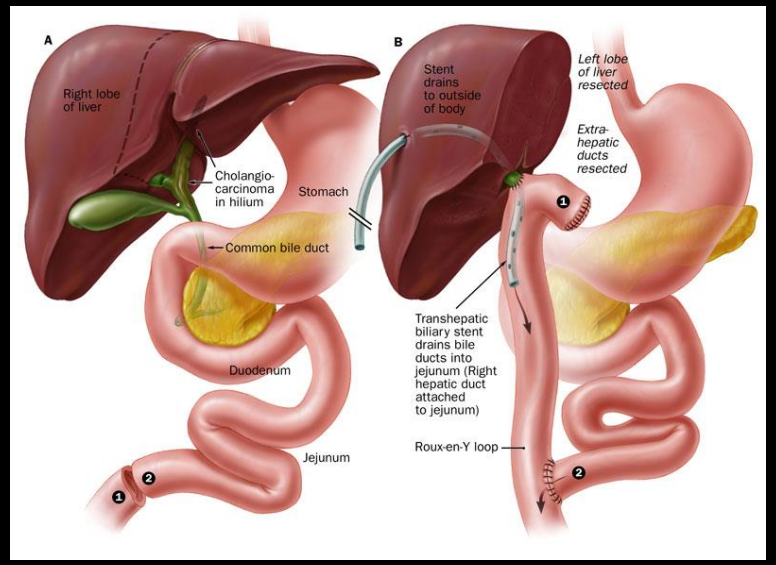
Ref. Johnhopkinsmedicine.org

Surgical biliary decompression

- 9-67% morbidity
- 3% mortality



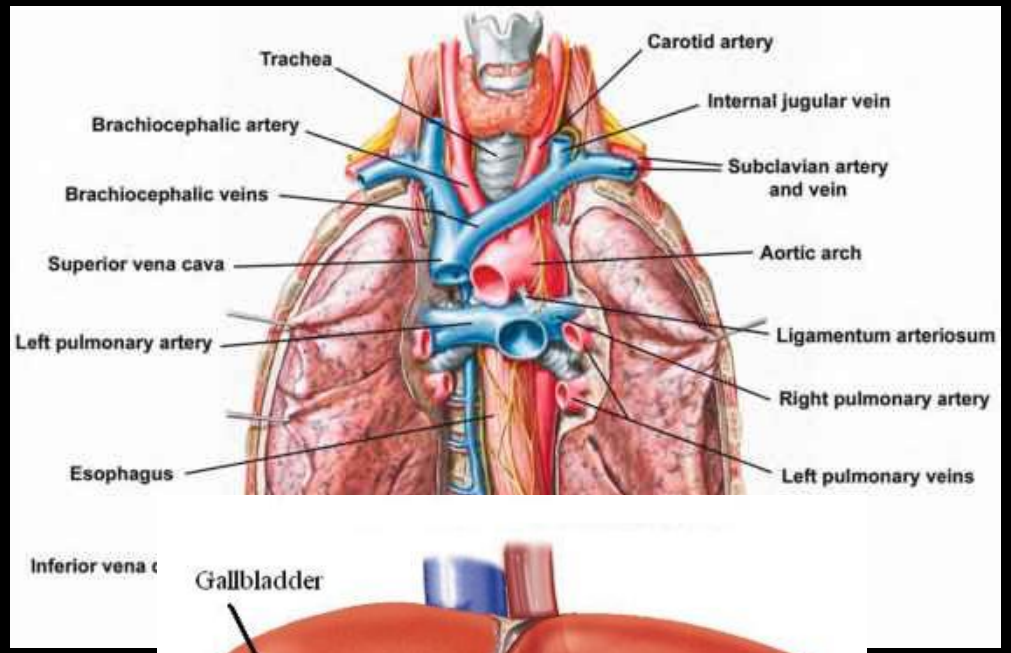
(a) Side-to-side hepaticojejunostomy: absorbable 5-0 monofilament interrupted stitches leaving the knots outside the anastomotic lumen. (b) Roux-en-Y hepaticojejunostomy.

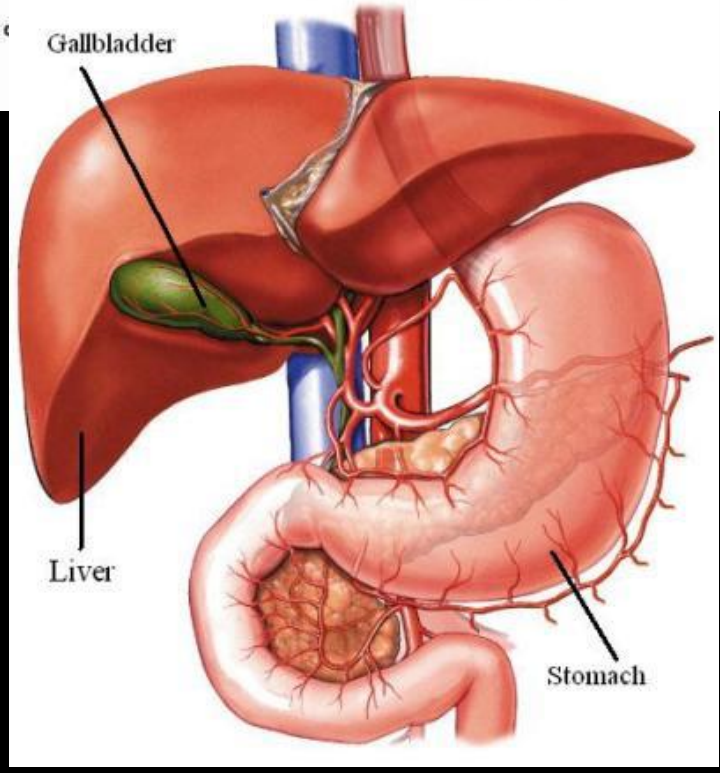


Linear EUS fundamentals

- Anatomy difficult to understand
- Understand endoscopic and US pictures and handle the scope
- Samples/FNA

- Possible targets: Liver, pancreas, kidneys, adrenals, spleen, mediastinum, great vessels

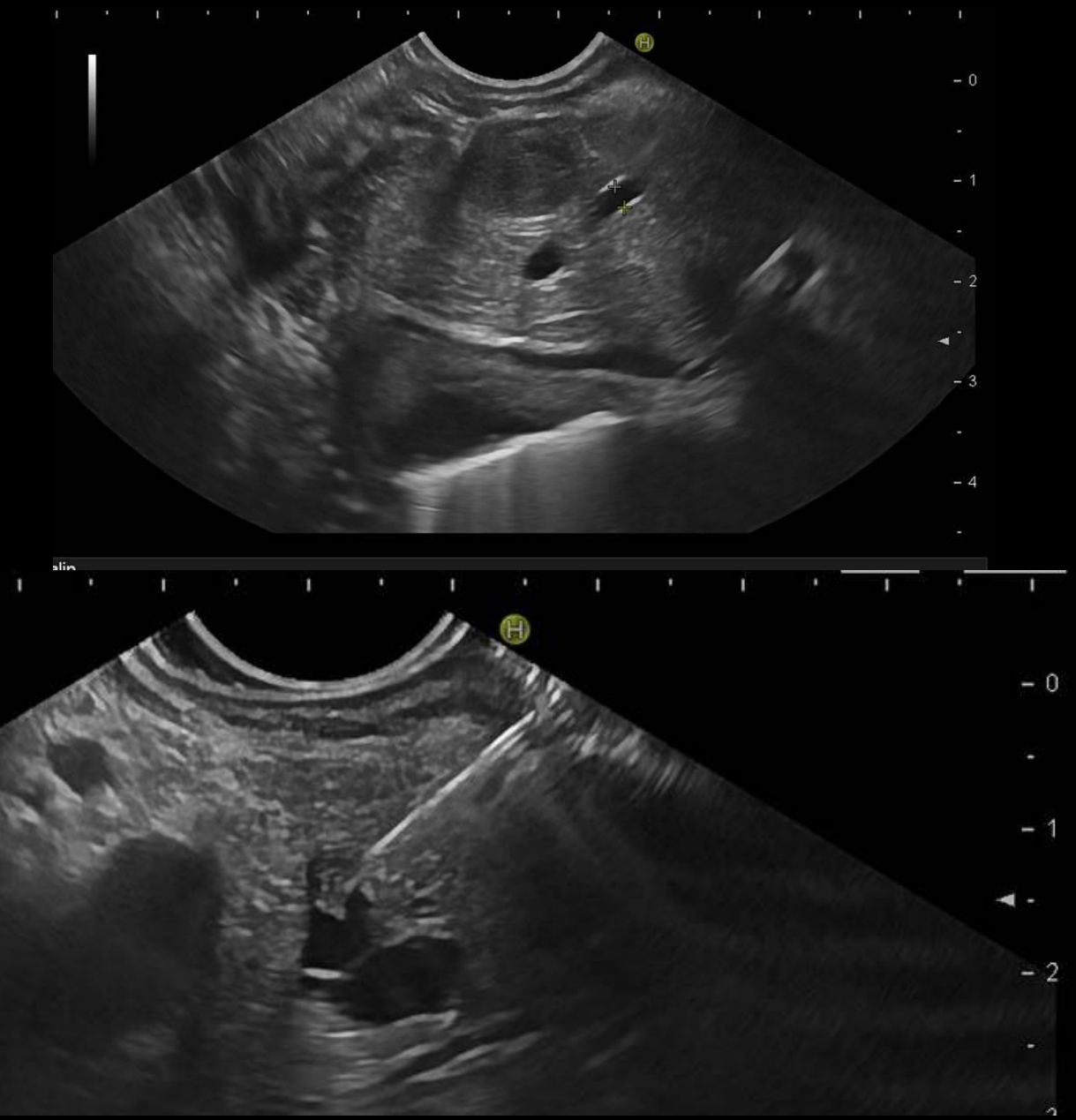




EUS Advantages

- Short route to nearby structures
- Fine diagnostics
- Superior real time resolution
- Doppler
- Precision

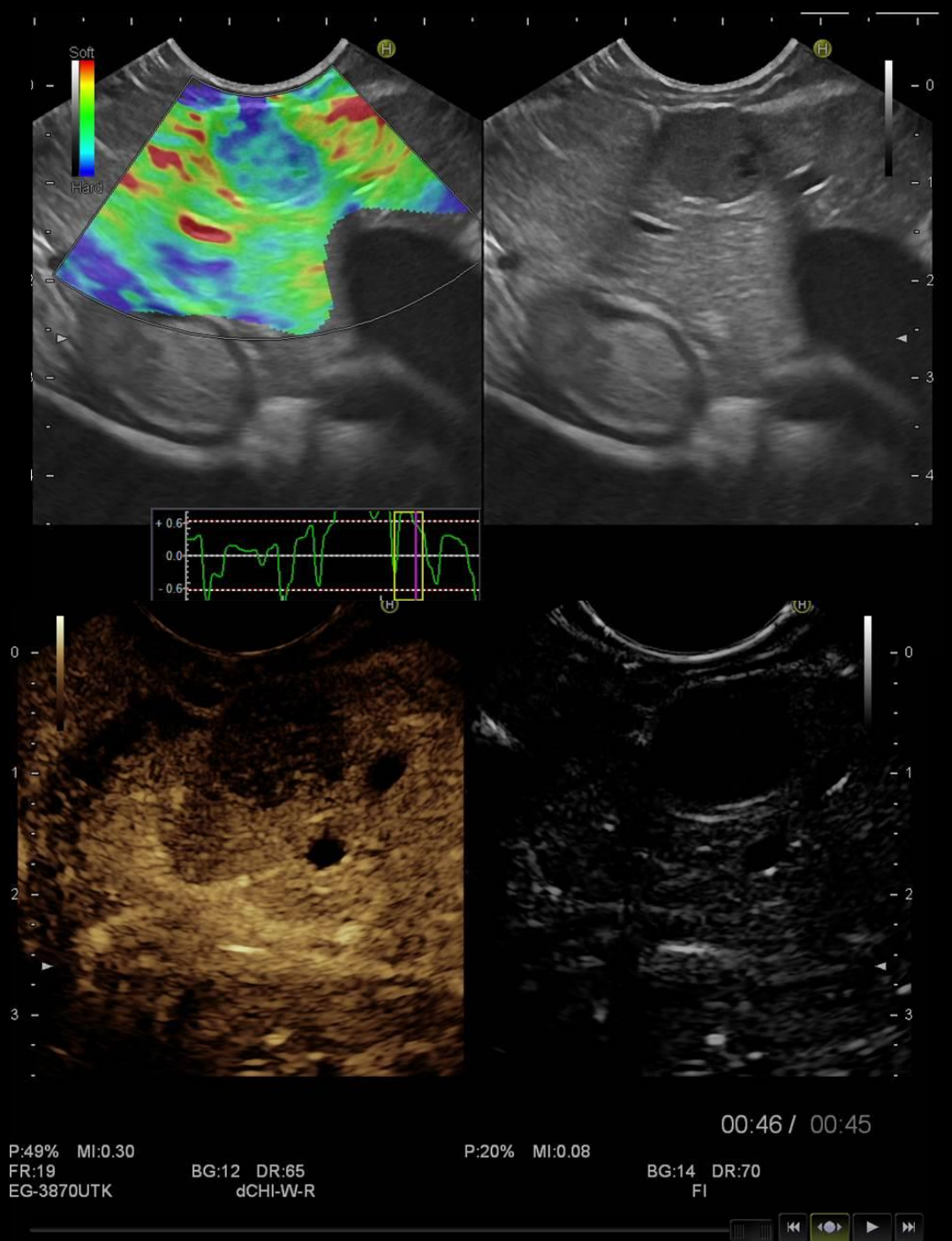
- Platform for intervention



EUS modalities

- EUS (B-Mode)
- EUS with elastosonography
- EUS with contrast (CE-EUS)

- FNA, FNB



EUS biliary drainage

- Alternative to percutaneous trans hepatic biliary drainage (PTBD) after failed ERCP
- 90% success rate
- Clinical result equal to PTBD
- Lower complication rate than PTBD
- Less pain
- More comfortable for the patient
- “Automatic drainage system”
- The bile is emptied into the GI tract, more physiological
- Stay at home – less to handle

EUS-BD vs PTBD

Surg Endosc. 2016 Dec;30(12):5500-5505. Epub 2016 Apr 29.

Endoscopic ultrasound-guided biliary drainage versus percutaneous transhepatic biliary drainage: predictors of successful outcome in patients who fail endoscopic retrograde cholangiopancreatography.

Sharaiha RZ[1], Kumta NA[1], Desai AP[1], DeFilippis EM[1], Gabr M[1], Sarkisian AM[1], Salgado S[1], Millman J[1], Benvenuto A[1], Cohen M[1], Tyberg A[1], Gaidhane M[1], Kahaleh M[2].

Author information

CONCLUSION: Despite similar technical success rates compared to PTBD, EUS-BD results in a lower need for re-intervention, decreased rate of late adverse events, and lower pain scores, and is the sole predictor for clinical success and long-term resolution. EUS-BD should be the treatment of choice after a failed ERCP.

Dig Dis Sci. 2015 Feb;60(2):557-65. doi: 10.1007/s10620-014-3300-6. Epub 2014 Aug 1.

A comparative evaluation of EUS-guided biliary drainage and percutaneous drainage in patients with distal malignant biliary obstruction and failed ERCP.

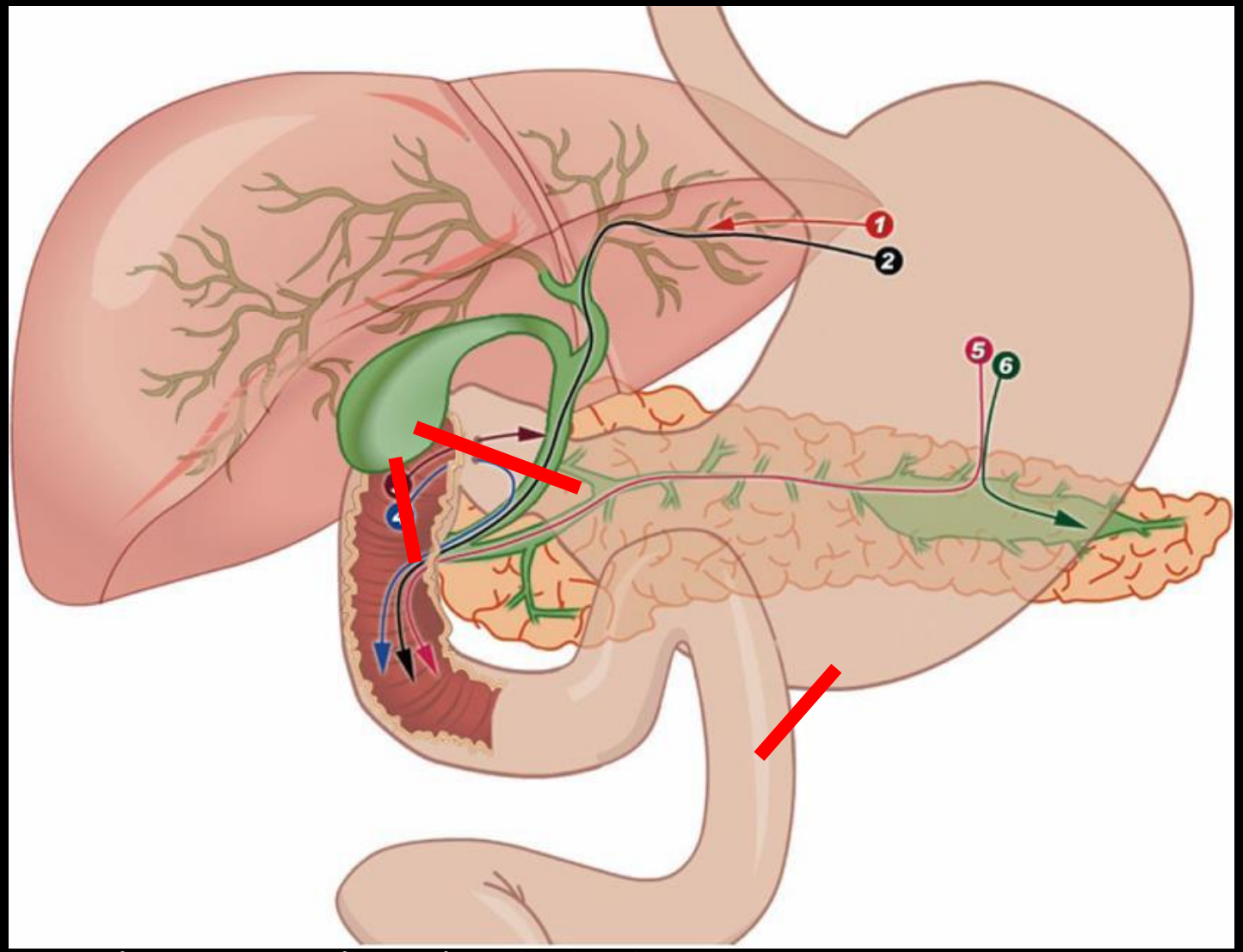
Khashab MA[1], Valeshabad AK, Afghani E, Singh VK, Kumbhari V, Messallam A, Saxena P, El Zein M, Lennon AM, Canto MI, Kalloo AN.

CONCLUSION: EGBD and PTBD are comparably effective techniques for treatment of distal malignant biliary obstruction after failed ERCP. However, EGBD is associated with decreased adverse events rate and is significantly less costly due to the need for fewer reinterventions. Our results suggest that EGBD should be the technique of choice for treatment of these patients at institutions with experienced interventional endosonographers.

But be aware!

- EUS-BD is sometimes a dangerous procedure
- EUS-guided drainage should not be used to compensate for a lack of ERCP skills
- “EUS-BD is technically difficult and, currently, complications rates are high, so only endoscopist`s skilled in both EUS and ERCP should perform EUS-guided biliary and pancreatic drainage procedures"
- TRAINING

Endosonography-guided cholangiopancreatography as a salvage drainage procedure for obstructed biliary and pancreatic ducts

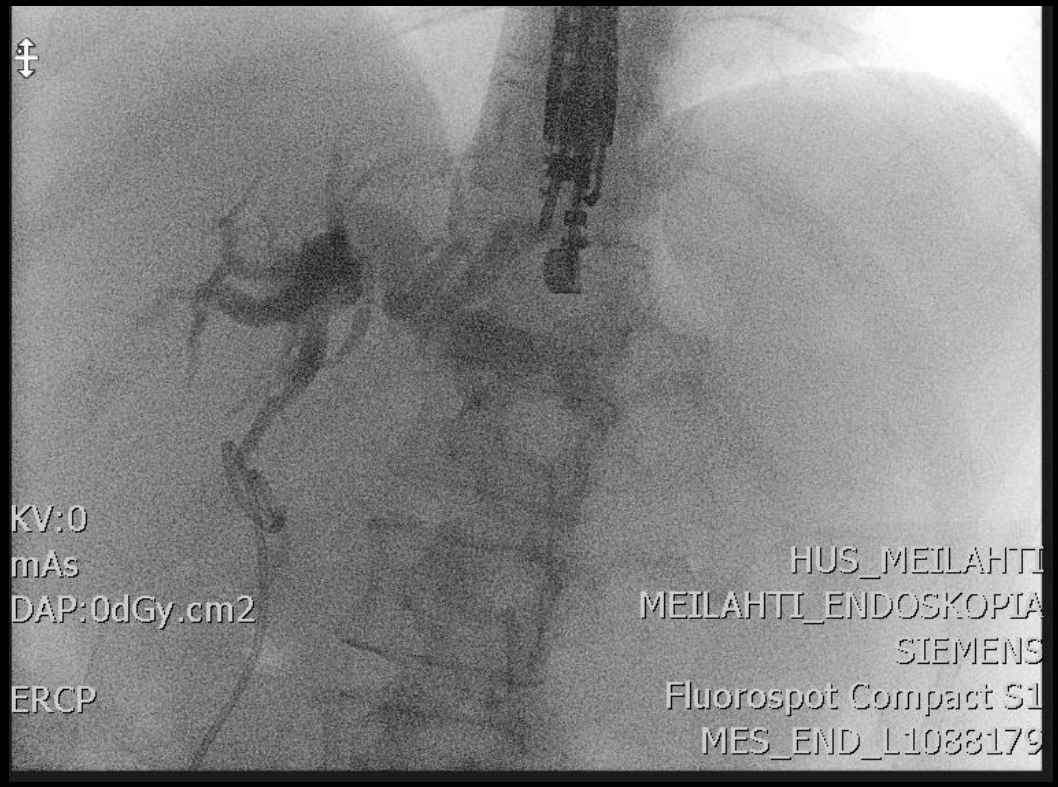


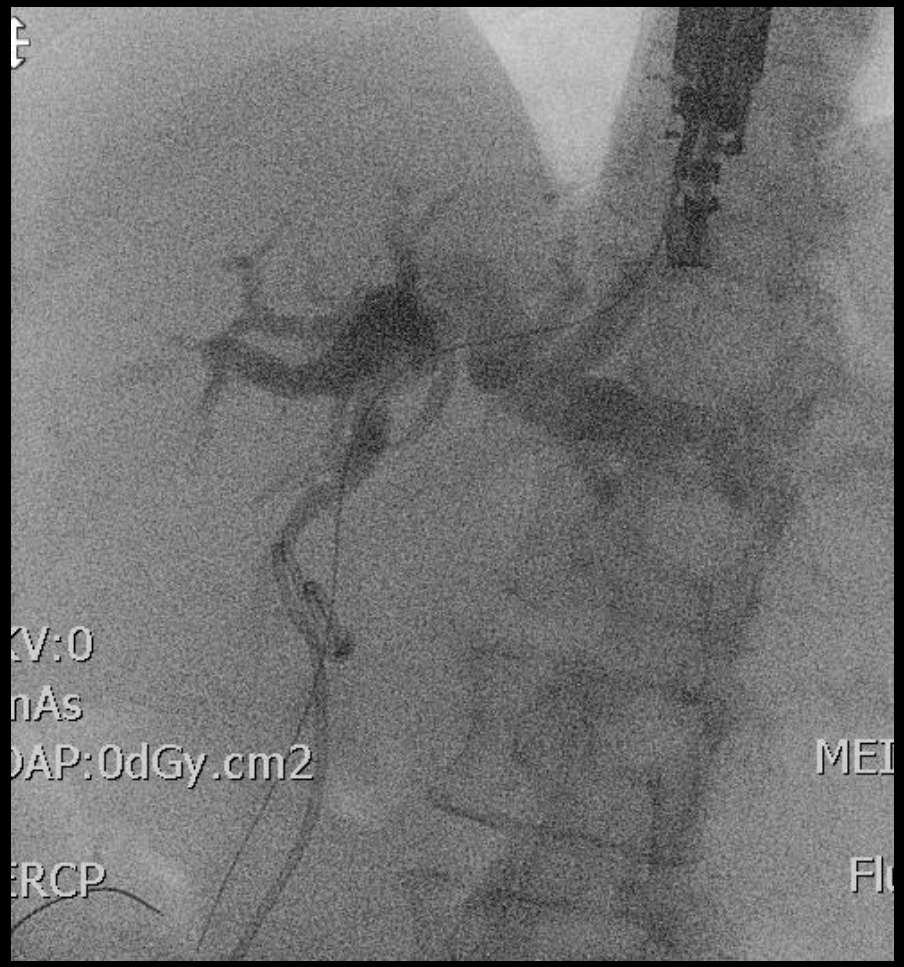
Manuel Perez-Miranda et al WJGE 2010

EUS drainage steps

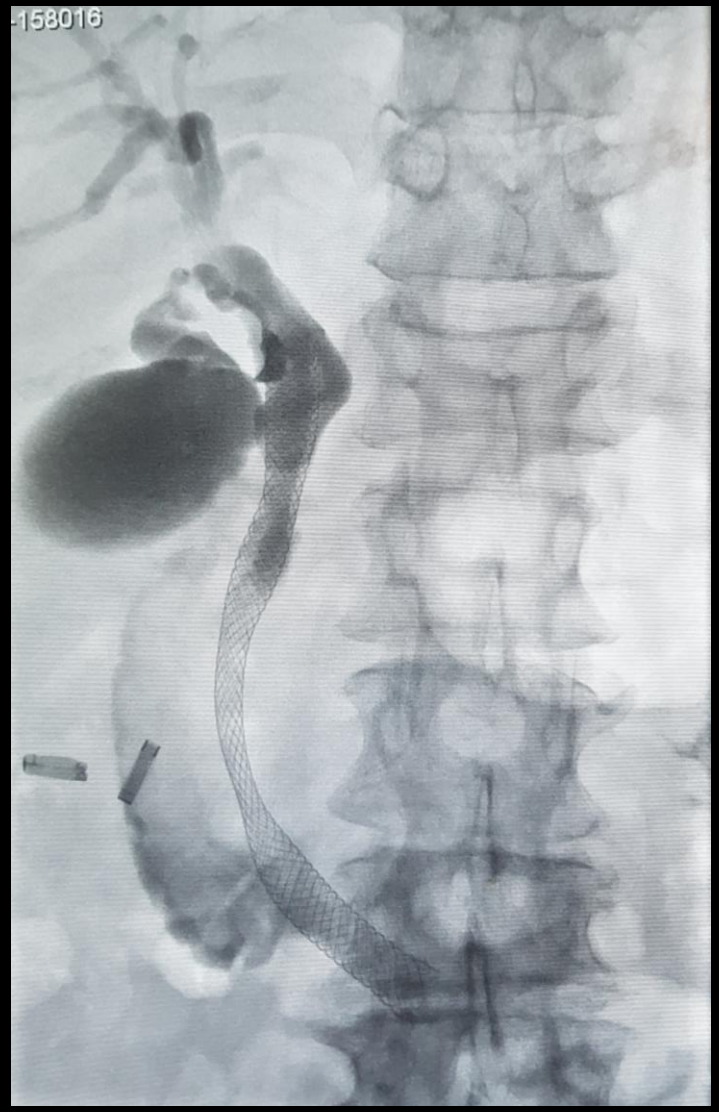
- Identify the ducts
- 19G needle
- Aspiration
- Injection of contrast
- Guide wire
- Dilation of fistula with, diathermy, bouginage catheter or balloon

EUS-ERCP Rendez-vous





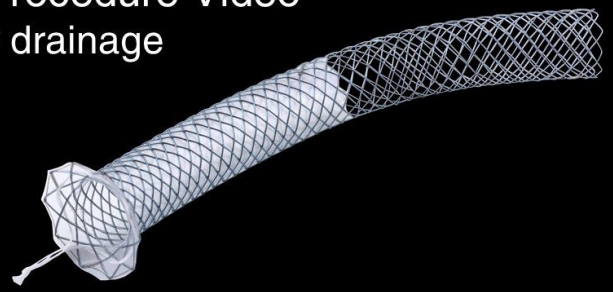
Antergrade stenting



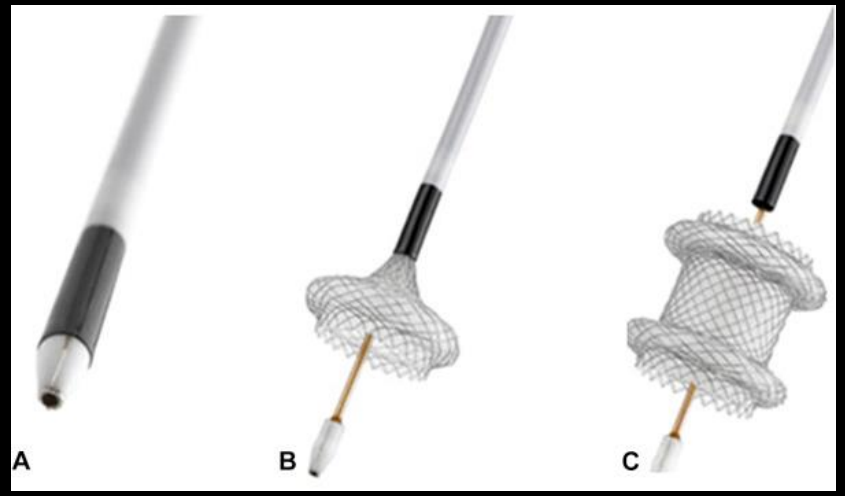
TAEWOONG NITI-S™

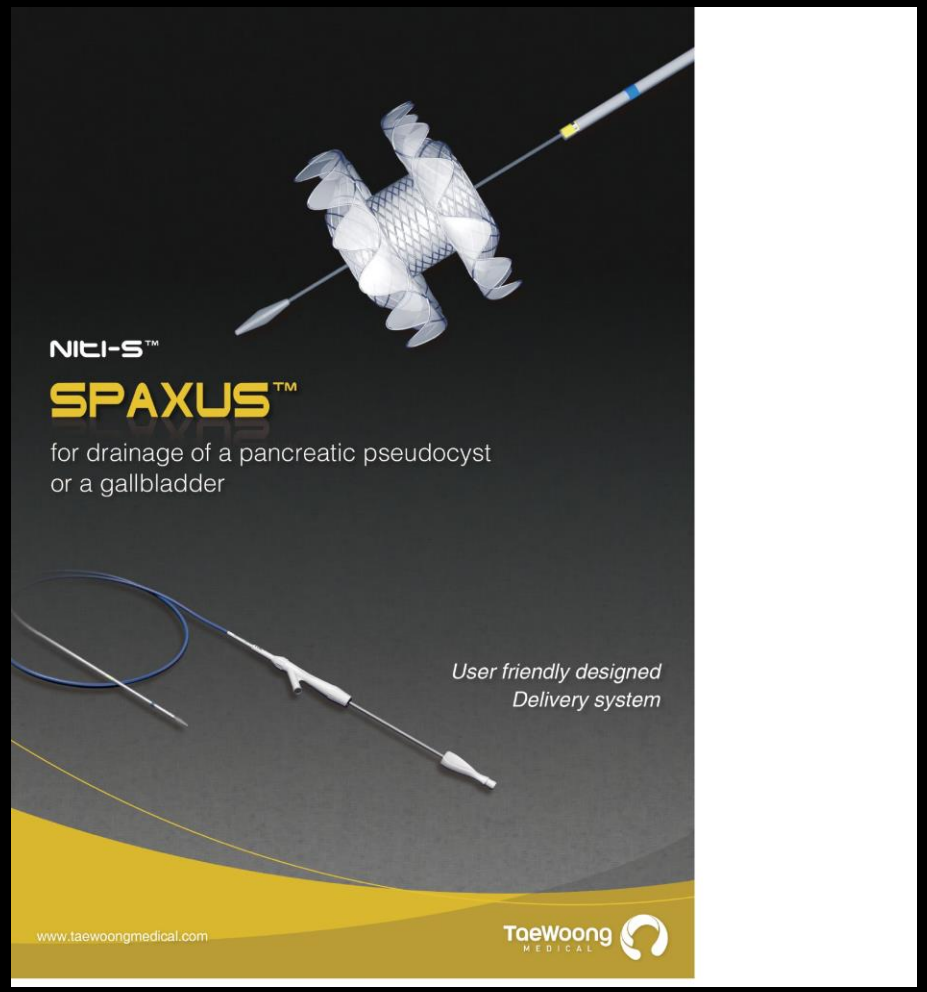
GIOBOR™ Stent Procedure Video
-EUS-Guided biliary drainage

by Dr. Giovannini, France

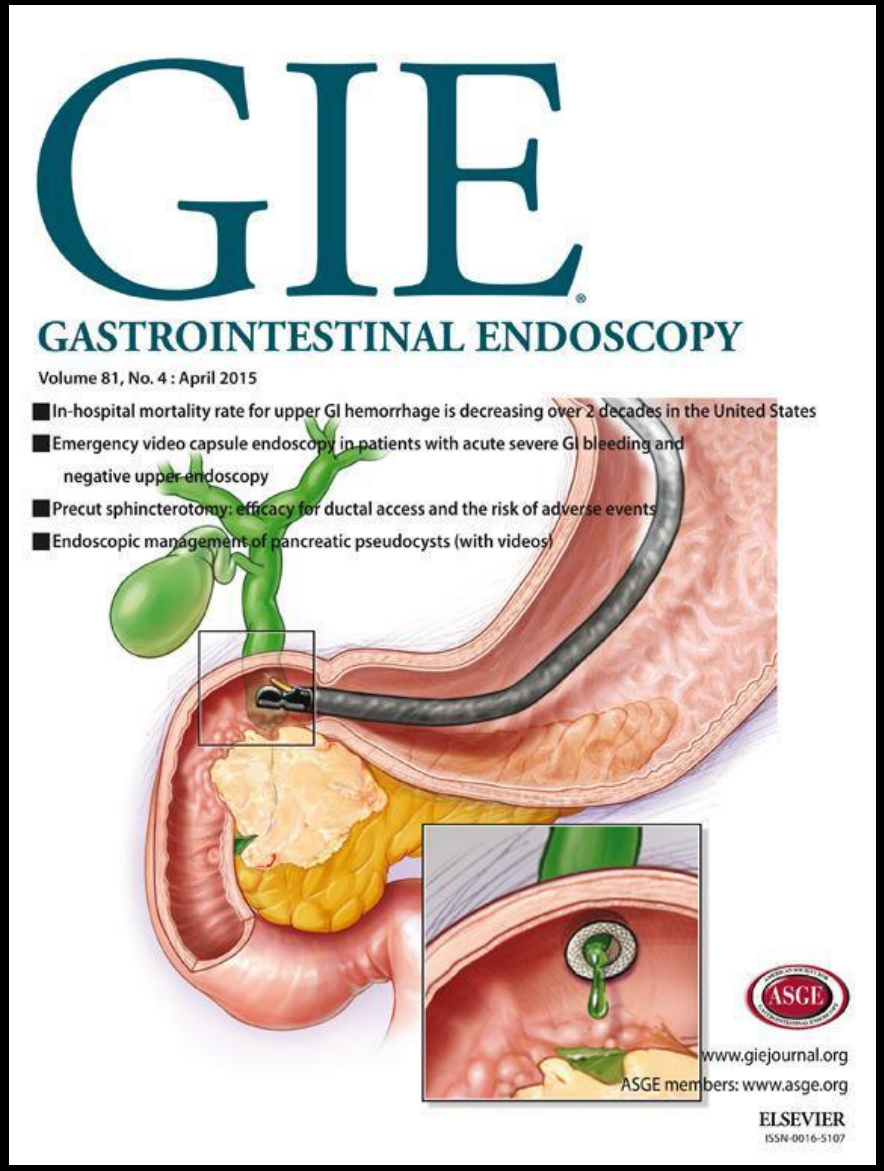


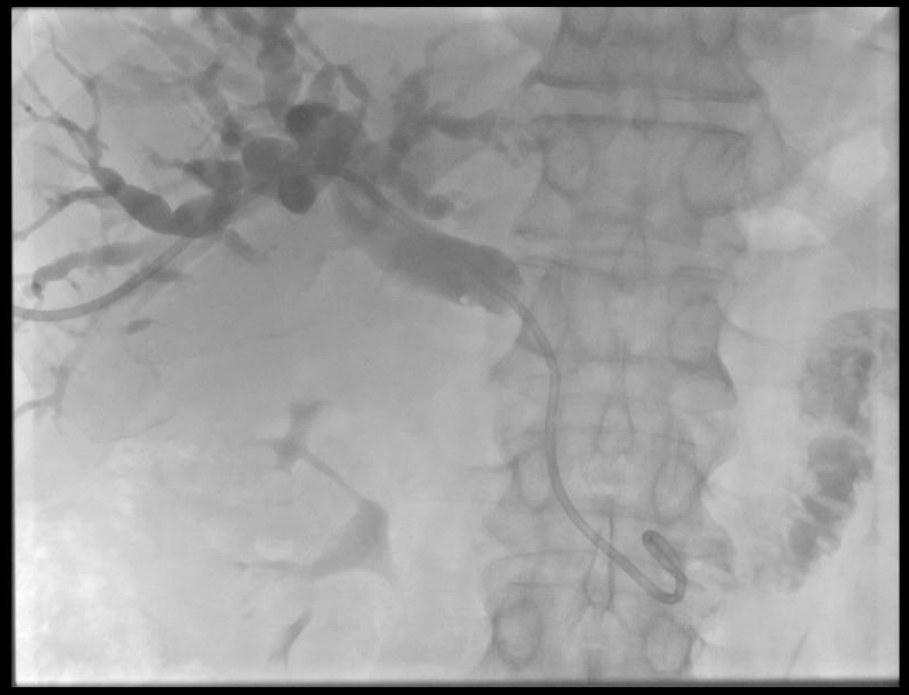
TaeWoong MEDICAL

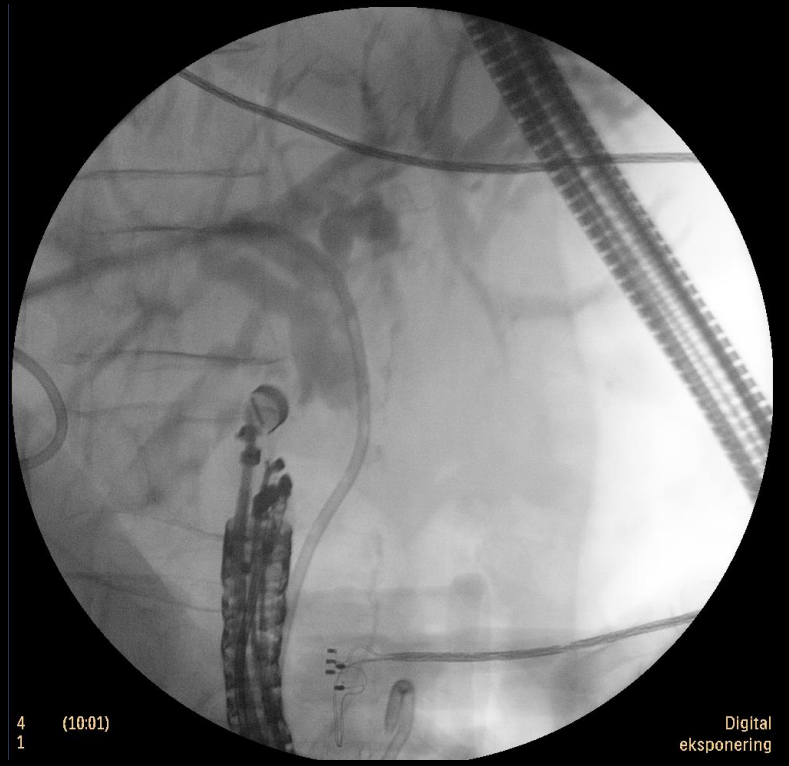




EUS-guided Choledochoduodenostomy







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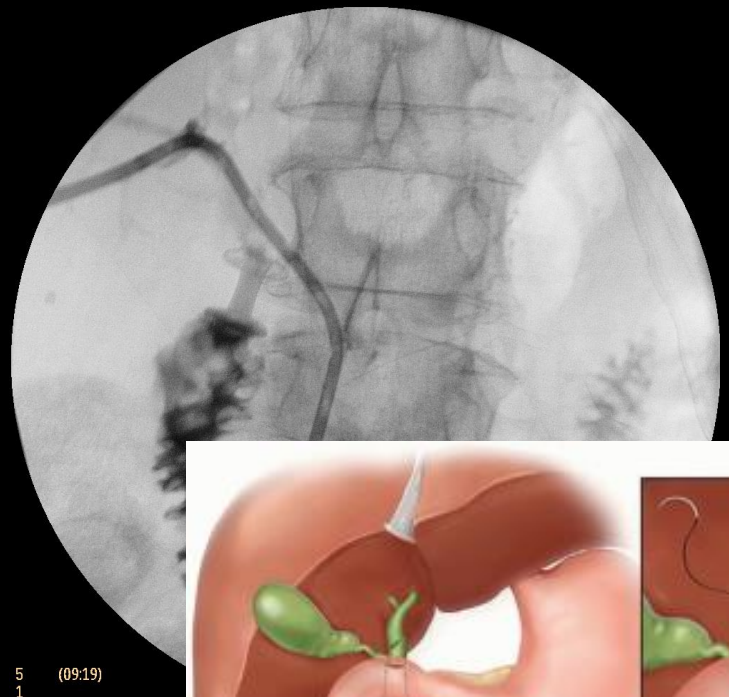

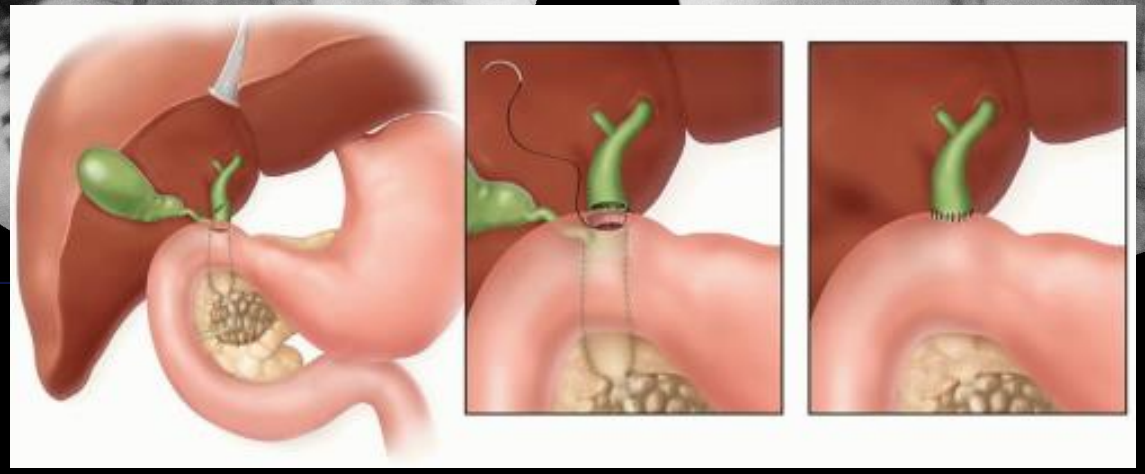

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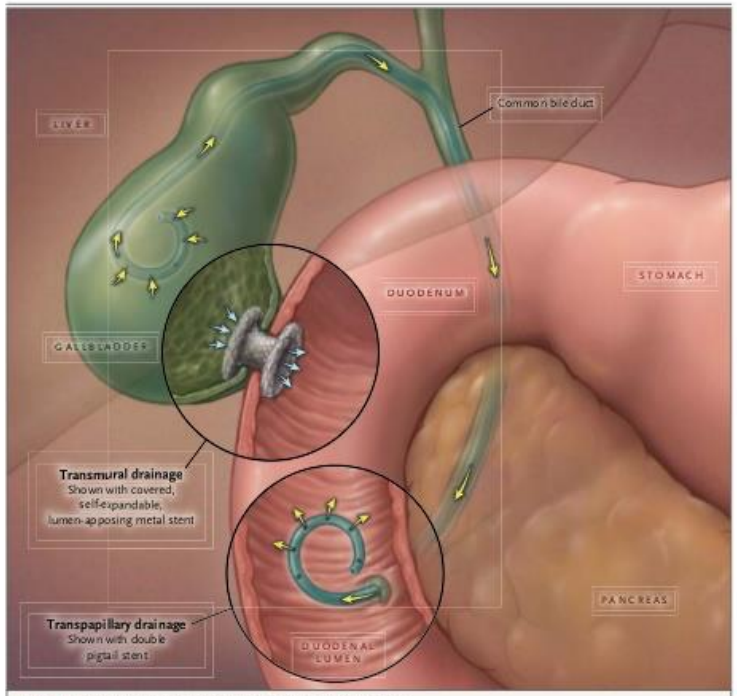


Figure 3. Peroral Endoscopic Approaches to Gallbladder Drainage.
Transpapillary and transmural (transduodenal) drainage are shown.

The use of transpapillary drainage of the gallbladder is limited by the technical difficulty of advancing a guidewire from a retrograde position through the cystic duct, which is often long, narrow, and tortuous and is sometimes occluded by an impacted gallstone. In addition, the cystic duct can accommodate only small-caliber plastic stents (5 to 7 French), which are prone to occlusion with biofilm. It is not know whether stent occlusion limits the long-term efficacy of the procedure, since bile can often flow around the stent.[45]

TRANSMURAL DRAINAGE

The most recent alternative to percutaneous cholecystostomy is transmural EUS-guided gallbladder drainage, which was described in 2007.[46] The gallbladder is usually closely apposed to the gastrointestinal tract and is conspicuous on endosonography. The use of Doppler imaging allows the endoscopist to avoid vessels while introducing the needle into the gallbladder. A guidewire is then positioned within the gallbladder, which allows for the deployment of transnasal drainage catheters or internal stents (Fig. 3).

Although assessments of EUS-guided gallbladder drainage have been limited to small studies conducted at expert centers, the procedure has been effective in the treatment of more than 95% of high-risk surgical patients who have acute cholecystitis. In a recent review of 155 patients

Gastrointest Endosc. 2019 Sep;90(3):483-492. doi: 10.1016/j.gie.2019.04.238. Epub 2019 May 2.

EUS-guided gallbladder drainage with a lumen-apposing metal stent versus endoscopic transpapillary gallbladder drainage for the treatment of acute cholecystitis (with videos).

Higa JT[1], Sahar N[1], Kozarek RA[1], La Selva D[1], Larsen MC[1], Gan SI[1], Ross AS[1], Irani SS[1].

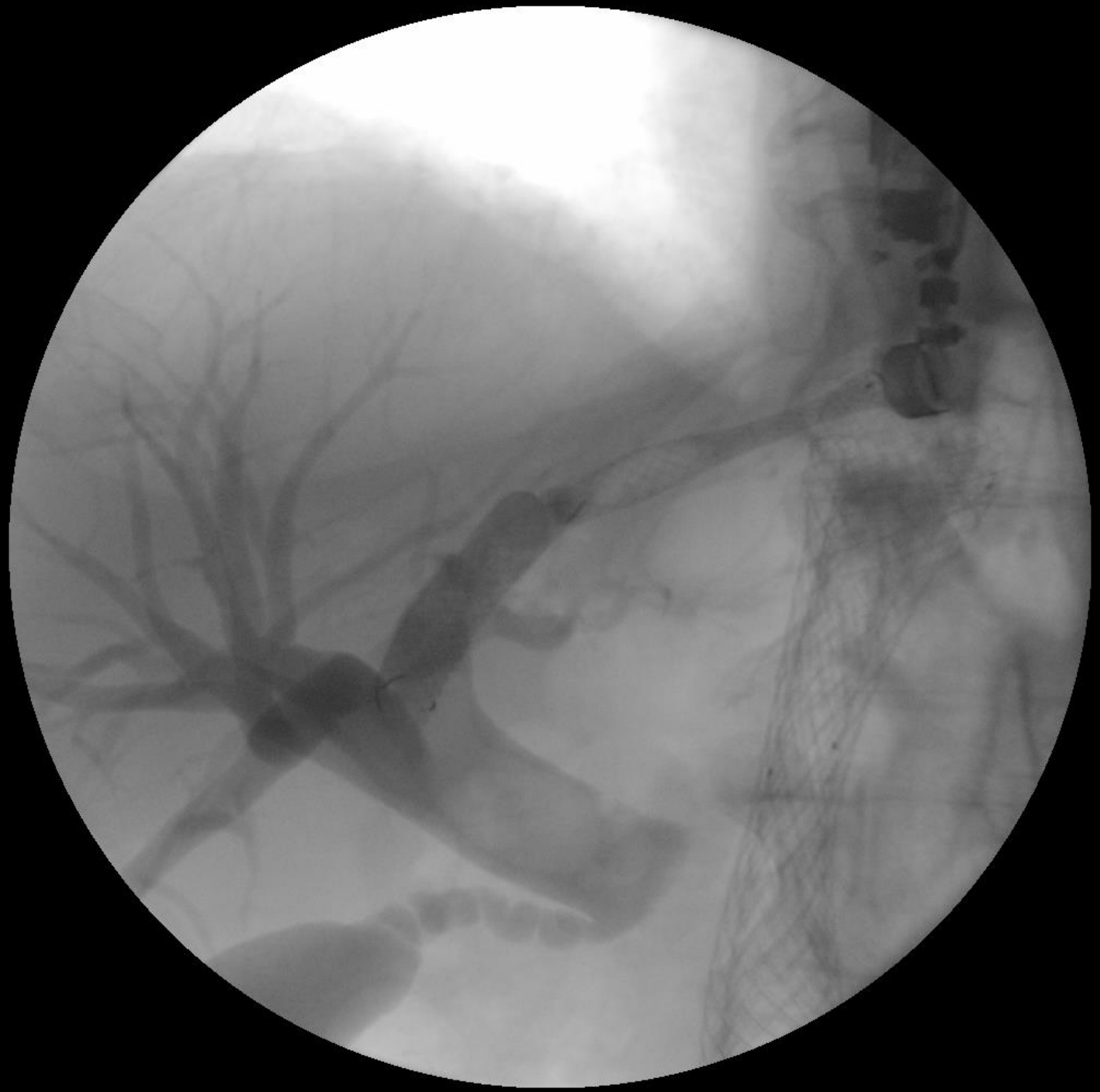
CONCLUSIONS: EUS-guided GB drainage results in a higher clinical success rate compared with transpapillary drainage and may be associated with a lower recurrence rate of cholecystitis. However, transpapillary drainage should be considered as the first-line treatment for patients who are surgical candidates but require temporizing measures or require an ERCP for alternative reasons.

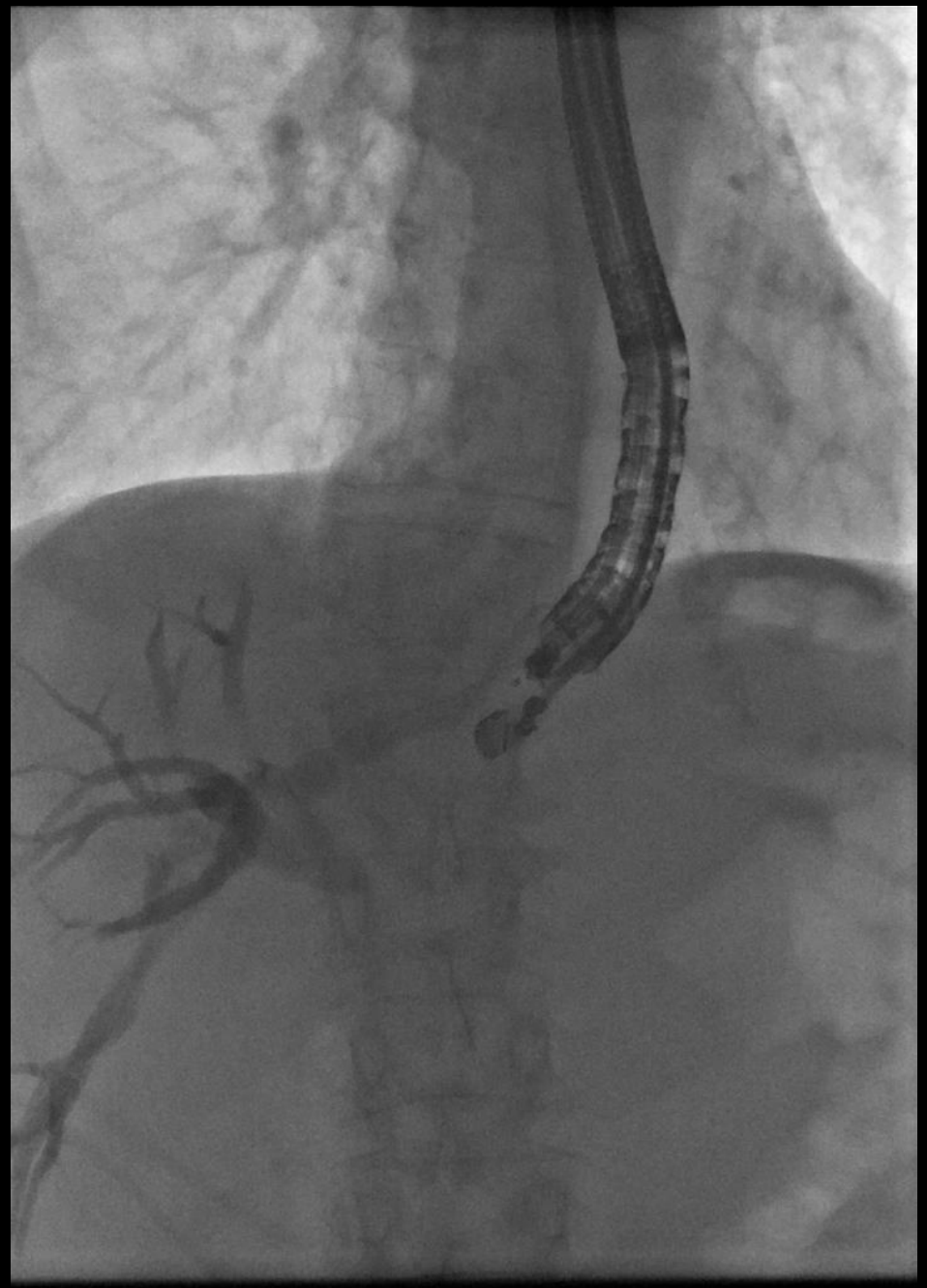
Surg Endosc. 2019 Apr;33(4):1260-1270. doi: 10.1007/s00464-018-6406-7. Epub 2018 Sep 12.

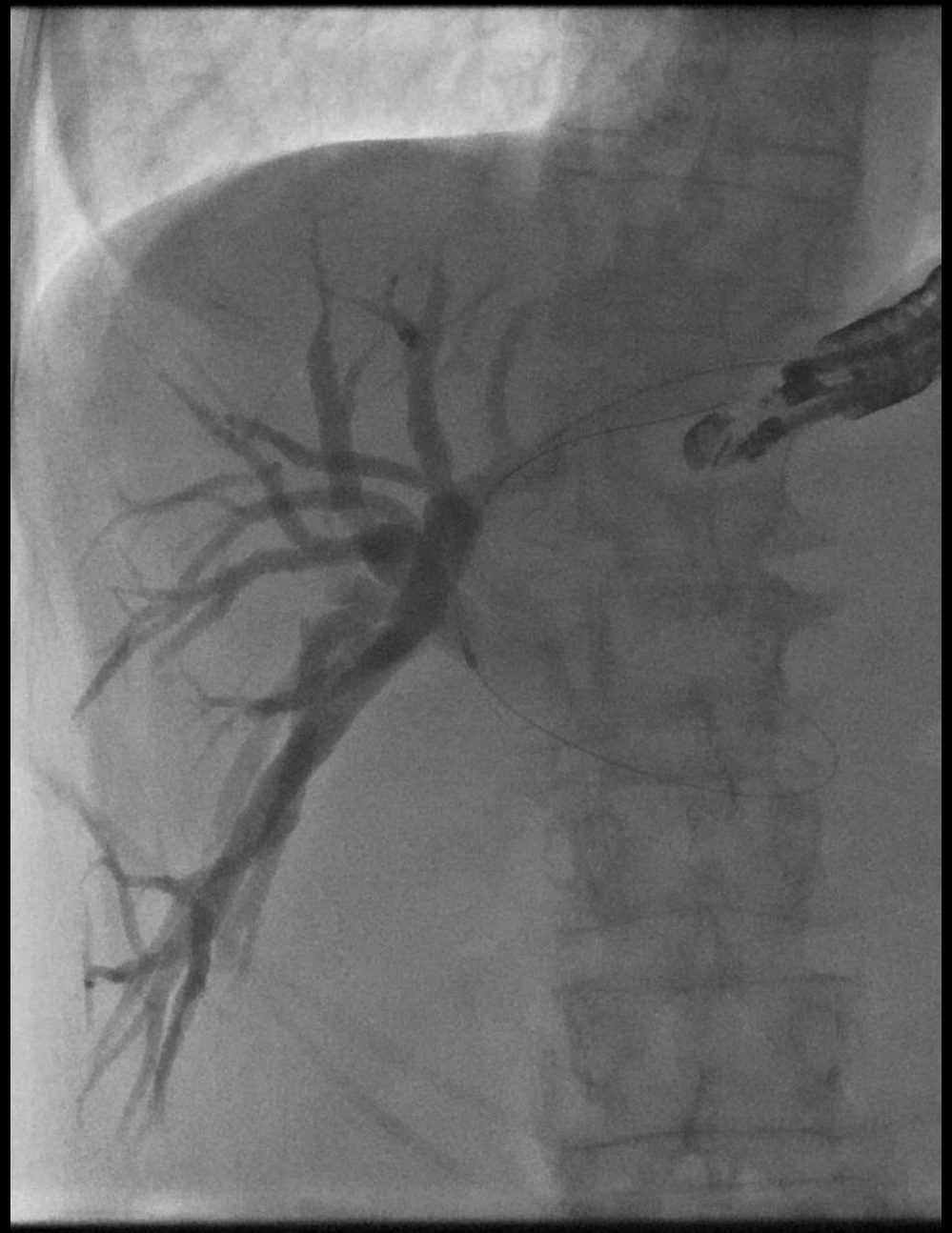
Three-way comparative study of endoscopic ultrasound-guided transmural gallbladder drainage using lumen-apposing metal stents versus endoscopic transpapillary drainage versus percutaneous cholecystostomy for gallbladder drainage in high-risk surgical patients with acute cholecystitis: clinical outcomes and success in an International, Multicenter Study.

Siddiqui A[1], Kunda R[2], Tyberg A[3], Arain MA[4], Noor A[1], Mumtaz T[1], Iqbal U[1], Loren DE[1], Kowalski TE[1], Adler DG[5], Saumoy M[3], Gaidhane M[3], Mallery S[4], Christiansen EM[4], Nieto J[6], Kahaleh M[7].

CONCLUSIONS: EGBD with LAMS is an effective and safer alternative to TP and PTGBD for treatment of patients with acute cholecystitis who cannot undergo surgery. EGBD with LAMS has significantly lower overall AEs, hospital stay, and unplanned admissions compared to PTGBD.







Complications HGS

- Bleeding
  - Hepatic artery
- Stent migration
  - Intrahepatic
  - To the stomach
  - Peritoneum
- Bile leakage & bile peritonitis
- Mortality

Surgical altered anatomy

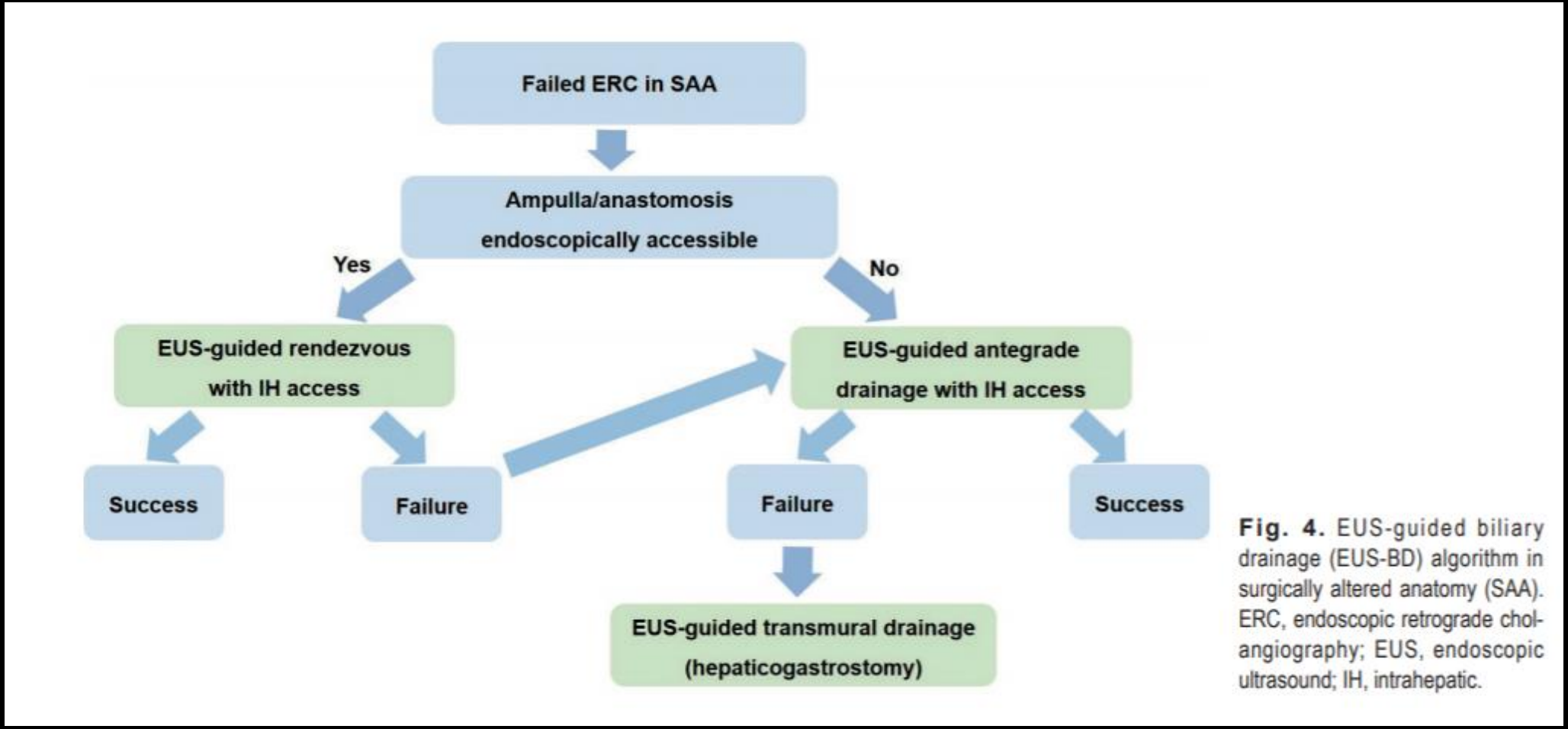


Fig. 4. EUS-guided biliary drainage (EUS-BD) algorithm in surgically altered anatomy (SAA). ERC, endoscopic retrograde cholangiography; EUS, endoscopic ultrasound; IH, intrahepatic.

Endoscopy. 2016;48 Suppl 1:E146-7. doi: 10.1055/s-0042-105561. Epub 2016 Apr 26.

Peroral transhepatic cholangioscopy-guided electrohydraulic lithotripsy via an endoscopic ultrasonography-guided hepaticogastrostomy route for bile duct stones in a patient with Roux-en-Y anatomy.

Kawakami H[1], Kubota Y[1], Kawahata S[2], Kubo K[2], Okabayashi S[3], Tatsumi R[3], Sakamoto N[2].

Gastrointest Endosc. 2018 May 3. pii: S0016-5107(18)32664-6. doi: 10.1016/j.gie.2018.04.2353. [Epub ahead of print]

EUS-guided hepaticoenterostomy as a portal to allow definitive antegrade treatment of benign biliary diseases in patients with surgically altered anatomy.

James TW[1], Fan YC[2], Baron TH[1].

Endosc Int Open. 2018 Feb;6(2):E127-E130. doi: 10.1055/s-0043-123188. Epub 2018 Feb 1.

Endoscopic ultrasound-guided hepaticogastrostomy and antegrade clearance of biliary lithiasis in patients with surgically-altered anatomy.

Hosmer A[1], Abdelfatah MM[2], Law R[1], Baron TH[3].

Endoscopic Ultrasound (EUS)-Directed Transgastric Endoscopic Retrograde Cholangiopancreatography (EGDE)

Endoscopy. 2017 Jun;49(6):549-552. doi: 10.1055/s-0043-105072. Epub 2017 Apr 10.

Endoscopic ultrasound-guided creation of a transgastric fistula for the management of hepatobiliary disease in patients with Roux-en-Y gastric bypass.

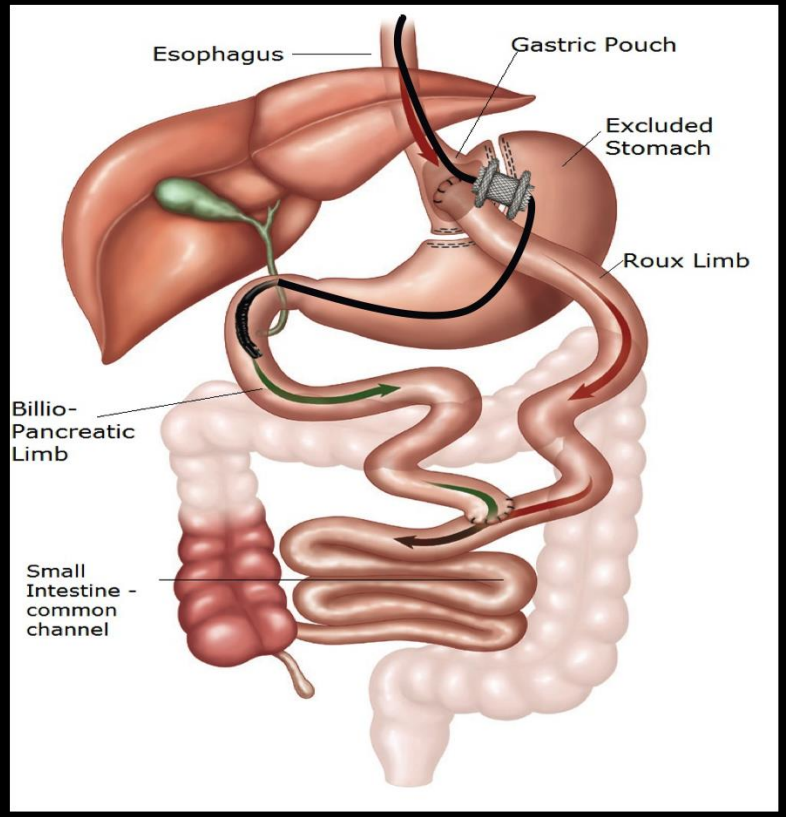
Ngamruengphong S[1], Nieto J[2], Kunda R[3], Kumbhari V[1], Chen YI[1], Bukhari M[1], El Zein MH[1], Bueno RP[1], Hajiyeva G[1], Ismail A[1], Chavez YH[1],

Gastrointest Endosc. 2018 Sep;88(3):486-494. doi: 10.1016/j.gie.2018.04.2356. Epub 2018 May 3.

An international, multicenter, comparative trial of EUS-guided gastrogastrostomy-assisted ERCP versus enteroscopy-assisted ERCP in patients with Roux-en-Y gastric bypass anatomy.

Bukhari M[1], Kowalski T[2], Nieto J[3], Kunda R[4], Ahuja NK[5], Irani S[6], Shah A[2], Loren D[2], Brewer O[5], Sanaei O[5], Chen YI[5], Ngamruengphong S[5], Kumbhari V[5], Singh V[5], Aridi HD[5], Khashab MA[5].

EUS-GG-ERCP may be superior to e-ERCP in patients with RYGB anatomy in terms of a higher technical success and shorter procedural times and offers a similar safety profile.



Malignant obstruction & EUS

- High probability of drainage

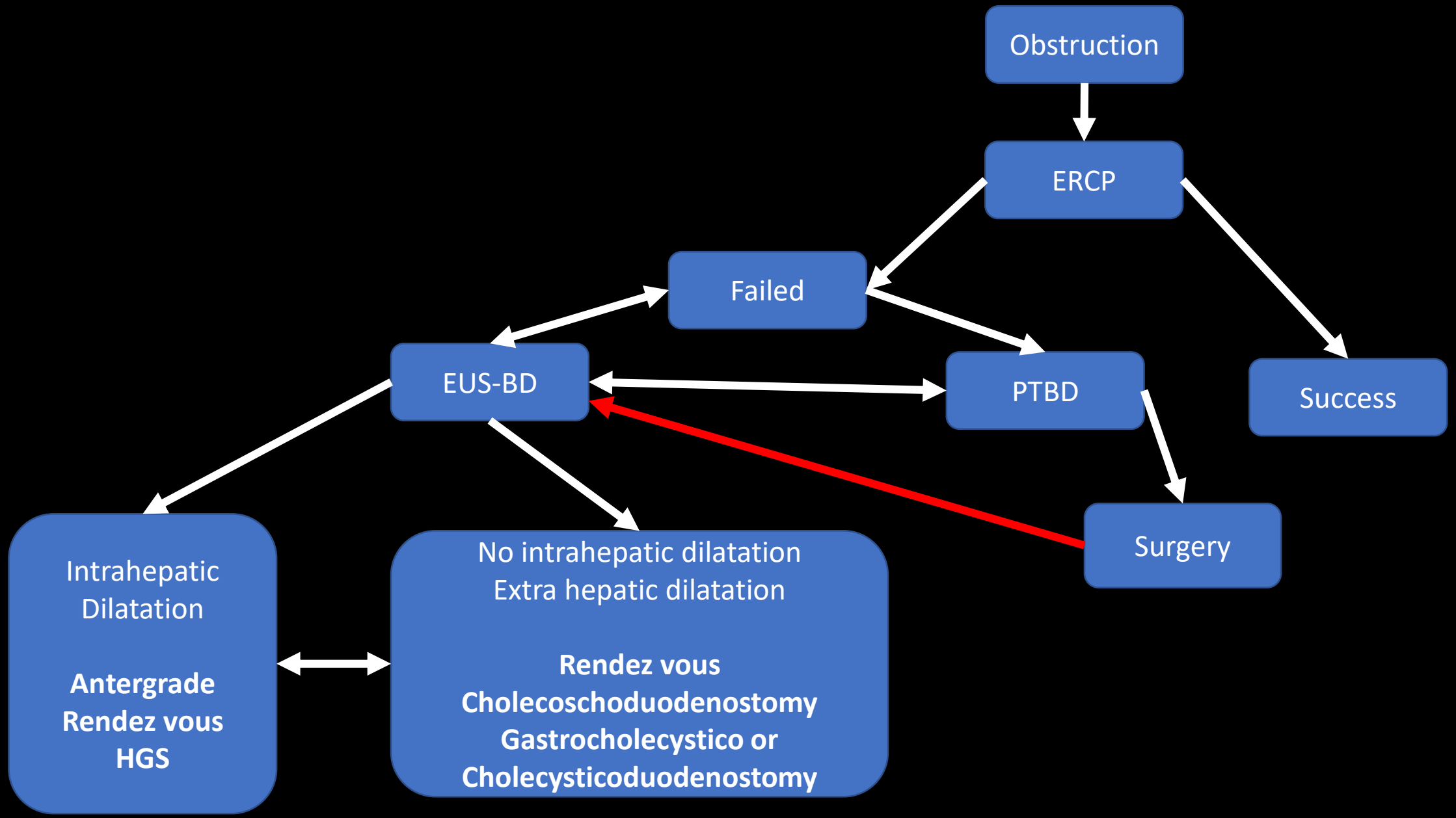
- Making new doors
- By-pass
- “Higher up in the tree”

- Antegrade therapy
- Rendez-vous

Indications for EUS-BD

- Failed ERCP/no access
- Failed/no radiological positions
- Palliation
- Non-operable patients
- Bridge to surgery?
- Fixing surgical complications

- Advantages: Reduce symptoms and hospital stay
- Endoscopic procedures – greater patient tolerance


Obstruction
ERCP
Failed
EUS-BD
PTBD
Success
Surgery
Intrahepatic Dilatation
Antergrade Rendez vous HGS
No intrahepatic dilatation
Extra hepatic dilatation
Rendez vous Cholecoschoduodenostomy Gastrocholecystico or Cholecysticoduodenostomy

European Society of
Gastrointestinal Endoscopy

Dual membership
ESGE and SADE

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