ERCP post Gastric Bypass

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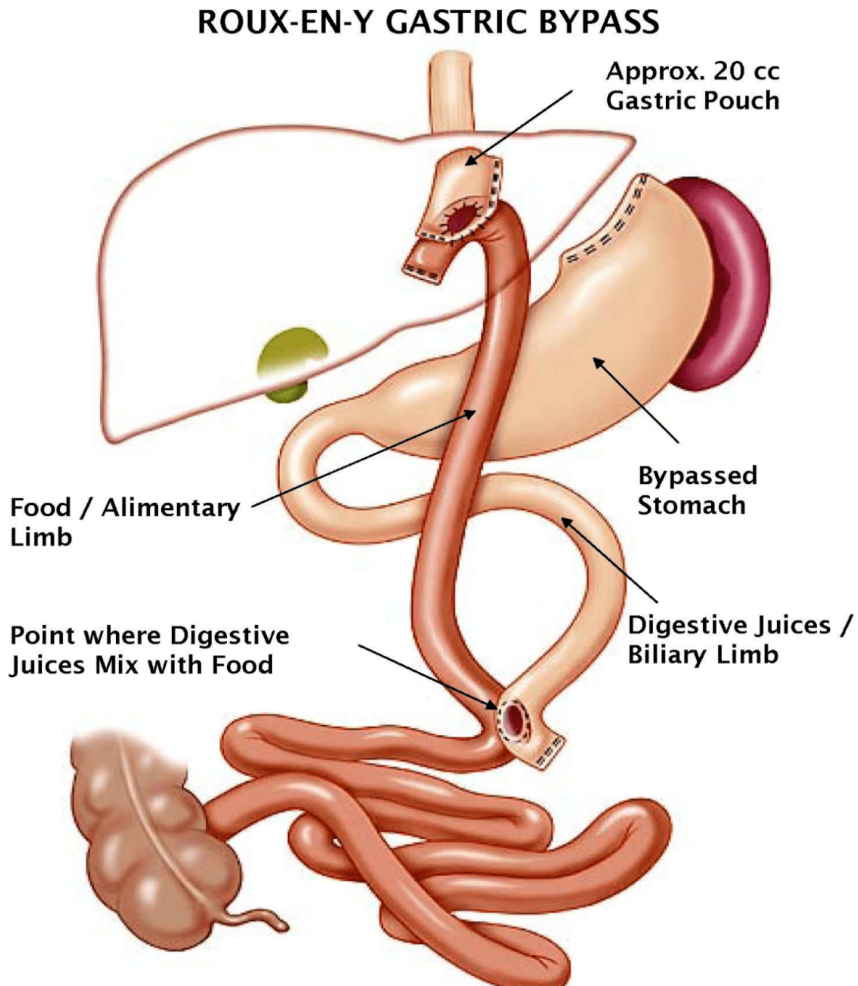
1. Roux-en-Y Gastric Bypass

- Roux-en-Y: biliopancreatic, alimentary and common limb
- Roux-en-Y gastric bypass: bariatric surgery

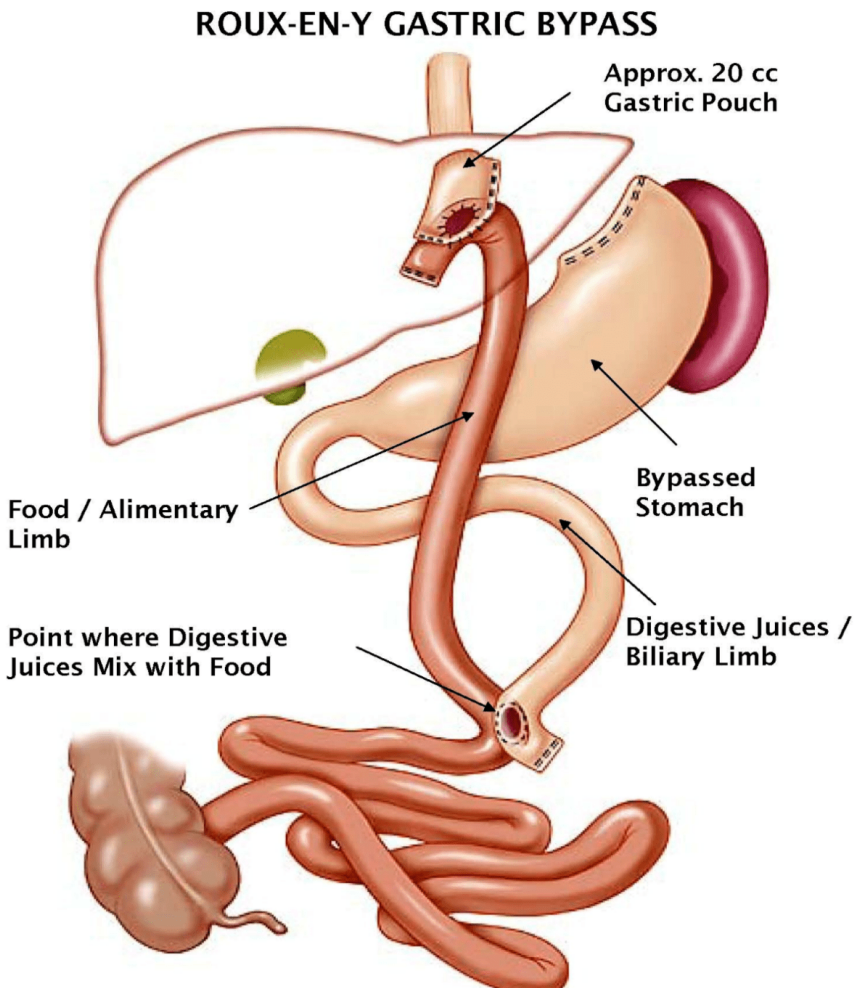
Roux 1893

César Roux



2. Why ERCP in Roux-en-Y Gastric Bypass ?

- Biliary stones
  - 30% after RYGB with 10% CBD stones
- Postoperative biliary leak (cholecystectomy)
  - More complications after RYGB
- Pancreatic cancer
  - Biliary stenting
- Chronic pancreatitis
  - Pancreatic stenting

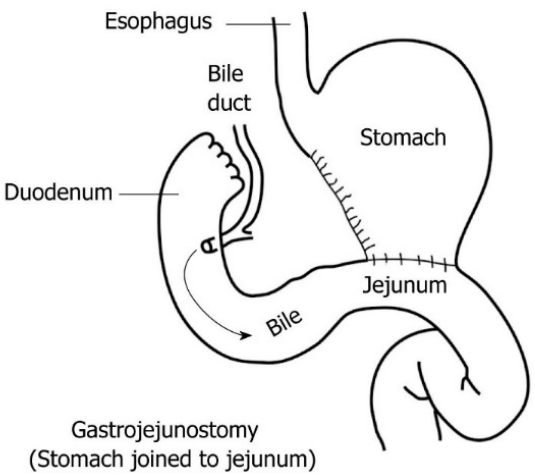


3. ERCP difficulties in surgically altered anatomy

Table 2.1 Degrees of difficulty in ERCP.

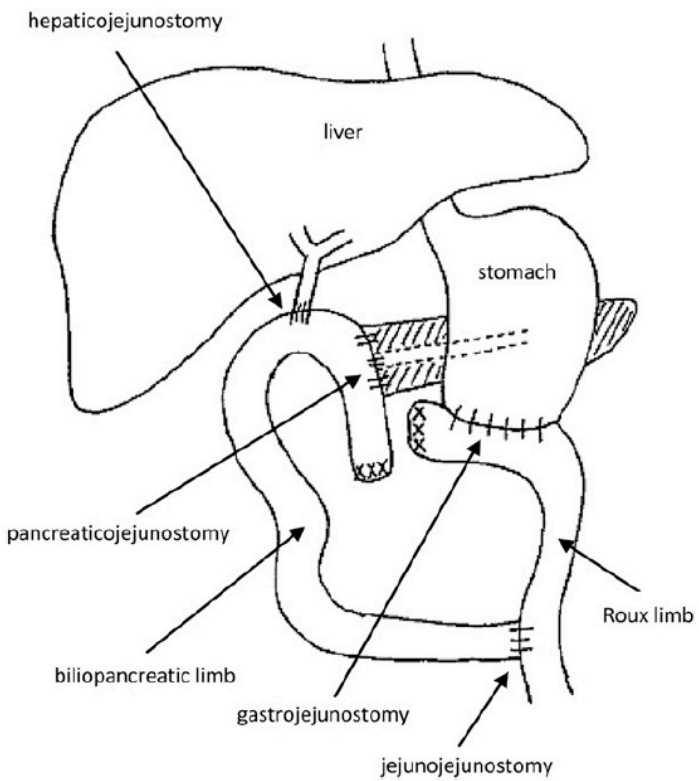
	Diagnostic	Therapeutic
Standard, grade 1	Selective deep cannulation Diagnostic sampling	Biliary sphincterotomy Stones < 10 mm Stents for leaks Low tumors
Advanced, grade 2	Billroth II diagnostics Minor papilla cannulation	Stones > 10 mm Hilar tumors Benign biliary strictures
Tertiary, grade 3	Manometry Whipple Roux-en-Y Intraductal endoscopy	Billroth II therapeutics Intrahepatic stones Pancreatic therapies

3. ERCP difficulties in surgically altered anatomy

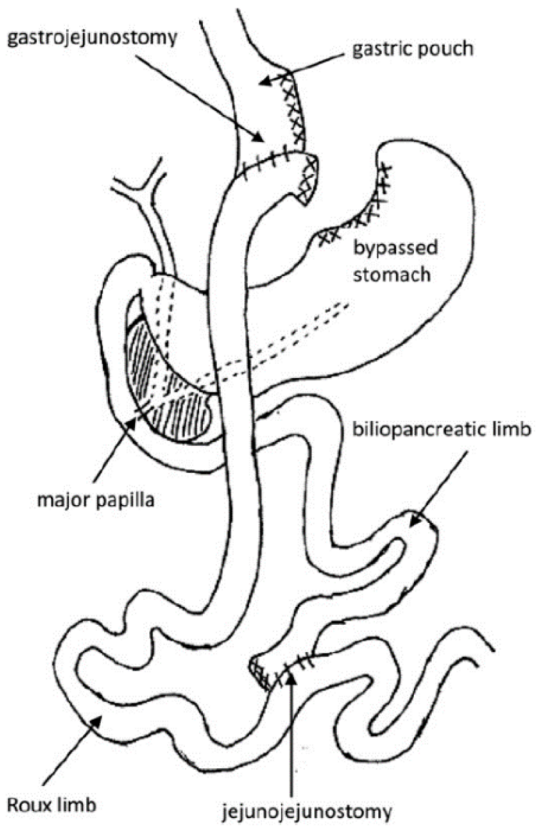


Billroth II

intact papilla ↔ anastomosis
long limb ↔ short limb



Whipple Roux-en-Y



Gastric bypass Roux-en-Y

4. How to perform ERCP in Roux-en-Y Gastric Bypass ?

Long limb Roux-en-Y gastric bypass

1

Device-assisted enteroscope

No cholecystectomy needed

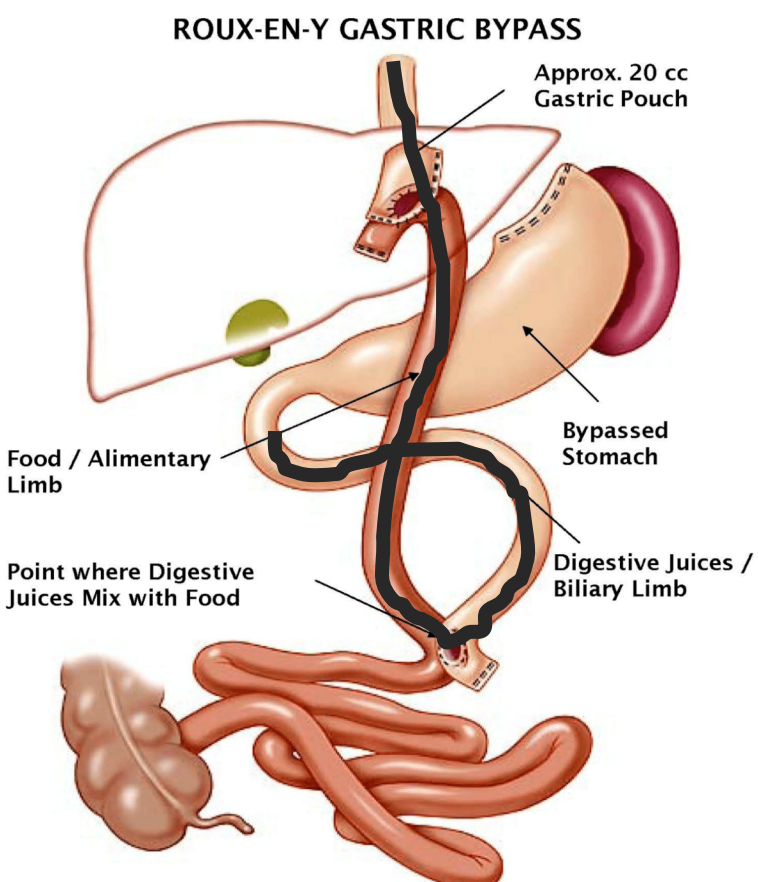
2a

EUS-guided transgastric
or
EUS-guided gastrostomy
or
DAE-guided gastrostomy

Cholecystectomy needed 2b

Laparoscopy-assisted ERCP
+ cholecystectomy

1



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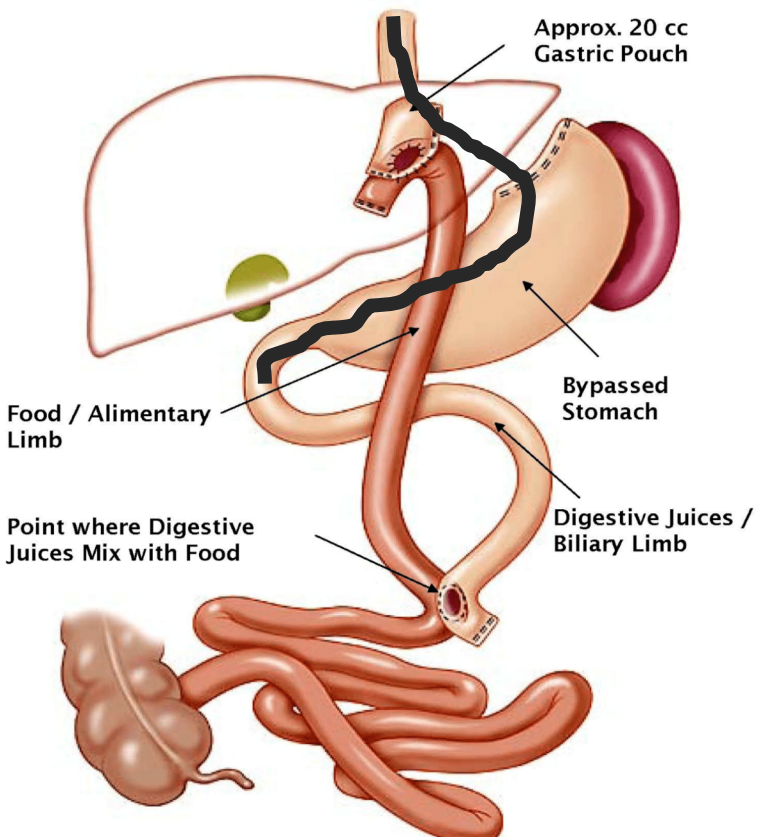

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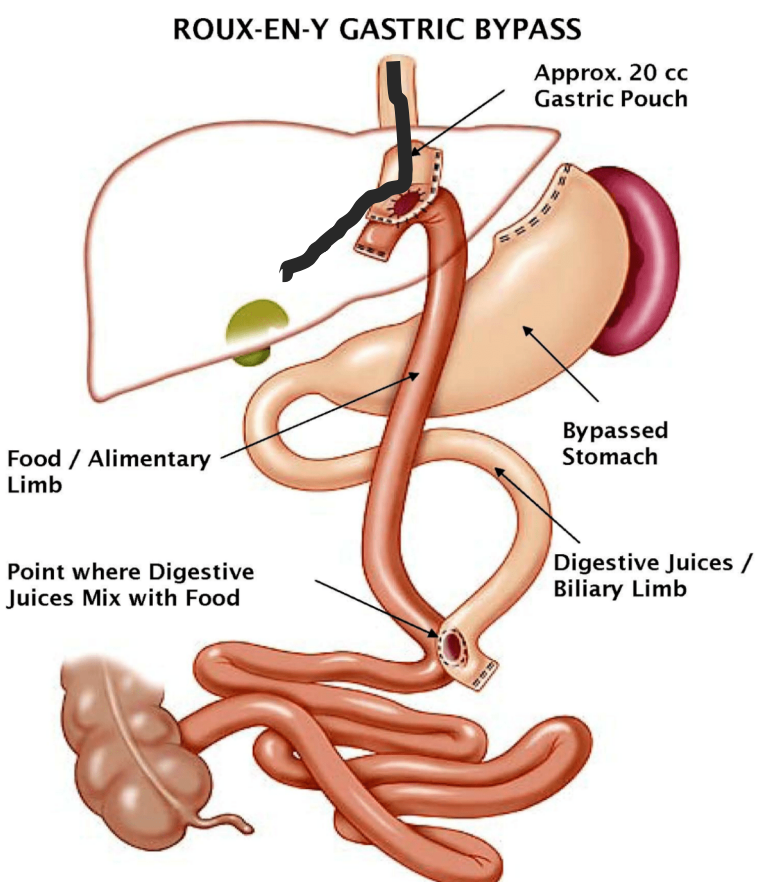

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2a 2b

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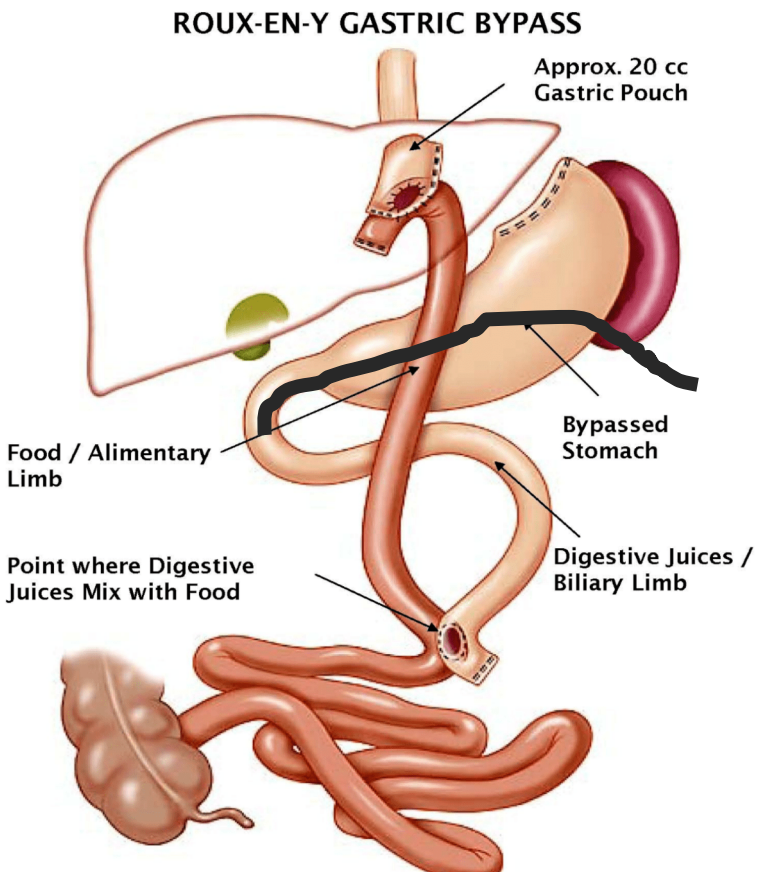
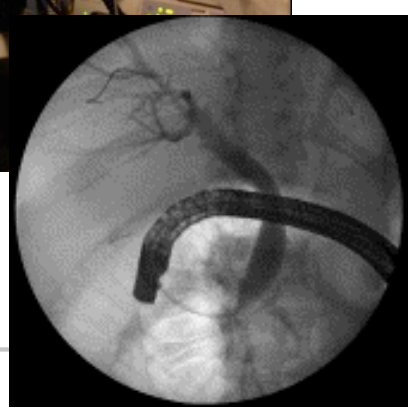




Laparoscopy-assisted ERCP

5. Which endoscope to use ?

- Device-assisted enteroscopy for ERCP
  - SBE: Olympus
    - Length: 200 cm
    - Working channel: 2.8 mm
  - DBE: Fujifilm
    - Length: 200 cm
    - Working channel: 2.8 mm
- Feasibility
  - Comparable SBE / DBE
- New prototypes
  - Length: 152 cm
  - Working channel: 3.2 mm
  - Passive bending / Water jet channel / …

Figure 1 Olympus single-balloon enteroscopy. (Copyright by Olympus Europe (Hamburg, Germany), used with permission.)

Figure 2 Fujifilm double-balloon enteroscopy. (Copyright by Fujifilm Europe, (Düsseldorf, Germany) used with permission.)

6. Feasibility of ERCP in surgically altered anatomy

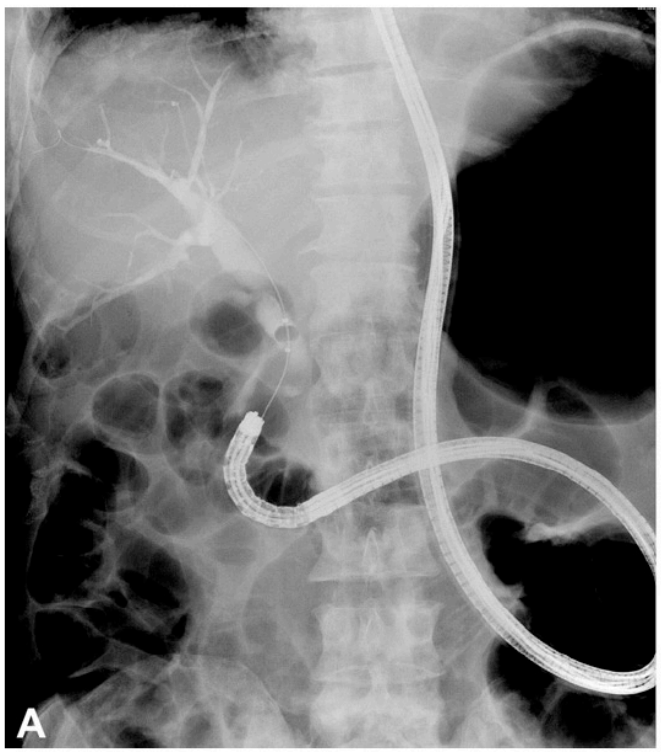
- Success rate DA enteroscopy ERCP
  - Success rate (large variation): 50-100 %
  - Failures due to:
    - Long limbs (>100 cm)
    - Roux-en-Y anastomosis (end-to-side vs side-to-side)
    - Intact papilla

      = Roux-en-Y Gastric Bypass (success rate ≤75%)
  - Higher success rates thanks to:
    - Short limbs (<50 cm)
    - Roux-en-Y anastomosis end-to-side
    - Biliary anastomosis

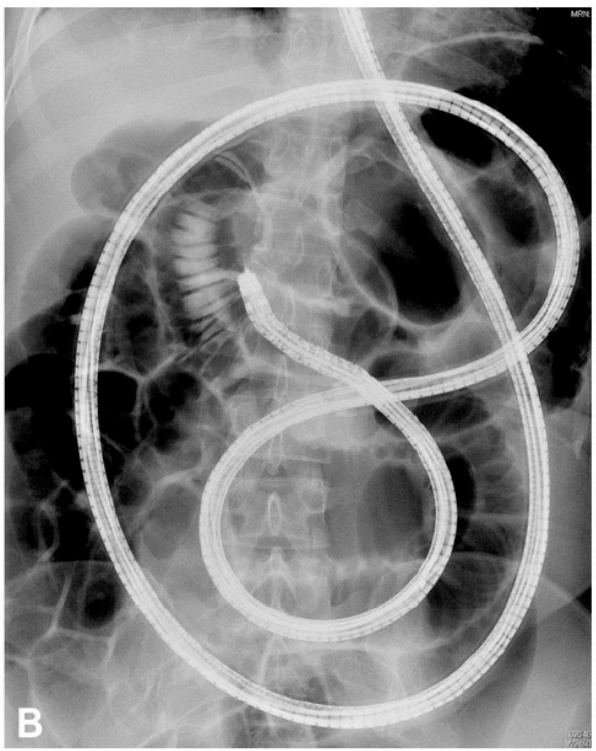
      = Biliary diversion Roux-en-Y (success rate ≥85%)

6. Feasibility of ERCP in surgically altered anatomy

- Success rate: Short limb (<50 cm) / long limb (>100 cm)



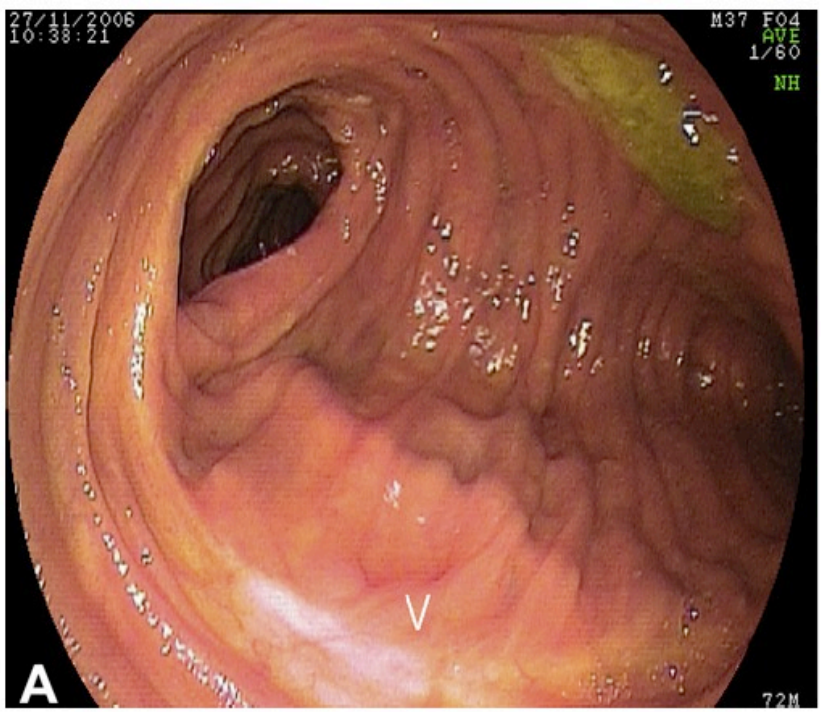
Roux-en-Y short limb



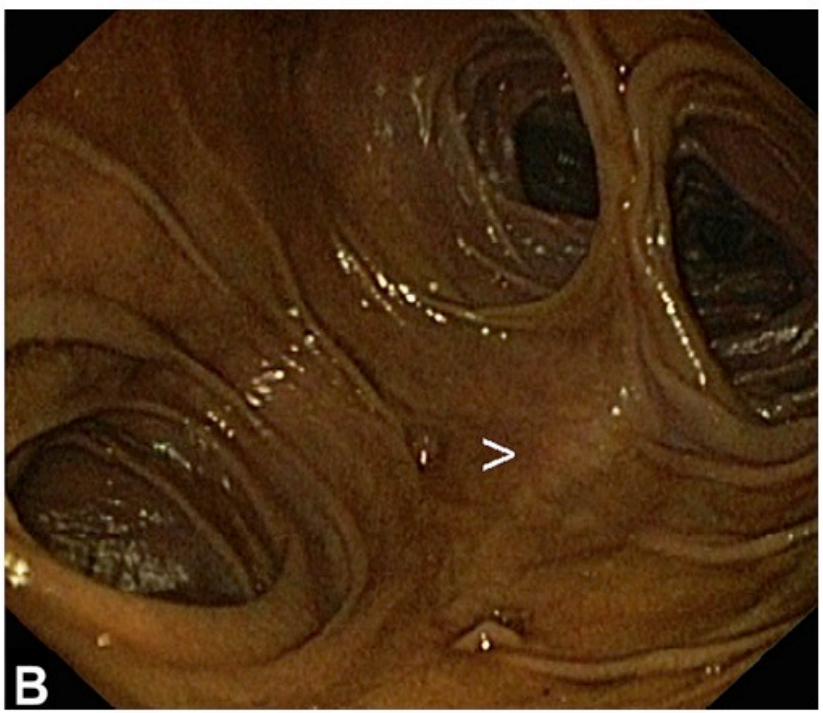
Roux-en-Y long limb

6. Feasibility of ERCP in surgically altered anatomy

- Success rate: Roux-en-Y anastomosis



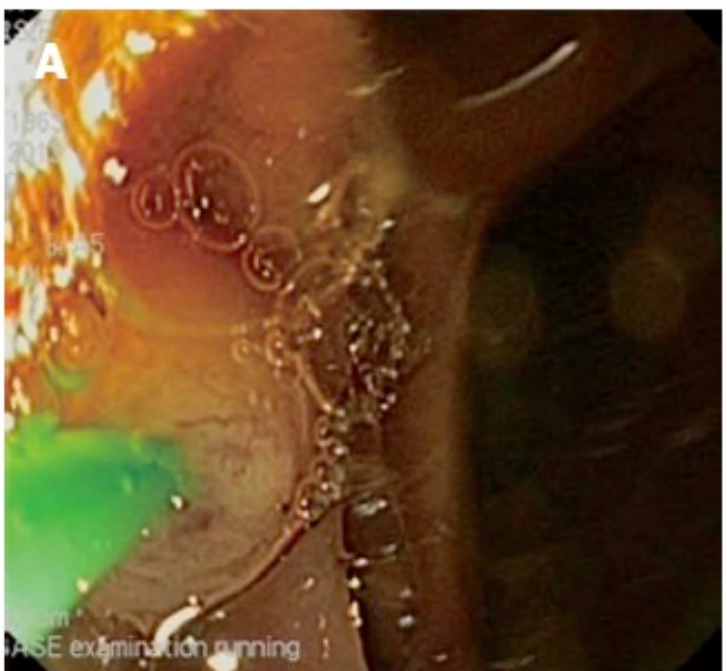
End-to-side: 2 lumens



Side-to-side: 3 lumens

6. Feasibility of ERCP in surgically altered anatomy

- Success rate: Intact papilla / anastomosis

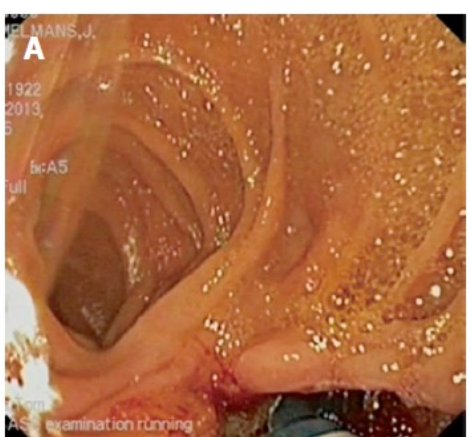


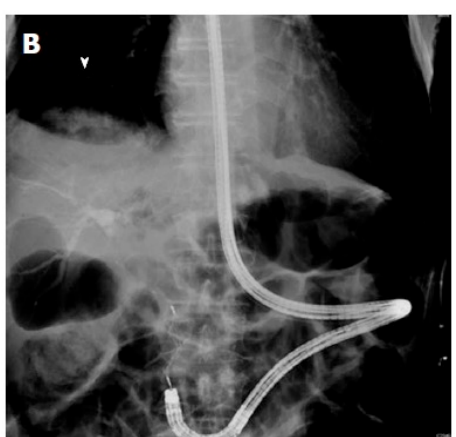
Intact papilla: difficult cannulation

Biliary anastomosis: easy cannulation

6. Feasibility of ERCP in surgically altered anatomy

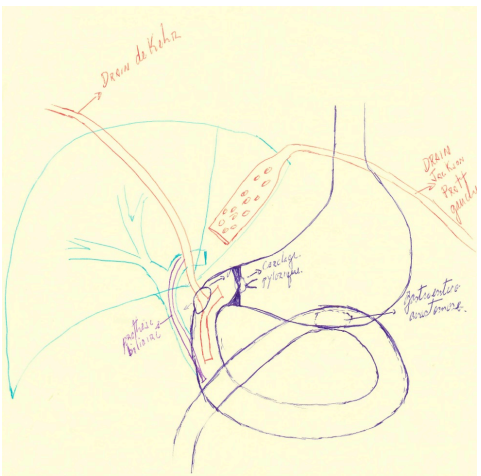
- Adverse event rate
  - Acceptable adverse event rate: 10 %
    - Post-ERCP pancreatitis
    - Post-ERCP cholangitis
    - Mucosal tears → intestinal perforation
    - Barotrauma due to closed loop (inflated balloon in closed afferent limb)
    - Liver capsule rupture due to long guidewire and no elevator to fixate the guidewire





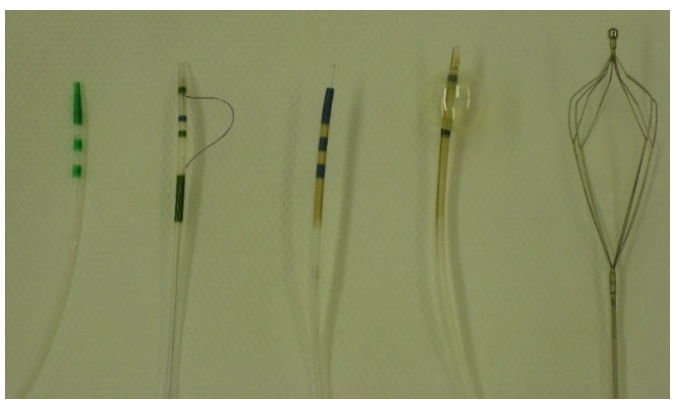
7. How to prepare for ERCP in surgically altered anatomy ?

- Explain the procedure to the patient !
  - Success and failure rate / Adverse events
  - Alternative approaches
- Know the anatomy
  - Operation protocol / Radiological imaging
  - Ask the surgeon to draw the surgically altered anatomy whenever necessary
  - Intact papilla ↔ anastomosis / Short limb ↔ long limb
- Choose your endoscope
  - Side-viewing duodenoscope for Billroth II
  - Forward-viewing DA enteroscope for long limb Roux-en-Y
  - Attach distal cap to facilitate cannulation of an intact papilla with a forward-viewing endoscope
- Choose your accessories
  - Adapted to the type of endoscope used
  - Long guidewire when using forward-viewing SBE / DBE without an elevator



7. How to prepare for ERCP in surgically altered anatomy ?

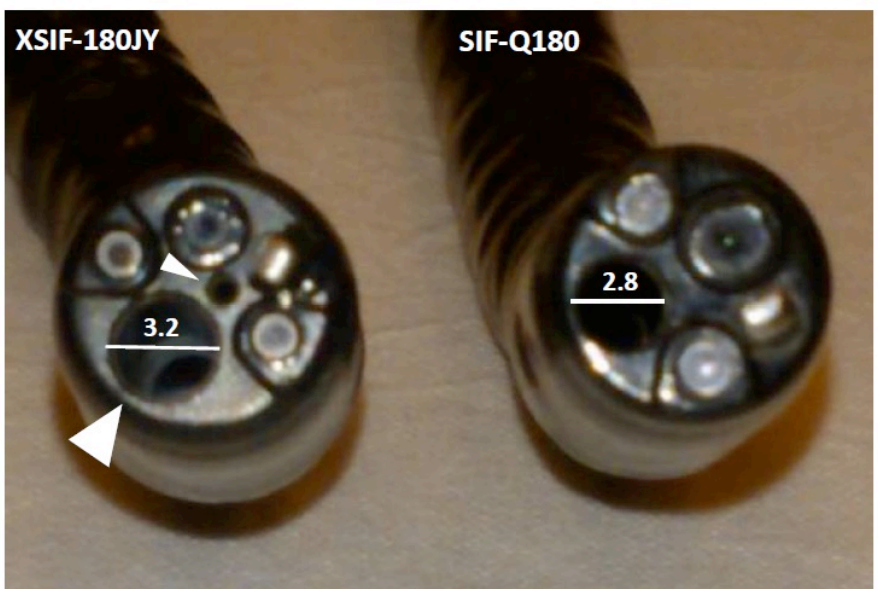
- Practical settings
  - Supine ↔ prone position of the patient
  - General anesthesia / CO_2 insufflation
  - Fluoroscopy to:
    - Guide de endoscope into the correct limb
    - Reduce looping of the endoscope
    - Perform the actual ERCP
- Be aware of the limitations !
  - Personal endoscopic experience
  - Availability of the correct endoscope
  - Availability of the correct accessories



- Limitations of ERCP using SBE/DBE in surgically altered anatomy
  - Working channel of 2.8 – 3.2 mm: max 7 – 8 Fr plastic stents / uncovered SEMS
  - Endoscope length of 200 cm: use long guidewire (>450 cm)

7. How to perform for ERCP in Roux-en-Y Gastric Bypass ?

- Case study: SBE ERCP after Roux-en-Y gastric bypass
  - ♀ 43 y
  - Roux-en-Y gastric bypass 12/2015
  - Acute cholecystitis 02/2016
  - Laparoscopic cholecystectomy 03/2016
  - Biliary leak with external drainage and AB 03/2016
  - Continuous external drainage 04/2016
  - Referred for SBE ERCP 21/04/2016
    - XSIF-180JY
      - Working channel 3.2 mm
      - Water jet channel
    - Olympus prototype catheters



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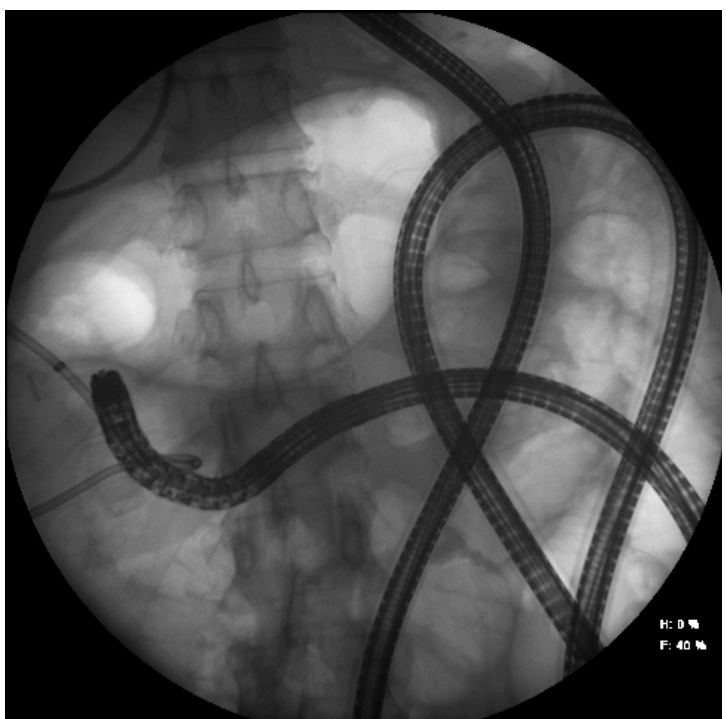
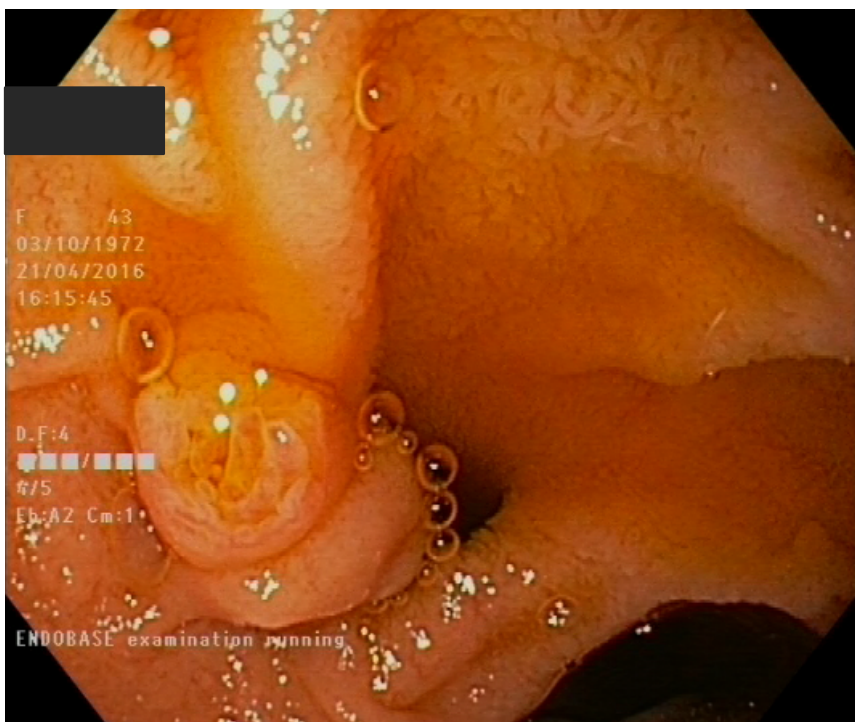
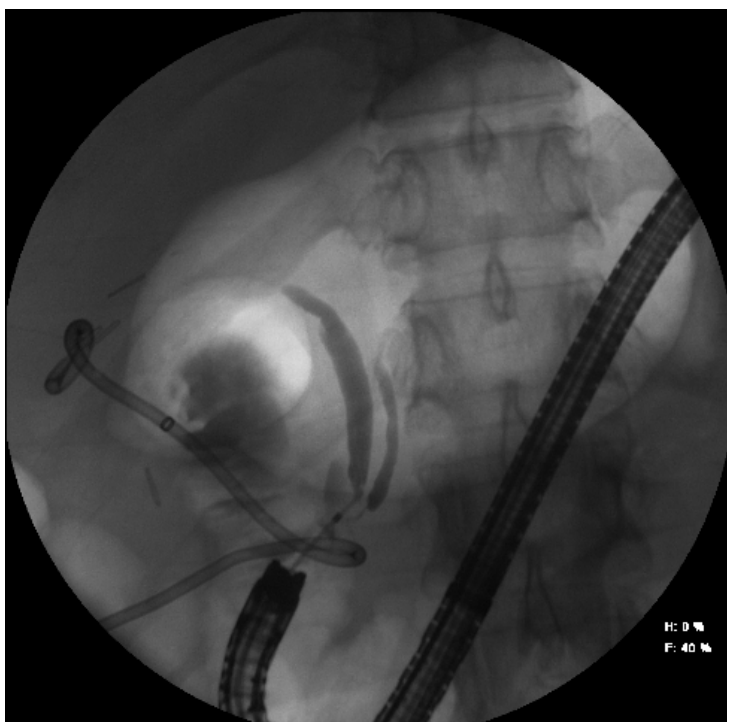


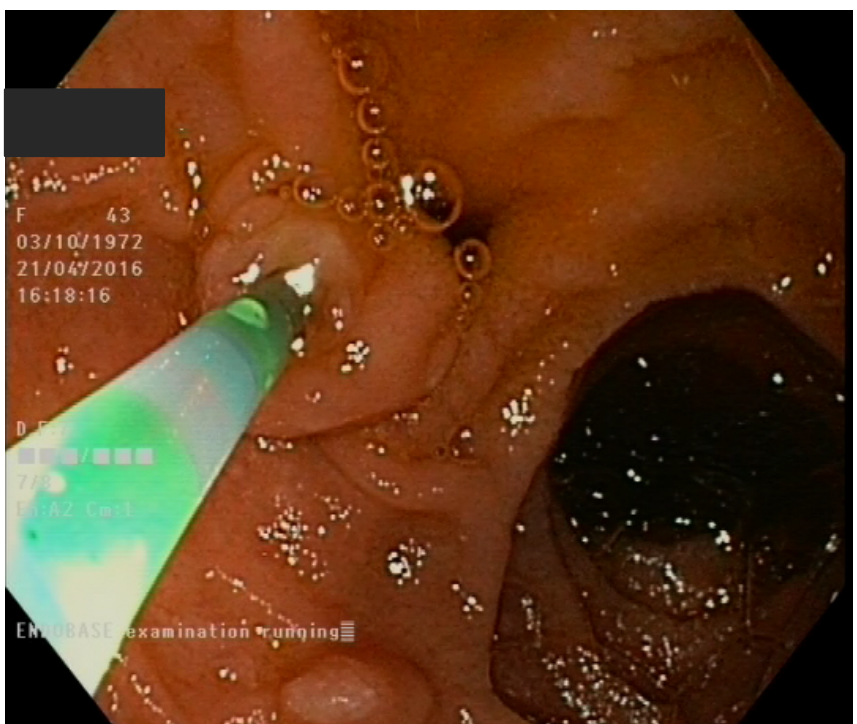


Distal endoscopic approach of the intact papilla

7. How to perform for ERCP in surgically altered anatomy ?

- SBE ERCP after Roux-en-Y gastric bypass





Cholangiopancreatogram

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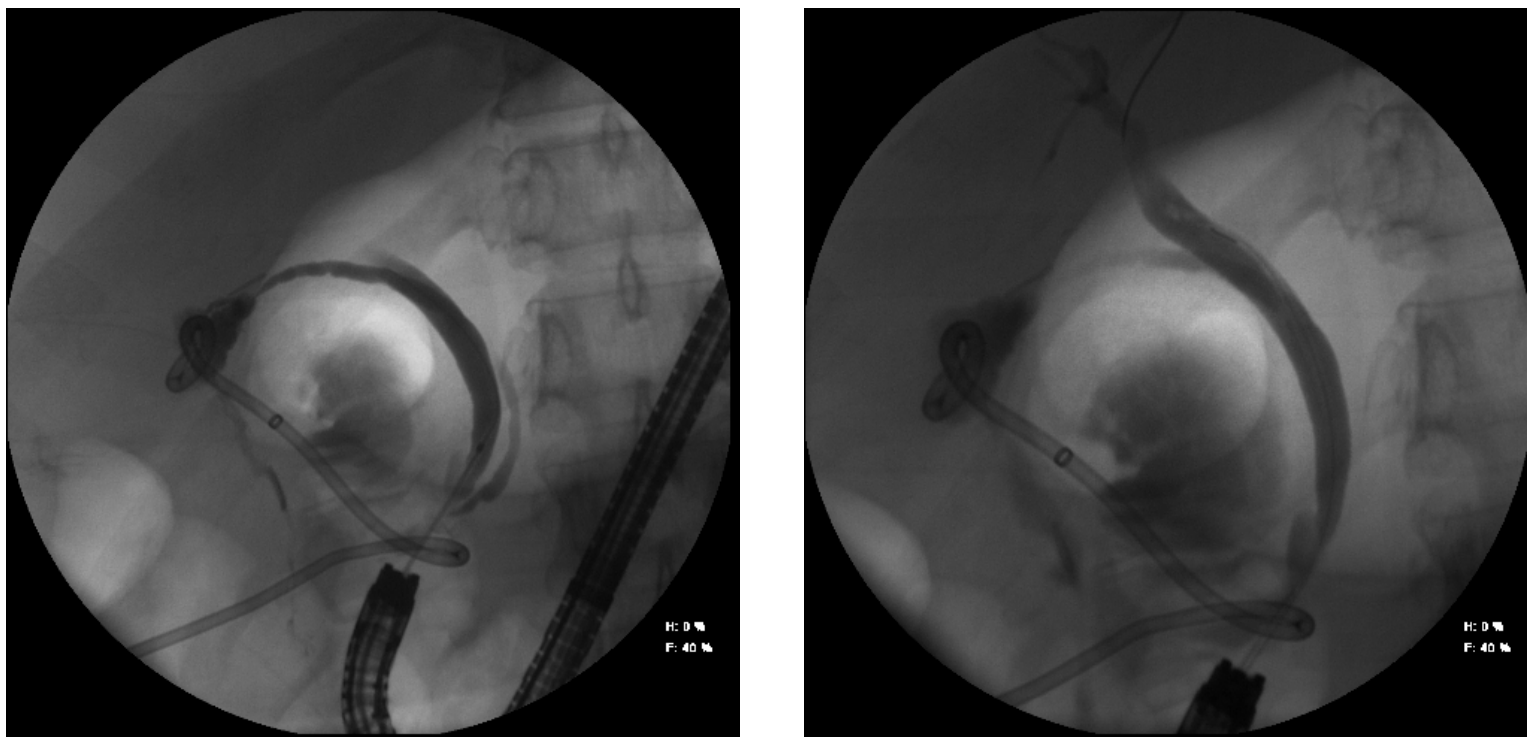

Biliary leak at cystic duct

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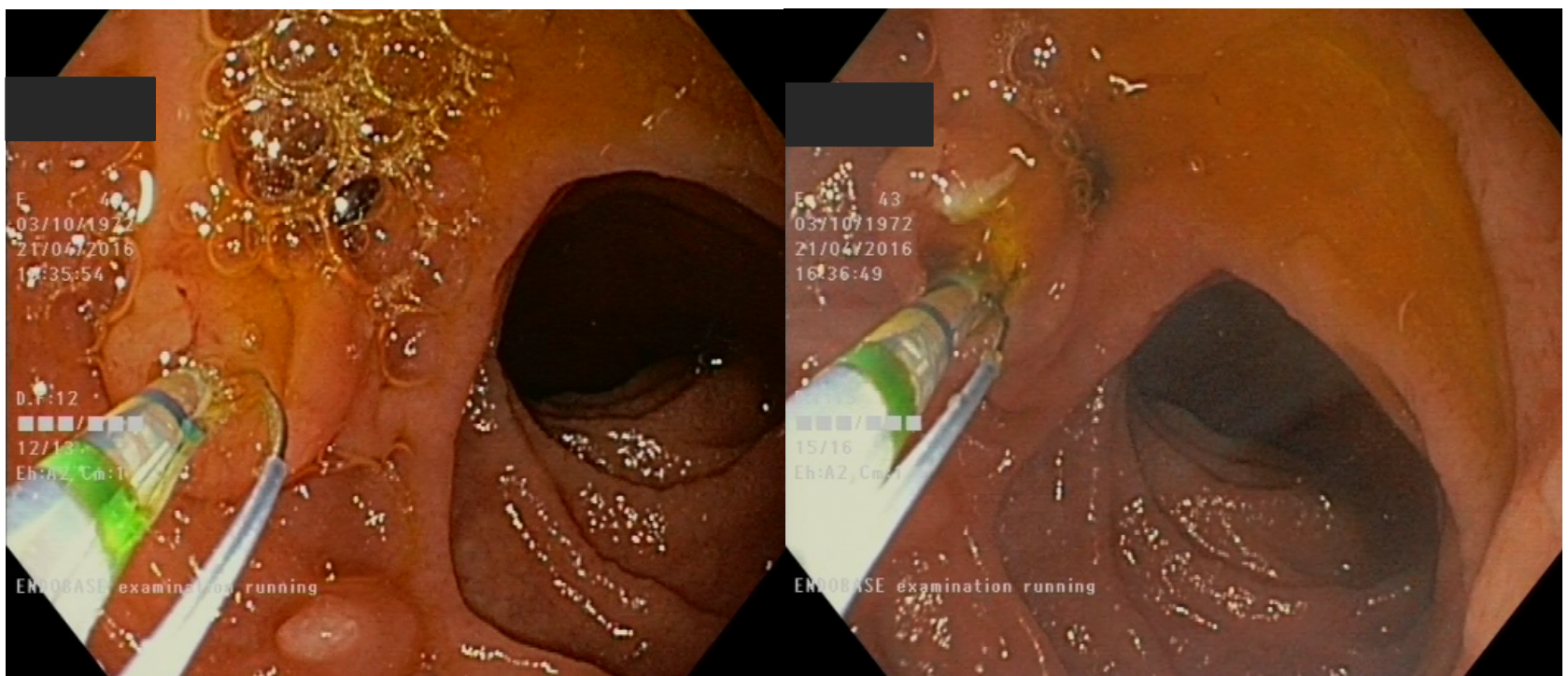

Biliary sphincterotomy

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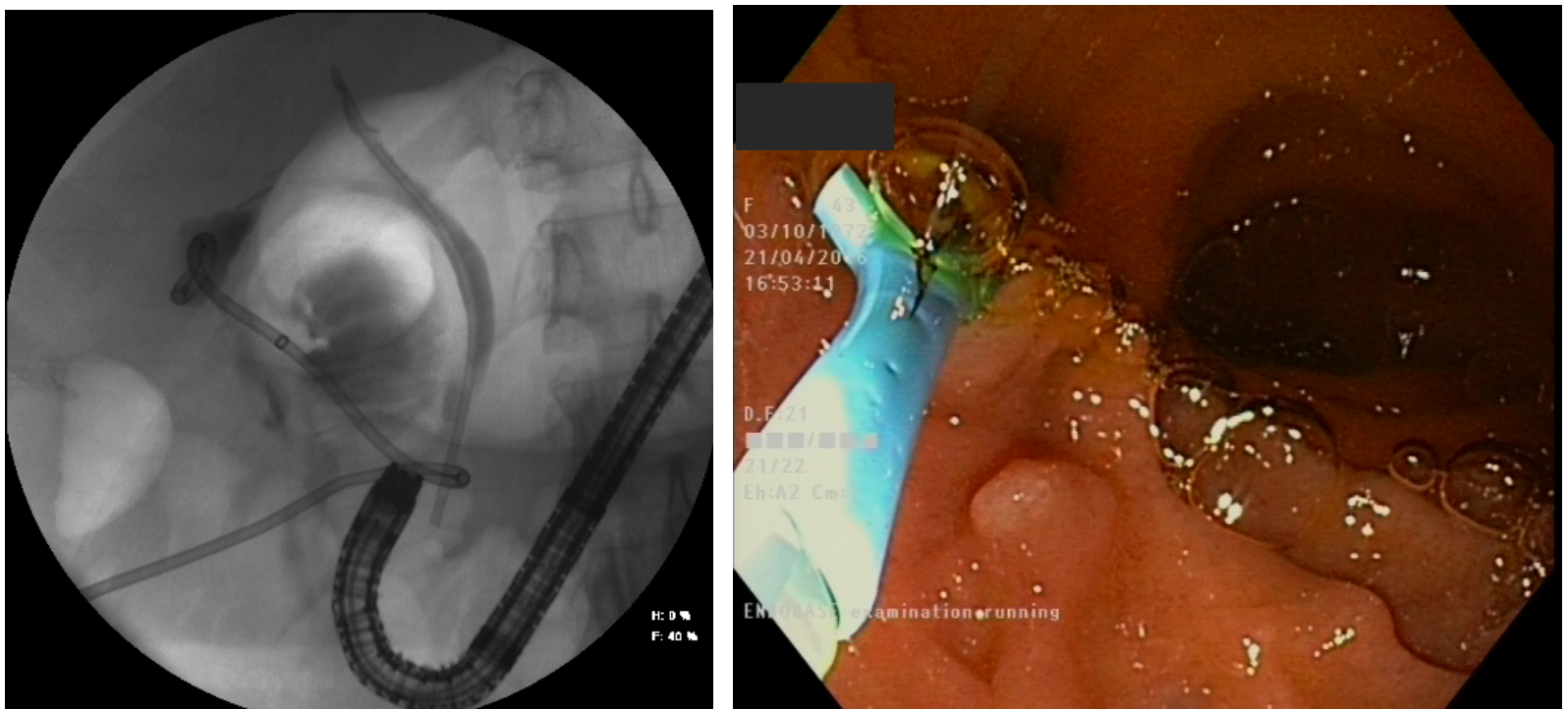

7 Fr plastic biliary stent

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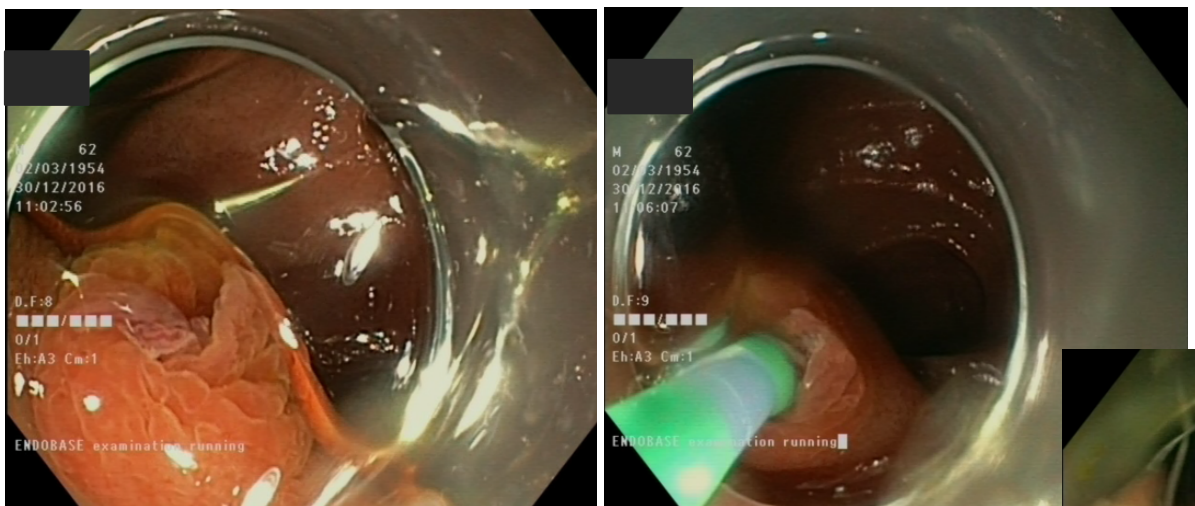
  - Biliary leak with external drainage and AB 03/2016
  - Continuous external drainage 04/2016
  - SBE ERCP 21/04/2016
    - Sphincterotomy + 7 Fr stent
    - Removal of external drain after 2 weeks
    - Endoscopic stent removal after 3 months
  - Complete clinical resolution

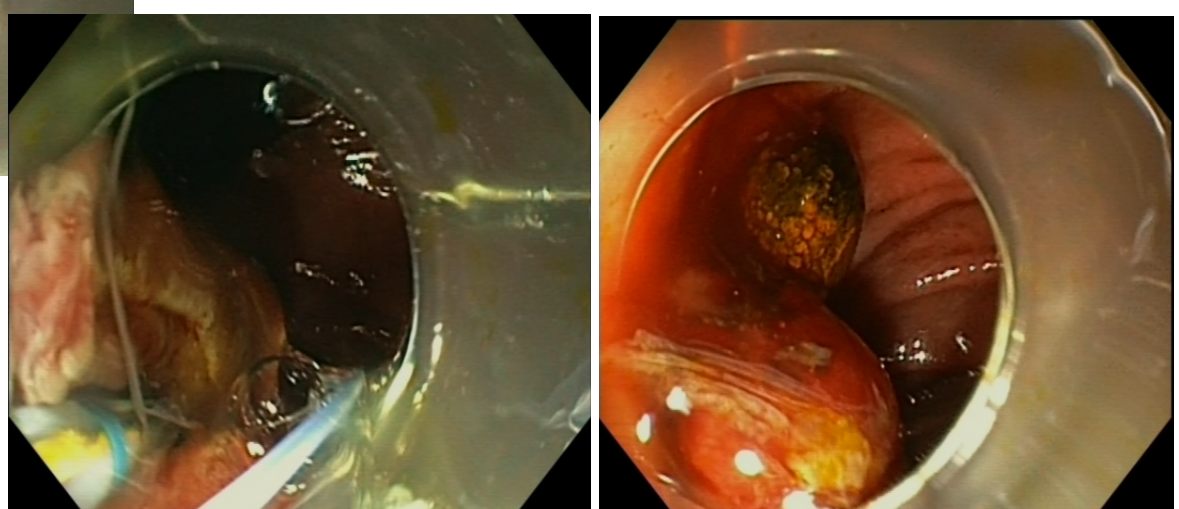
8. What can be achieved with ERCP in surgically altered anatomy ?

- Advantage of a distal cap



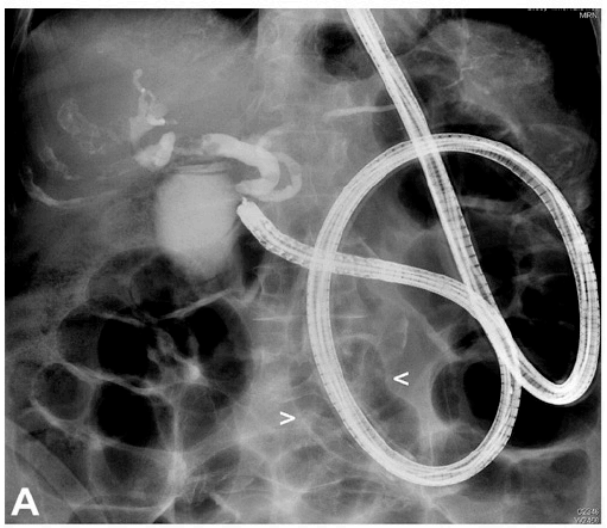
Cannulation of intact papilla

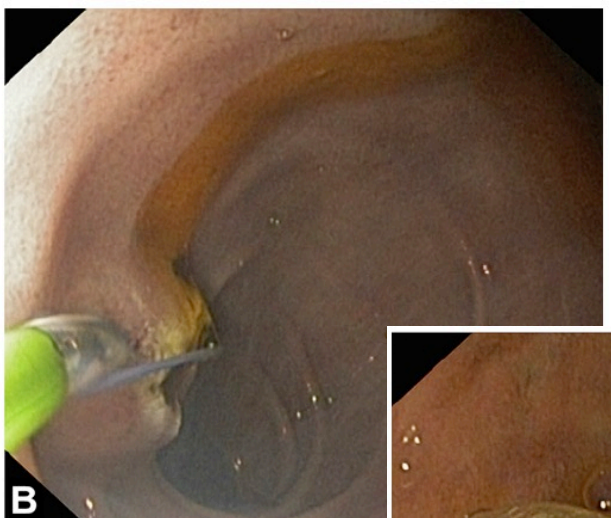
Sphincterotomy and stone extraction



8. What can be achieved with ERCP in surgically altered anatomy ?

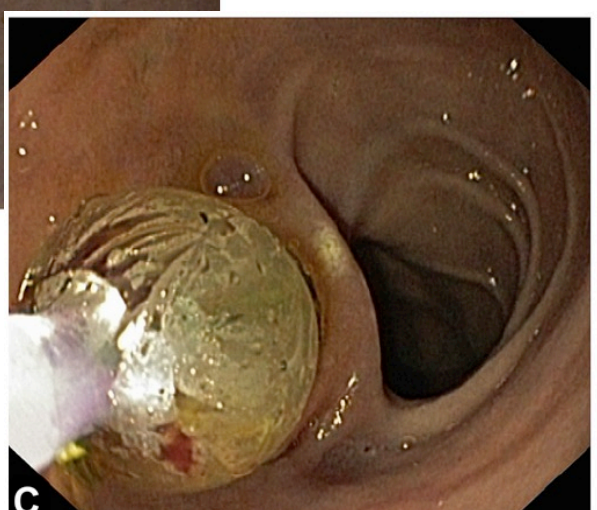
- Sphincterotomy and sphincteroplasty

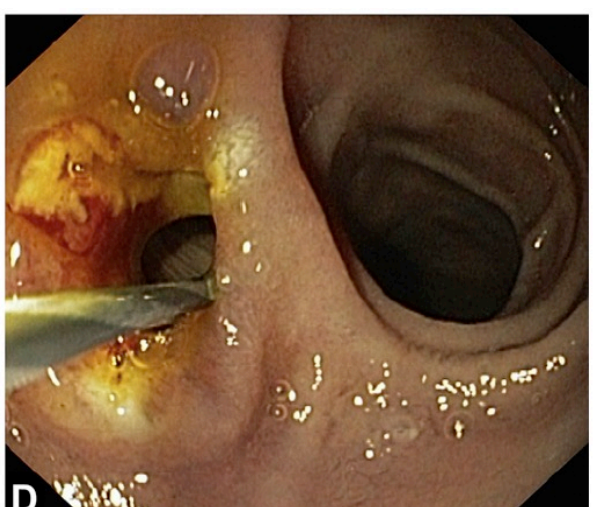




Sphincterotomy

Sphincteroplasty





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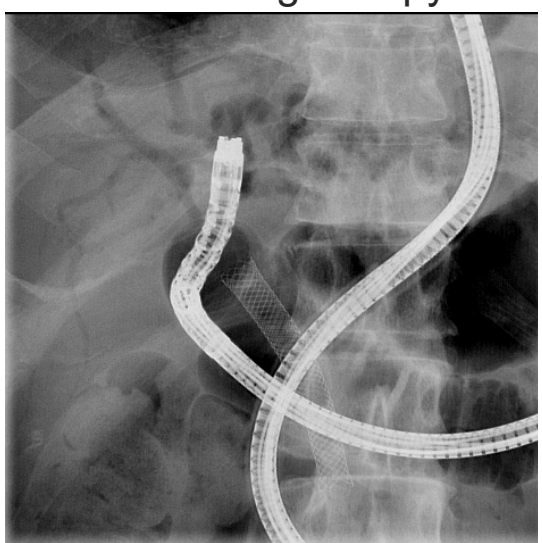
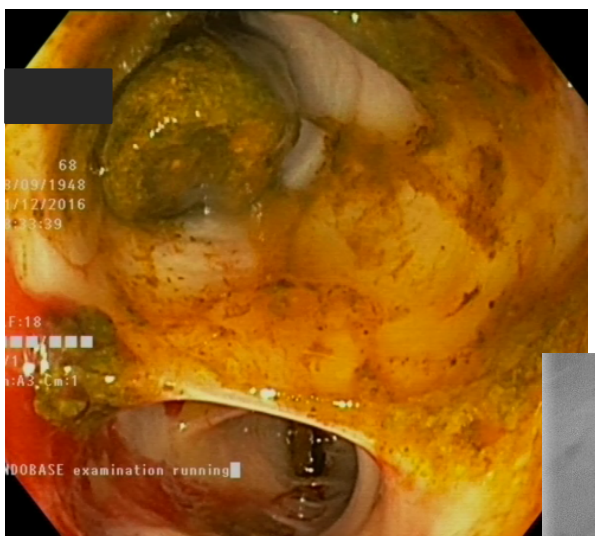
- Cholangioscopy





Direct cholangioscopy using SBE

Cholangioscopy and laser lithotripsy

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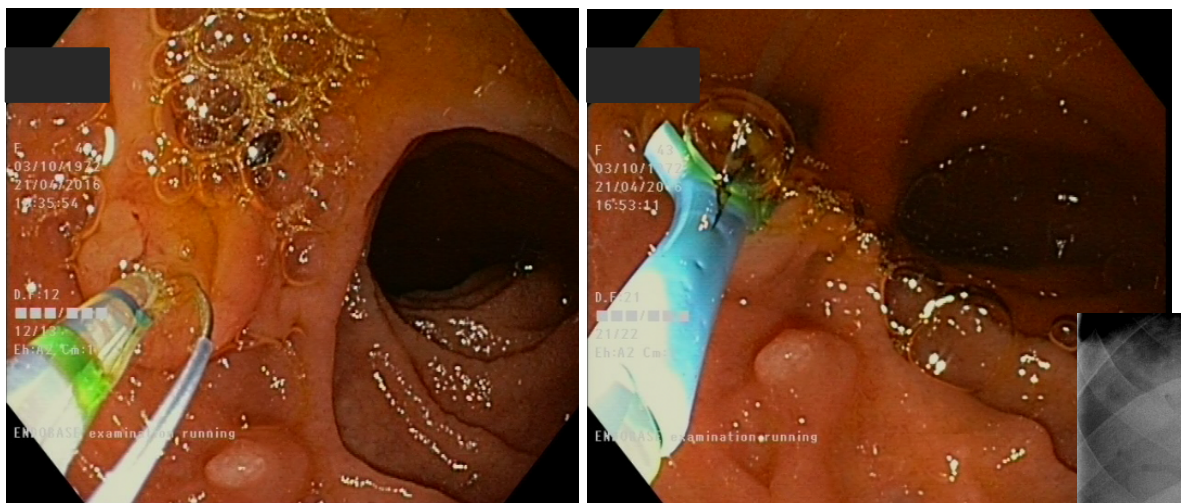
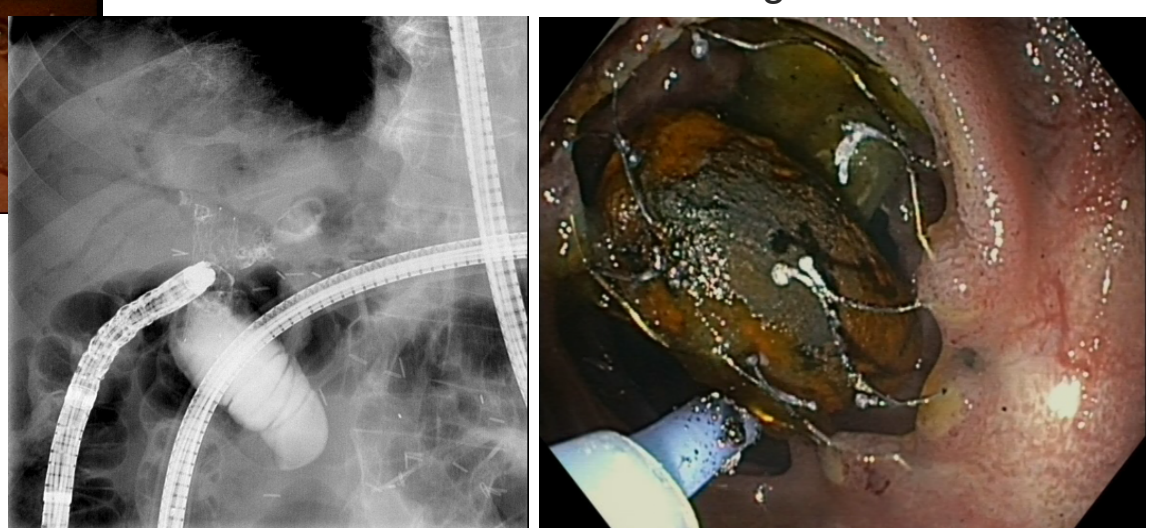
- Stent insertion



Plastic stent insertion

Metallic stent removal using forced APC



9. Alternative approaches for ERCP in Roux-en-Y Gastric Bypass

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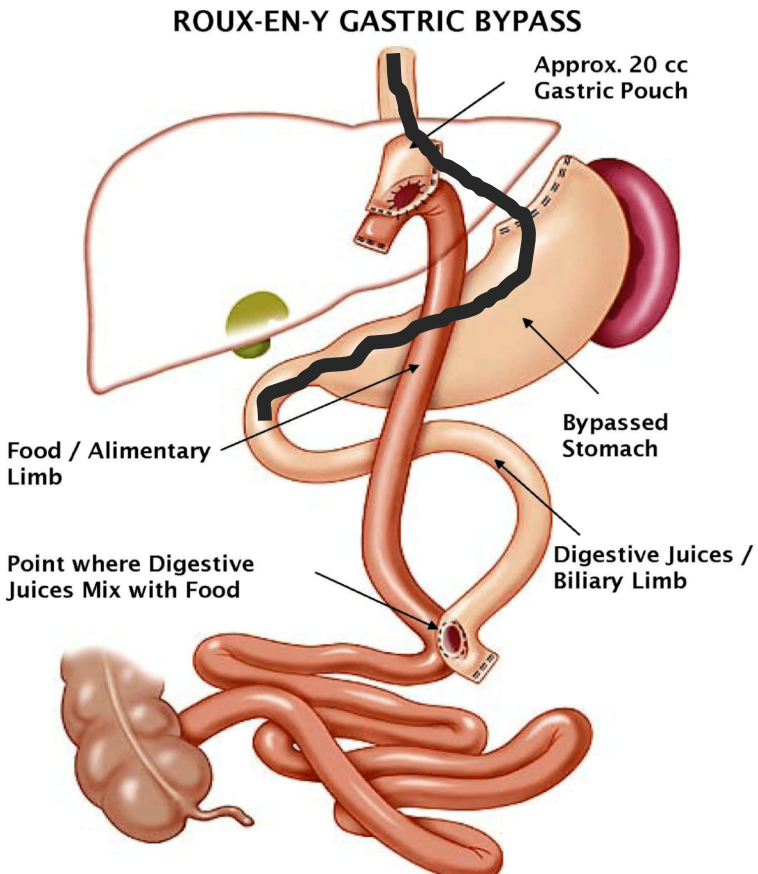

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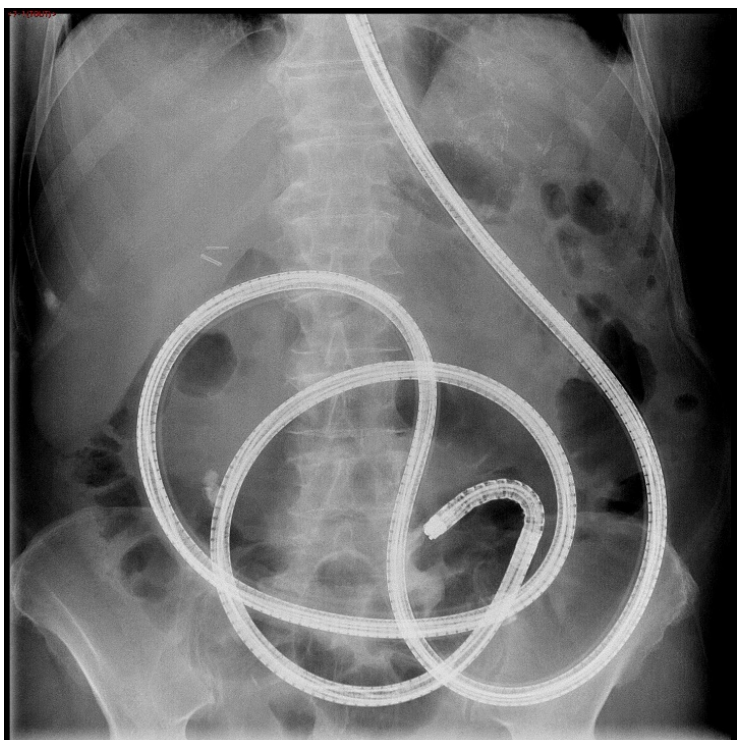
- Case study: SBE ERCP after Roux-en-Y gastric bypass
  - ♀ 66 y
  - Roux-en-Y gastric bypass + cholecystectomy 2004
  - Obstructive jaundice 07/2018
  - CT scan: tumor pancreatic head
    livermetastases 07/2018
  - SBE ERCP 13/07/2018
    - Failed to reach the papilla



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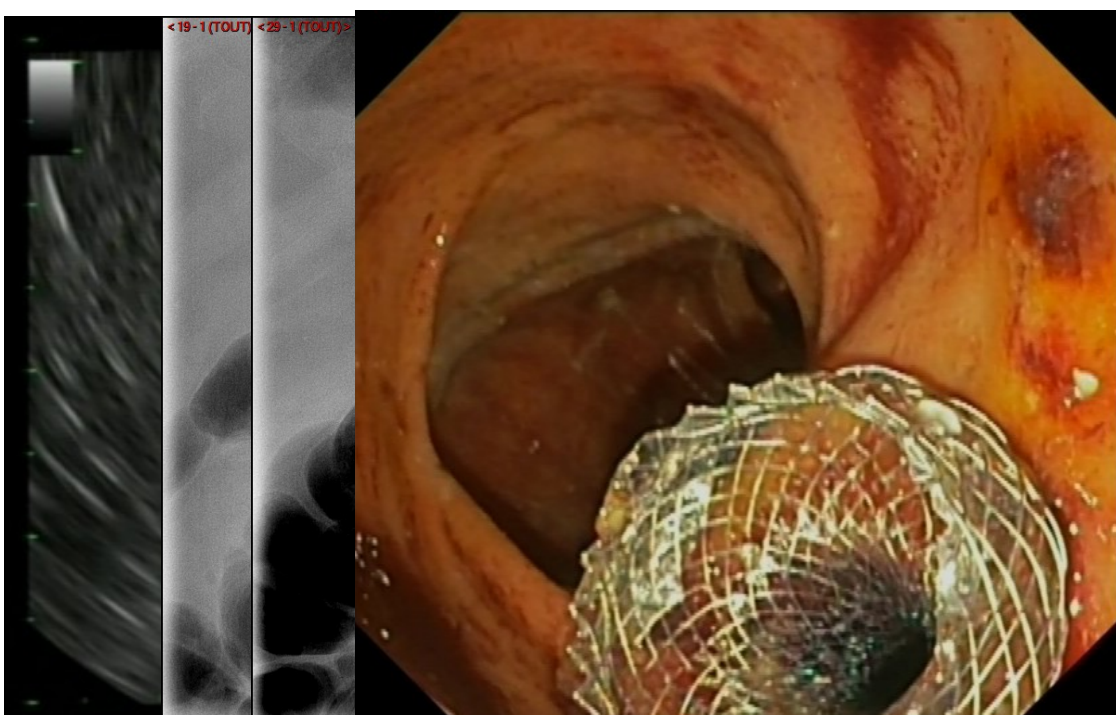
  - EUS gastro-gastrostomy 13/07/2018
    - Lumen-apposing metal stent LAMS



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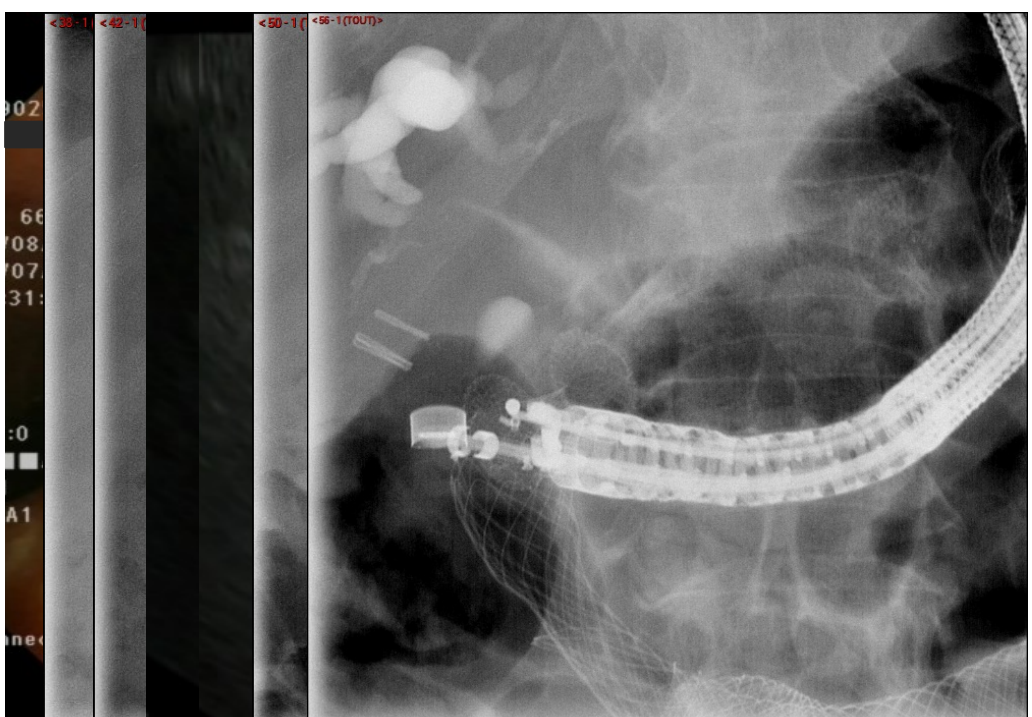
- Case study: SBE ERCP after Roux-en-Y gastric bypass
  - ♀ 66 y
  - Roux-en-Y gastric bypass + cholecystectomy 2004
  - Obstructive jaundice 07/2018
  - CT scan: tumor pancreatic head
    livermetastases 07/2018
  - SBE ERCP 13/07/2018
    - Failed to reach the papilla
  - EUS gastro-gastrostomy 13/07/2018
    - Lumen-apposing metal stent LAMS
  - ERCP 19/07/2018
    - Failed due to duodenal stenosis
  - EUS biliary drainage 19/07/2018
    - Lumen-apposing metal stent LAMS



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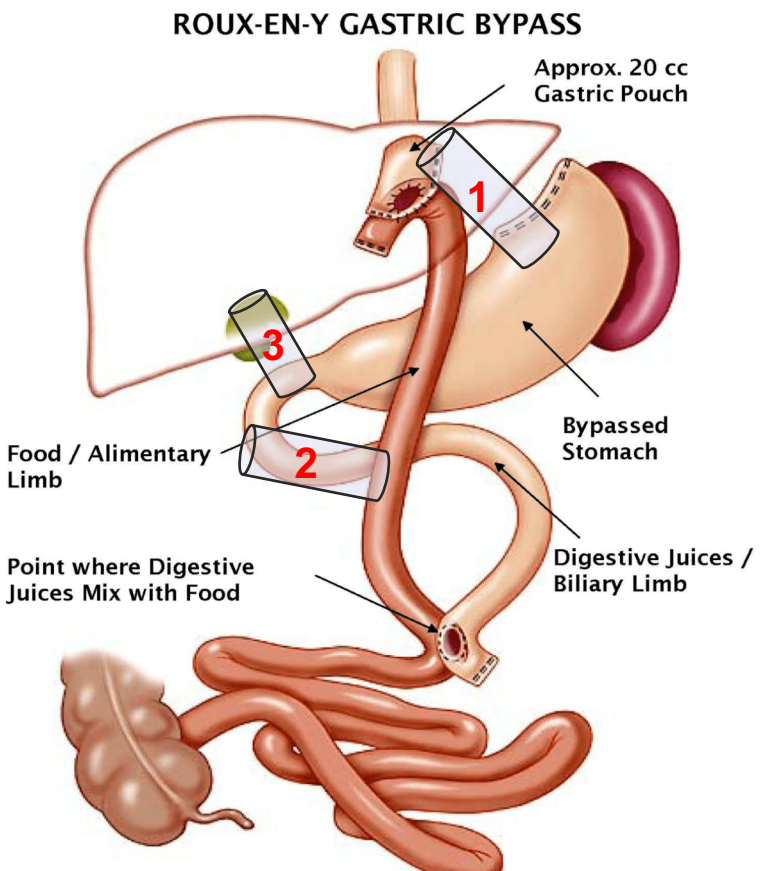
  - APD 26/07/2018 adenocarcinoma



10. Conclusion

Long limb Roux-en-Y gastric bypass

1

Device-assisted enteroscope

No cholecystectomy needed

2a

EUS-guided transgastric
or
EUS-guided gastrostomy
or
DAE-guided gastrostomy

Cholecystectomy needed 2b

Laparoscopy-assisted ERCP
+ cholecystectomy

DAE-ERCP vs EUS-GG-ERCP
Success 60% vs 100%
Adv events 6% vs 10%
N=60

LA-ERCP vs EUS-GG-ERCP
Success 97% vs 93%
Adv events 19% vs 24%
N=72