EUS-Guided Pancreaticobiliary Interventions

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Who Should Perform EUS Drainage

- EUS-PBD is technically difficult
- Only endoscopists skilled in both EUS and ERCP should perform this
- EUS-guided drainage should not be used to compensate for a lack of ERCP skills
- EUS-PBD is not a mature technique because of the current lack of dedicated devices.
EUS-BILIARY DRAINAGE TECHNIQUES

1. EUS-guided choledochoduodenostomy (EUS-CDS)
2. EUS-rendezvous technique (EUS-RV)
3. EUS-guided hepaticogastrostomy (EUS-HGS)
EUS-GUIDED CHOLEDOCHO-DUODENOSTOMY

Transenteric- transcholedochal or Extrahepatic

Gupta K. Rev Gastroenterol Disord 2007

EUS GUIDED CHOLEDOCHO-DUODENOSTOMY WITH STENT PLACEMENT
EUS-GUIDED CHOLEDOCHODUODENOSTOMY

1. Done in patients with confirmed biliary obstruction after failed ERCP
2. Level of obstruction must be at the distal biliary tract
3. Patients with prior gastrectomy or Whipple’s operation cannot be done with EUS-CDS
   • the distal CBD is typically imaged at the distal antrum or duodenum.
4. EUS-CDS is preferably used in patients with malignant biliary obstruction

EUS-GUIDED CHOLEDOCHODUODENOSTOMY

• The overall success rate is 94%
• Complication rate=19%
• If uncovered SEMS used, there may be lower chance of dislodgement but bile leakage can occur.
• If FC-SEMS used, chance of bile leakage is small but migration rate may be higher.
CASE 1

- 79 y old caucasian lady
- Ampullary stricture from malignancy
- Failed ERCP x 2
- Early cholangitis
INDICATIONS FOR RENDEZVOUS ERCP (EUS-RV)

• The duodenoscope must be able to access the papilla for retrieval of the guidewire.
• Is not feasible in patients with duodenal obstruction.
  → This technique is the safest of all techniques
  → Is preferred in cases of benign causes such as biliary stone

RENDEZVOUS ERCP (EUS-RV)

• The overall reported success rates was 82 %
• Complication rate=10 %
• Approach for EUS-RV
  ← the left intrahepatic duct (LIHD) can be punctured from the stomach
  ← The extrahepatic approach can be done with scope position in D1 or D2.
EUS Guided Drainage: RDV

<table>
<thead>
<tr>
<th>Approach</th>
<th>Success rate, % (n)</th>
<th>Complication rate, % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHBD approach</td>
<td>87 (139/160)</td>
<td>11 (24/217)</td>
</tr>
<tr>
<td>IHBD approach</td>
<td>65 (40/62)</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>81 (215/267)</td>
<td></td>
</tr>
</tbody>
</table>


Comparison of EUS-guided rendezvous and precut papillotomy techniques for biliary access (with videos)

Vinay Dhir, MD, DNB, Suryaparaksh Bhandari, MD, Mukta Bapat, MD, DM, Amit Maydeo, MD
Mumbai, India

**Table 2. Success and complications**

<table>
<thead>
<tr>
<th></th>
<th>Precut</th>
<th>EUS</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 144</td>
<td>n = 58</td>
<td></td>
</tr>
<tr>
<td>First session</td>
<td>130 (90.3%)</td>
<td>57 (98.3%)</td>
<td>.038</td>
</tr>
<tr>
<td>Overall success</td>
<td>138 (95.8%)</td>
<td>57 (98.3%)</td>
<td>.35</td>
</tr>
<tr>
<td>Overall</td>
<td>10 (6.9%)</td>
<td>2 (3.4%)</td>
<td>.27</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>4 (2.8%)</td>
<td>0</td>
<td>.25</td>
</tr>
<tr>
<td>Bleeding</td>
<td>6 (4.2%)</td>
<td>0</td>
<td>.12</td>
</tr>
<tr>
<td>Pericholecdochal contrast medium leak</td>
<td>—</td>
<td>2 (3.4%)</td>
<td>—</td>
</tr>
</tbody>
</table>

Gastrointest Endosc 2012:75:354-9
**EUS-GUIDED HEPATICOGASTROSTOMY**

- Transgastric-transhepatic or Intrahepatic

**INDICATIONS**

- Only choice for patients with hilar biliary obstruction
- It is also the preferred route for patients with gastrectomy or duodenal obstruction.
- Operator preferences play an important role if EUS-HG done in distal CBD obstruction
- It should be reserved in patients with malignant biliary obstruction (not benign dz)
EUS-GUIDED HEPATICOGASTROSTOMY

- The overall success rate is 87%
- Complication rate = 23%
- Bile leakage is a major risk of EUS-HGS.
- Use of partially or fully covered SEMS with both ends flared have been used when EUS-HGS done

18 years old female diagnosed as case of gall stones in January 2016
Underwent lap chole on table was found to have GB mass with local infiltration
Undewent Radical cholecystectomy with HJ

Planned for Adjuvant Chemo - did not tolerate

Now presented in December 2016 with obstructive jaundice and imaging - MRCP was done as shown in subsequent slides
• Meta analysis of 27 independent cohorts
• The databases included Ovid MEDLINE, Ovid EMBASE, Scopus, and PUBMED
• Studies that reported outcomes of at least 4 EUS-BD procedures.
Adverse Events = 14%

EUS-CDS VS. EUS-HGS

<table>
<thead>
<tr>
<th></th>
<th>EUS-CDS</th>
<th>EUS-HGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Success Rate</td>
<td>91%</td>
<td>96%</td>
</tr>
<tr>
<td>Clinical Success Rate</td>
<td>79%</td>
<td>91%</td>
</tr>
<tr>
<td>Adverse Event Rate</td>
<td>13%</td>
<td>20%</td>
</tr>
</tbody>
</table>

There are no obvious eminent advantages & disadvantages between EUS-HGS and EUS-CDS
EUS Guided Drainage vs. PTBD?

**LIMITATIONS OF EUS-GUIDED BILIARY DRAINAGE**

- Tortuous bile ducts (failure to advance guide wire)
- High grade obstruction
- Right hepatic duct drainage ??

**TABLE 4. Results of Interventional Attempts**

<table>
<thead>
<tr>
<th></th>
<th>EUS-CD</th>
<th>PTBD</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>13/13</td>
<td>12/12</td>
<td>0.8</td>
</tr>
<tr>
<td>Follow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alkaline phosphatase (mean)</td>
<td>101</td>
<td>129</td>
<td>0.08</td>
</tr>
<tr>
<td>GGT (mean)</td>
<td>133</td>
<td>174</td>
<td>0.04</td>
</tr>
<tr>
<td>30 days (n = 22)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total bilirubin (mean)</td>
<td>2.2</td>
<td>1.98</td>
<td>0.3</td>
</tr>
<tr>
<td>QOL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>3</td>
<td>0.44</td>
</tr>
<tr>
<td>Bleeding</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biloma</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bile leak</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Abscess</td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Technical Success=100%
No difference in AEs

Endoscopic Ultrasound-Guided Pancreatic Duct Intervention

When to Perform?

<table>
<thead>
<tr>
<th>Indications</th>
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<tbody>
<tr>
<td>Altered Anatomy: Stenosis of the Pancreaticeo-Jejunal Anastomosis with or without fistula</td>
</tr>
<tr>
<td>Failed ERCP (Inaccessible and difficult to access the papilla or anastomosis):</td>
</tr>
<tr>
<td>1. MPD disruption</td>
</tr>
<tr>
<td>2. MPD hypertension secondary to PD stricture or stones in the MPD, or IPMN</td>
</tr>
</tbody>
</table>
Retrograde placement: stent placement in the direction of pancreatic tail

Anterograde placement: stent placement in the direction of pancreatic head

Systemic Review of EUS-guided PD Access

- Systematic review of studies evaluated EUS-guided PD access and intervention
- They identified 222 patients
  - Technical success = 77%
  - Clinical success rate = 70%
- Complications developed in 19% of the patients
  - Pancreatitis (3.1%)
  - Perforation (0.9%)

Gastrointest Endosc 2013;78:854-86
EUS-guided pancreatic drainage for pancreatic strictures after failed ERCP: a multicenter international collaborative study

- 80 patients who underwent EUS-PDI
  - Technical success=89%
  - Clinical success=81%
- Stent placement via rendezvous wire access was most successful technique
- Major immediate adverse events (AEs) occurred in 15%
- The method of approach (antegrade vs. rendezvous) was not a predictor of immediate or delayed AEs

Gastrointest Endosc 2017;85:164-169

Consensus about the Utility of EUS-PDI

- EUS-PDI is highly effective
- Associated with significant complications.
- This procedure is technically demanding.
- Taking publication bias into account, actual success rates are likely lower than reported.
- It has only been described in retrospective studies with small sample sizes.
CONCLUSIONS

• EUS-PBD is useful alternative biliary drainage methods after failed ERCP
• Selection of the approaches for EUS-BD should be based on:
  1. patient's condition
  2. patient's anatomy
  3. specialist's experience with the procedure

CONCLUSIONS

Procedures should be carried out by skilled endoscopists who can perform each type of EUS-PBD at high-volume centers with appropriate backup