EUS guided biliary drainage
Ready for prime time?

Pierre H. Deprez
Brussels
INTRODUCTION

Techniques and routes

EUS better access?

CONCLUSIONS
Abstract: P.245E
Citation: Endoscopy 2000; 32(Suppl1):E38

EUS GUIDED BILIO-DUODENAL ANASTOMOSIS: A NEW TECHNIQUE OF BILIARY DRAINAGE. A CASE REPORT

M. Giovannini, Ch. Pesenti, A.L. Rolland, V. Moutardier, B. Lelong, J.R. Delpero

Endoscopic unit: Paoli-Calmettes Institute, Marseille, France

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Endoscopic Ultrasound-Guided Bilioduodenal Anastomosis: A New Technique for Biliary Drainage

M. Giovannini¹, V. Moutardier², C. Pesenti¹, E. Bories¹, B. Lelong², J. R. Delpero²

¹ Endoscopy Unit, Paoli-Calmettes Institute, Marseille, France
² Dept. of Surgery, Paoli-Calmettes Institute, Marseille, France
EUS pioneers: biliary

Wiersema GIE 1996
- First EUS cholangiography

Sahai A. GIE 1998
- Hepaticogastrostomy attempts in 5 pigs

Giovannini M. Endoscopy 2001
- Bilio-duodenal anastomosis
  - 5Fr NK, 0.035 wire, 6.5 Fr Soehendra dilator, Exchange duodenoscope

Giovannini M. Endoscopy 2003
- Hepaticogastrostomy
  - 19g, wire guide, 3lumen needle knife, 8.5Fr stent

Mallery J. GIE 2004-Kim Endoscopy 2010
- Rendez-vous technique
  - 19-22g needles and wireguide passage through papilla or tumour

Larghi A. GIE 2008-2010
- Rendezvous with EUS FV scope

Kim GIE 2010
- SEMS
Indications

**Symptomatic biliary obstruction**

Second line after failed ERCP

- Malignant
- Benign
  - Anastomotic strictures
  - Stones

First line in “surgical” anatomy

- Gastrectomy
- Biliary bypass
- Gastric bypass

**Contra-Indications: ascites, diffuse metastatic disease**

<table>
<thead>
<tr>
<th>2015</th>
<th>CDS</th>
<th>HGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>N° of cases</td>
<td>340</td>
<td>153</td>
</tr>
<tr>
<td>Technical success</td>
<td>92%</td>
<td>95%</td>
</tr>
<tr>
<td>Early adverse events</td>
<td>15%</td>
<td>17%</td>
</tr>
</tbody>
</table>
INTRODUCTION

Techniques and routes

EUS better access?

CONCLUSIONS
3 mains routes

- Rendez-vous
- Transluminal stenting
  - CDS: choledocoduodenostomy
  - HGS: hepaticogastrostomy
    - Proximal biliary stricture
    - Anatomy prohibiting access to EHBD
  - EUS-guided antegrade transpapillary (or transanastomostic) stenting

Khashab et al GIE 2015
ESCP or ESBD: A HYBRID BETWEEN EUS & ERCP

<table>
<thead>
<tr>
<th>ACCESS DRAINAGE</th>
<th>Intrahepatic</th>
<th>Extrahepatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmural</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Transpapillary</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Perez-Miranda, GI End Clin N Am 2012
Tips and tricks

General
- CO² insufflation
- Fluoroscopy

CDS
- Avoid wire shearing
- Axial cautery safer, avoid needle knife
- LAMS better
- Take care of duodenal obstruction

HGS
- Avoid cardia/esophagus
- Special stents
- Leave 3 cm in the stomach

Ogura et al WJG 2015
Complications

- pneumoperitoneum: CO2 insufflation!
- Bile peritonitis
- Shrinkage or migration
- Haemorrhage
- Cholangitis
- Obstruction of stent
- Failed drainage
- Biliary gastritis
- Fatal outcome

Ogura et al WJG 2015
Mediastinal migration of SEMS
Removal, biliary drainage and
Ovesco clip closure
What is the best and safest route for bile duct drainage?

- EUS-RV
- EUS-CDS
- EUS-HGS
- EUS- anterograde BD
- PTBD
Is EUS-BD better than PTBD?

In theory?
- Left lobe drainage: adequate palliation if
  - drainage of 30% of the functioning hepatic mass
- No hydric losses with internal drainage
- More comfortable
- Easy access in case of stent occlusion

Comparative studies?
- Only 1 randomized controlled trial 25 pts
  - similar outcomes reported in both arms
- Retrospective review
  - PTBD higher Technical success rate (100% vs 86%, P<.007)
  - Clinical success rate was similar (92% vs 86%)
  - PTBD was associated with a higher risk of adverse events
    ▪ index procedure: 39% vs 18%;
    ▪ all procedures including reinterventions: 80% vs 16%

Lee et al CGH 2016

Multicenter, open-label, randomized trial to compare EUS-BD vs PTBD for malignant distal biliary obstruction after a failed ERCP.

The procedures were performed at 4 tertiary academic referral centers in South Korea from October 2014 through March 2015; patients were followed up through June 2015

<table>
<thead>
<tr>
<th></th>
<th>PTB</th>
<th>EGD</th>
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<tbody>
<tr>
<td>N</td>
<td>34</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Techn success</td>
<td>97%</td>
<td>94%</td>
<td>ns</td>
</tr>
<tr>
<td>Funct success</td>
<td>87%</td>
<td>87%</td>
<td>ns</td>
</tr>
<tr>
<td>Reinterventions</td>
<td>0.9</td>
<td>0.3</td>
<td>P=0.02</td>
</tr>
<tr>
<td>Complic.</td>
<td>31%</td>
<td>9%</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>QOL</td>
<td>=</td>
<td>=</td>
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OP027  EUS-GUIDED BILIARY DRAINAGE VERSUS PERCUTANEOUS BILIARY DRAINAGE: RESULTS OF A MULTICENTER RANDOMIZED PHASE II STUDY

E. Bories¹, J.P. Ratone¹, F. Caillol¹, C. Pesenti², C. Zemmour³, J. Boher³, D. Genre⁴, M. Barthet⁵, B. Napoléon⁶, M. Giovannini¹

¹Endoscopy, Institut Paoli Calmette, marseille/France
²Endoscopy, Paoli Calmettes Institute, Marseille/France
³Biostatistique, Institut Paoli Calmette, marseille/France
⁴paoli calmettes institute, marseille/France
⁵Hopital Nord, Hopital Nord, Marseille/France
⁶69, Hôpital Privé Jean Mermoz, Lyon/France
Aims & Methods:
Inclusion criteria were: benign or malignant obstructive jaundice with failure of ERCP.
Exclusion criteria were: ascites, blood coagulation disorders, stenosis of the right bile duct.
Randomization ratio was 1:1, (4 centers).

The choice of the EGD technique was free for the operator as (Anterograde transpapillary stenting, choledoco-duodenostomy, hepatico-gastrostomy).

To prove a decrease of 50% of the morbidity rate in the EGD arm (A=30%, B=15%), 55 patients should be included.

Intermediate analysis was performed after inclusion of 47 patients and showed significantly higher morbidity rate in the PTB arm. Then, PTB arm was stopped and inclusions were made only in the EGD arm.
Similar high technical and clinical success rates

Specific complication rate was higher in the PTB arm

EUS guided biliary drainage should be the first therapeutic approach after failure of ERCP, in selected patients.
Is there a better route? RV vs. TL

- No difference
  - Retrospective analysis, Khashab et al GIE 2015
  - Drawbacks of RV
    - Successful completion of RV in only 75% of patients, even among expert endoscopists often due to surgically altered anatomy
    - Longer duration, exchange scopes, pancreatitis risk

- EUS-guided biliary drainage is safe and effective when the described standardized algorithm is used. Stent occlusion is not common during long-term follow-up.
- Both rendezvous and direct transluminal techniques seem to be equally effective and safe. The latter approach is a reasonable alternative to rendezvous EUS-guided biliary drainage, and aggressive wire manipulation is not warranted.
Is there a better route: CDS vs HGS?

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Success rate CDS vs HGS</th>
<th>Adverse events CDS vs HGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artifon et al</td>
<td>49</td>
<td>91 vs 95%</td>
<td>12 vs 20%</td>
</tr>
<tr>
<td>Gupta et al</td>
<td>246</td>
<td>84 vs 90%</td>
<td>30 vs 31%</td>
</tr>
<tr>
<td>Dhir et al</td>
<td>68</td>
<td>93 vs 50%</td>
<td>9 vs 30%</td>
</tr>
</tbody>
</table>

- Intrahepatic route
  - Needle traverses the peritoneal cavity
  - The stomach and liver move independently (respiration and peristalsis), which may induce stent migration, biloma formation
  - Smaller-caliber intrahepatic ducts may not accommodate wider 8- to 10-mm metal stents, which can theoretically predispose to pneumoperitoneum and bile leakage

- Extrahepatic access, has many potential advantages including
  - Close proximity of the duodenum to the dilated bile duct
  - Relatively fixed bile duct with minimal respiratory influence.
Could it even represent the future of BD drainage?

**EUS-CDS vs. ERCP**

- 26 pts EUS-CDS and 56 ERCP.
- Clinical success rates were equivalent
  - EUS-CDS 96% vs ERCP 98%
- Procedure time shorter with EUS-CDS
  - 20 vs. 30 min; P<0.01
- Rate of overall adverse events similar
  - 27% vs 36%; P=0.4
- Pancreatitis only observed in the ETS group
  - 0% vs 16%; P=0.03

Kawakubo et al. Endoscopy 2015
Could it represent the future of BD drainage?

<table>
<thead>
<tr>
<th></th>
<th>EUS-CDS (n=26)</th>
<th>ETS (n=56)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complications, n (%)</td>
<td>7 (26.9)</td>
<td>20¹ (35.7)</td>
<td>0.46</td>
</tr>
<tr>
<td>Severe/Moderate/Mild, n</td>
<td>0/5/2</td>
<td>0/4/16</td>
<td></td>
</tr>
<tr>
<td>Cholecystitis, n</td>
<td>3</td>
<td>3</td>
<td>0.38</td>
</tr>
<tr>
<td>Pancreatitis, n</td>
<td>0</td>
<td>9</td>
<td>0.03</td>
</tr>
<tr>
<td>Liver abscess, n</td>
<td>2</td>
<td>0</td>
<td>0.10</td>
</tr>
<tr>
<td>Fever, n</td>
<td>0</td>
<td>3¹</td>
<td>0.55</td>
</tr>
<tr>
<td>Abdominal pain, n</td>
<td>0</td>
<td>5¹</td>
<td>0.30</td>
</tr>
<tr>
<td>Peritonitis, n</td>
<td>1</td>
<td>0</td>
<td>0.32</td>
</tr>
<tr>
<td>Cholangitis, n</td>
<td>1</td>
<td>1</td>
<td>0.54</td>
</tr>
</tbody>
</table>

EUS-CDS, endoscopic ultrasound-guided choledochoduodenostomy; ETS, endoscopic transpapillary stenting.

¹ One patient developed both fever and abdominal pain.
Conclusions
Is it ready for prime time? YES BUT

Expert and tertiary centers

- Nearly all published studies originate from tertiary high volume centers that employ highly qualified interventional endoscopists.

- These procedures should ideally be performed by endoscopists well trained in both ERCP and EUS.

- Carried out at institutions where surgery and radiology backup are available to help manage failed interventions and/or adverse events.
Conclusions
Is it ready for prime time?

Yes for failed ERCP
- Surgical anatomy
- Previous failed ERCP
- Periampullary cancer with duodenal invasion
- Duodenal stent covering the ampulla...

Consent process with thorough discussion regarding the potential indications, benefits, and risks and available alternatives such as repeat ERCP versus percutaneous or surgical drainage.

But still limitations: lack of high quality data, lack of devices, lack of long term outcomes in benign disease