Management of malignant biliary stricture: EUS management

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Disclosure

• Consultant for Boston Scientific
Short history of endoscopic biliary drainage

XXth century

1970s
Surgical biliary drainage
Percutaneous biliary drainage

1980s
ERCP biliary drainage

2000s
EUS biliary drainage

2010
Hepaticogastrostomy
Choledocoduodenostomy

2015
Lumen apposing metallic stent
(LAMS)

Anatomical (anastomosis)
Extra-anatomical (T-tube)
Extra-anatomical (through skin, muscle, ...)
Antegrade
Anatomical Retrograde
Extra-anatomical
Metallic stent
Type of biliary drainage / level of obstruction

- Surgery
- PTBD
- ERCP
- EUS ???
EUS-BD: 4 techniques

3 for malignant stricture

- Antegrade Transpapillary Stenting
- CDS: Choledocoduodenostomy
- HGS: Hepaticogastrostomy
What do you need for EUS-BD?

- **Therapeutic EUS Operating channel > 3.7 mm**
- **19 G needle) (standard or « access »)**
- **6 F cystotome or dilator**
- **Interventional radiologist**
- **Surgeon**
- **Trained and skillful endoscopist**
Antegrade transpapillary stenting
Hepaticogastrostomy
Standard choledocoduodenostomy
**EUS-BD / Consensus and controversy**

- **Consensual**
  - Malignancy
  - + non operable status
  - + distal obstruction
  - + **Failure of ERCP**

- **What to do if?**
  - Potentially resectable
  - Hilar stricture

- **Or in every primary biliary drainage?**

- **Controversial**
  - Not accessible papilla
    - Duodenal stricture
    - Modified anatomy (Roux-en-Y, gastrectomy, bypass...)
  - Failure of cannulation
EUBD for primary decompression?

<table>
<thead>
<tr>
<th>Author [ref], year</th>
<th>Study type</th>
<th>Centers, n</th>
<th>Patients (EUS, ERCP), n</th>
<th>Technical success EUS / ERCP</th>
<th>Clinical success</th>
<th>Overall Adverse events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paik [26]</td>
<td>RCT</td>
<td>4</td>
<td>125 (64, 61)</td>
<td>94 NS 90</td>
<td>84 NS</td>
<td>11</td>
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<tr>
<td>Am J Gastro 2018</td>
<td></td>
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<td></td>
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<tr>
<td>Bang [27]</td>
<td>RCT</td>
<td>1</td>
<td>67 (33, 34)</td>
<td>91 NS 94</td>
<td>97 NS</td>
<td>21</td>
</tr>
<tr>
<td>GI Endosc 2018</td>
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</tr>
<tr>
<td>Park [28]</td>
<td>RCT</td>
<td>1</td>
<td>28 (14, 14)</td>
<td>93 NS 100</td>
<td>93 NS</td>
<td>0</td>
</tr>
<tr>
<td>GI Endosc 2018</td>
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</tbody>
</table>

Non-inferiority

Less morbidity

BUT
- Not top-level quality studies
- Heterogeneous drainage techniques
- ERCP morbidity not realistic
PTBD or EUS-BD?

- Meta-analysis (3 RCTs*, 6 retrospective studies)
- NS on technical success and length of stay

- EUS-BD > PTBD
  - Morbidity (8.8% vs 31.2%) (Lee et al)
  - % of Reintervention
  - Cost-Efficacy

**EUS-BD should be preferred if local resources are available**

Hindryckx P et al. World J Gastrointest Endosc 2019
Sharaiha RZ et al. Gastrointest Endosc 2017
### EUS-CDS or EUS-HGS ?

<table>
<thead>
<tr>
<th>5 studies (1 RCT *, 2 retro, 2 prosp)</th>
<th>Technical success</th>
<th>Clinical success</th>
<th>Adverse events</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUS-CDS</td>
<td>87%</td>
<td>95%</td>
<td>20%</td>
</tr>
<tr>
<td>EUS-HGS</td>
<td>84%</td>
<td>96%</td>
<td>29%</td>
</tr>
<tr>
<td>p-value</td>
<td>NS</td>
<td>NS</td>
<td>OR 2,01 p = 0,004</td>
</tr>
</tbody>
</table>

- **Favor CDS vs HGS if possible**
- **Depends on local expertise**

*Artifon et al. Gastrointest Endosc. 2015  
Hedjoudje et al. UEG journal 2019
HOT AXIOS: LAMS / All in one device
EUS guided drainage, after failed ERCP, in a 92 yo female presenting with an ampullary cancer invading the CBD
# Biliary AXIOS: results

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Nbre of patients</td>
<td>58</td>
<td>19</td>
<td>46</td>
<td>52</td>
<td>67</td>
</tr>
<tr>
<td>Type of study</td>
<td>Multi, retro</td>
<td>Multi, prospect</td>
<td>Mono, retro</td>
<td>Multi, retro</td>
<td>Multi, retro</td>
</tr>
<tr>
<td>Technical success</td>
<td>98 %</td>
<td>100 %</td>
<td>94 %</td>
<td>89 %</td>
<td>96 %</td>
</tr>
<tr>
<td>Clinical success</td>
<td>96 %</td>
<td>95 %</td>
<td>97 %</td>
<td>100 %</td>
<td>100 %</td>
</tr>
<tr>
<td>Early adverse events</td>
<td>7 %</td>
<td>16 %</td>
<td>0 %</td>
<td>4 %</td>
<td>8 %</td>
</tr>
<tr>
<td>Late adverse events</td>
<td>9 %</td>
<td>26 %</td>
<td>12 %</td>
<td>14 %</td>
<td>18 %</td>
</tr>
</tbody>
</table>
### Biliary AXIOS: technical details

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size of stent</strong></td>
<td>6x8 10x10</td>
<td>6x8</td>
<td>6x8 8x8</td>
<td>6x8</td>
<td>10x10</td>
</tr>
<tr>
<td><strong>Technique</strong></td>
<td>Both</td>
<td>Indirect</td>
<td>Direct</td>
<td>Direct ++</td>
<td>Indirect</td>
</tr>
<tr>
<td><strong>CBD size in mm</strong></td>
<td>17.9 (8-35)</td>
<td>17.3</td>
<td>17.3</td>
<td>17.2 (9-25)</td>
<td>17.6</td>
</tr>
</tbody>
</table>

Small size of stent
Direct method without needle or guidewire
CBD > 15 mm
Early adverse events / Technical failures

- NO ACUTE PANCREATITIS
- Almost NO BILE LEAKAGE OR PERITONITIS

- Anderloni et al
  - 3 failures
    - 2 misdeployments = loss of EUS view during release of the first flange
    - 1 immediate migration / CBD = 11mm

- Jacques et al
  - 6 failures
    - 1 massive bleeding (beware of the gastroduodenal artery)
    - 1 failure of the fistulotomy
    - 4 misdeployments

* Uemura et al. J Clin Gastroenterol 2017
### Success / failure Factors

<table>
<thead>
<tr>
<th></th>
<th>OR (95%CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female sex</td>
<td>5.45 (0.59 – 50.4)</td>
<td>0.13</td>
</tr>
<tr>
<td>Age &gt; 77 years</td>
<td>3.11 (0.52 – 18.8)</td>
<td>0.22</td>
</tr>
<tr>
<td>Bile duct diameter &gt; 15 mm</td>
<td>10.3 (1.11 – 96.5)</td>
<td>0.04</td>
</tr>
<tr>
<td>Not the recommended technique</td>
<td>0.06 (0.01 – 0.60)</td>
<td>0.02</td>
</tr>
<tr>
<td>First procedure</td>
<td>0.24 (0.042 – 1.41)</td>
<td>0.12</td>
</tr>
<tr>
<td>Hot Axios stent 6 mm</td>
<td>6.67 (1.08 – 41.0)</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Comparison of experts and nonexperts.

<table>
<thead>
<tr>
<th></th>
<th>Experts</th>
<th>Nonexperts</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures, n</td>
<td>29</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>CBD diameter, mean, mm</td>
<td>16.6</td>
<td>17.9</td>
<td>0.24</td>
</tr>
<tr>
<td>Size of the stent, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mm</td>
<td>27 (93.1)</td>
<td>16 (69.6)</td>
<td>0.004</td>
</tr>
<tr>
<td>8 mm</td>
<td>0 (0)</td>
<td>7 (30.4)</td>
<td></td>
</tr>
<tr>
<td>15 mm</td>
<td>2 (6.9)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Current, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endocut</td>
<td>16 (55.2)</td>
<td>3 (13.0)</td>
<td>0.003</td>
</tr>
<tr>
<td>Pure cut</td>
<td>13 (44.8)</td>
<td>20 (87.0)</td>
<td></td>
</tr>
<tr>
<td>Technique, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot Axios only</td>
<td>22 (75.9)</td>
<td>15 (65.2)</td>
<td>0.69</td>
</tr>
<tr>
<td>Hot Axios secured by guidewire</td>
<td>5 (17.2)</td>
<td>6 (26.1)</td>
<td></td>
</tr>
<tr>
<td>Hot Axios after puncture and guidewire</td>
<td>2 (6.9)</td>
<td>2 (8.7)</td>
<td></td>
</tr>
<tr>
<td>Duration of procedure, mean, minutes</td>
<td>9.9</td>
<td>10.6</td>
<td>0.85</td>
</tr>
<tr>
<td>Technical success, n (%)</td>
<td>24 (82.8)</td>
<td>22 (95.7)</td>
<td>0.21</td>
</tr>
<tr>
<td>Clinical success, n (%)</td>
<td>28 (96.6)</td>
<td>23 (100)</td>
<td>&gt;0.99</td>
</tr>
</tbody>
</table>
Late adverse events

- 9 à 26 %
- Cholangitis mainly
  - Food impaction and sump syndrom
  - Increased risk if duodenal stricture?
    - 20 % vs 4 % if duodenal stricture (Anderloni et al)
    - Already known data with classic duodenostomy *
  
  - Always duodenal stent even if asymptomatic stricture?

* Ogura et al. Endoscopy 2016
Latest American data:

Indirect technique
LAMS 10 mm

12 % vs 50 %
Late obstruction if Stent in stent

Improved design?
Anti-reflux design?
Conclusion

• In case of malignant biliary stricture with jaundice

• EUS biliary drainage is a wonderful tool in case of failure of ERCP
  – High technical success
  – High clinical success
  – Tolerable rate of adverse events

• Specific technical skills and training
  → Replace the PTBD if available

• New devices are emerging to make it easier (HOT stent / HOT AXIOS)
Conclusion

• Lack of prospective studies / Lack of long-term follow-up

• New all-in-one device for hepaticogastrostomy is mandatory

→ Soon ready for prime time vs ERCP ?

→ In every cases: potentially resectable malignancy ?
Thank you for your attention !!!!

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