QUALITY IN ENDOSCOPY: ERCP

Session 3 - Biliary stone disease

REMOVAL OF SMALL AND LARGE STONES FROM THE BILE DUCT

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SMALL AND LARGE BILE DUCT STONES

EASY

DIFFICULT (10%)

...but nothing is simple
Bile Duct Stones: Issues

- Size and number
- Anatomy
- Choice of the devices
- Extraction technique
Difficult stones:
Size > 2 cm, number >3
Anatomy: narrow intrapancreatic CBD
Anatomy: narrow intrapancreatic CBD
Anatomy: narrow intrapancreatic CBD
Anatomy: “S shaped CBD”
Anatomy: “S shaped CBD”
Anatomy: Mirizzi’s syndrome

3 months after surgery
Devices: Fogarty vs Dormia basket
Devices: which basket

Nitinol:
Memory shape
Devices: which basket

Nitinol: radial force
Devices: mechanical lithotripsy
Devices: mechanical lithotripsy

Slow!!!
Devices: mechanical lithotripsy
Devices: mechanical lithotripsy
Mechanical lithotripsy
Traction wire fracture/trapped basket
Complications: 4.5% (29/643)
- Trapped/Broken basket: 11
- Traction wire fracture: 8
- Broken handle: 7
- Perforation/duct injury: 3

Table 5. Biliary Complications – Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrohydraulic lithotripsy (EHL)</td>
<td>11</td>
</tr>
<tr>
<td>Soehendra (per-oral) lithotripsy</td>
<td>8</td>
</tr>
<tr>
<td>Sphincterotomy extension</td>
<td>7</td>
</tr>
<tr>
<td>Extracorporeal lithotripsy (ESWL)</td>
<td>5</td>
</tr>
<tr>
<td>Dislodge stone/change basket</td>
<td>4</td>
</tr>
<tr>
<td>Biliary stent (straight/NB)</td>
<td>3</td>
</tr>
<tr>
<td>Surgery</td>
<td>1</td>
</tr>
</tbody>
</table>

Total: 39
Devices: EHL / Laser lithotripsy
Devices: SpyGlass® Direct Visualization System

- 4 Lumens
- 10 French
- 1.2 mm accessory channel
- Four direction steering capability
- Independent irrigation channels
- Single operator system
- Single use
# EHL and laser lithotripsy: results

<table>
<thead>
<tr>
<th>Author, Journal year</th>
<th>#pts</th>
<th>Type</th>
<th>Succ clearance</th>
<th>N° ERCP/pt</th>
<th>Complications*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arya, Am J Gastr 2004</td>
<td>94</td>
<td>EHL</td>
<td>90%</td>
<td>1.9</td>
<td>18%</td>
</tr>
<tr>
<td>Piraka, Cl Gastr Hep 2007</td>
<td>32</td>
<td>EHL</td>
<td>97%</td>
<td>1.4</td>
<td>10%</td>
</tr>
<tr>
<td>Jakobs, Arq Gastro 2007</td>
<td>89</td>
<td>Laser</td>
<td>80%</td>
<td>N/A</td>
<td>0%</td>
</tr>
<tr>
<td>Kim, World J Gastr 2008</td>
<td>17</td>
<td>Laser (Freddy, X-Ray control)</td>
<td>88%</td>
<td>1.7</td>
<td>18%</td>
</tr>
<tr>
<td>Cho, GIE 2009</td>
<td>52</td>
<td>Laser (Freddy, X-Ray control)</td>
<td>92%</td>
<td>1.4</td>
<td>12%</td>
</tr>
<tr>
<td>Swann, Surg Endosc 2009</td>
<td>44</td>
<td>Laser + EHL</td>
<td>77%</td>
<td>N/A</td>
<td>11%</td>
</tr>
<tr>
<td>Liu, Endoscopy 2011</td>
<td>30</td>
<td>Laser (Freddy, X-Ray control)</td>
<td>90%</td>
<td>1.4</td>
<td>7%</td>
</tr>
<tr>
<td>Chen, GIE 2011</td>
<td>66</td>
<td>Laser + EHL (SPY GLASS)</td>
<td>71%</td>
<td>N/A</td>
<td>6%</td>
</tr>
</tbody>
</table>

* Mild pancreatitis, jaundice, cholangitis, haemobilia
Devices: ESWL
## ESWL: results

<table>
<thead>
<tr>
<th>Author, Journal / yr</th>
<th># pts</th>
<th>Stone diameter</th>
<th>Success (%)</th>
<th># ESWL / pts</th>
<th>Complications *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sackman GIE 2001</td>
<td>313</td>
<td>20 mm (8-60)</td>
<td>90</td>
<td>1.6 (1-5)</td>
<td>7.9%</td>
</tr>
<tr>
<td>Amplatz, Diget Liver Dis 2007</td>
<td>376</td>
<td>21 mm (7-80)</td>
<td>90</td>
<td>3.7 (1-12)</td>
<td>9.1%</td>
</tr>
<tr>
<td>Tandan J Gastro Hepatol 2009</td>
<td>283</td>
<td>32 mm (18-70)</td>
<td>84</td>
<td>2.8 (1-10)</td>
<td>15.9%</td>
</tr>
<tr>
<td>Muratori World J Gastro 2011</td>
<td>214</td>
<td>&gt;15 (15-50)</td>
<td>89</td>
<td>3.5 (1-14)</td>
<td>12.6</td>
</tr>
</tbody>
</table>

* Mild haemobilia, arrhythmias, mild pancreatitis, cholangitis, skin haematoma
Bile duct stones: key points

- Size of the sphincterotomy
- Extraction technique
- Management of failed extraction
Technique: use of the Dormia basket
Technique: ES + Large Balloon dilation for big bile duct stones

How long?
30 sec / 6 min

Quality in Endoscopy: ERCP, Munich 2011
ES + Large Balloon dilation (ESLBD) for big bile duct stones: results

<table>
<thead>
<tr>
<th>Author, Journal year (Prospective / Retrospective)</th>
<th>pts</th>
<th>Balloon size (mm)</th>
<th>Mean stone size (mm)</th>
<th>Need for mech Litho (%)</th>
<th>Succ clearance (%)</th>
<th>AP (%)</th>
<th>Bleed. (%)</th>
<th>Perf. (%)</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ersoz GIE 2003 (R)</td>
<td>58</td>
<td>10-20</td>
<td>17</td>
<td>7</td>
<td>100</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>Heo GIE 2007 (P)</td>
<td>100</td>
<td>12-20</td>
<td>16</td>
<td>7</td>
<td>97</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>Maydeo Endoscopy 2007 (P)</td>
<td>60</td>
<td>12-15</td>
<td>16</td>
<td>5</td>
<td>100</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>Itoi Am J Gastro 2009 (R)</td>
<td>53</td>
<td>15-20</td>
<td>15</td>
<td>5.5</td>
<td>100</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>Draganov J Clin Gastro 2009 (R)</td>
<td>44</td>
<td>10-15</td>
<td>13</td>
<td>4.5</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>Kim Surg Endosc 2011 (P)</td>
<td>72</td>
<td>12-20</td>
<td>&gt; 10</td>
<td>8.3</td>
<td>97</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>Youn Dig Dis Sci 2011 (R)</td>
<td>101</td>
<td>15-20</td>
<td>22</td>
<td>6.9</td>
<td>100</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>?</td>
</tr>
</tbody>
</table>

Procedure related mortality absent
Bile duct stones

... in case of failed extraction

*DRAIN the bile ducts!!* (stent near the stone)

Endoscopy is repeatable!!!
In patients with irretrievable biliary stones, insertion of a plastic stent is effective at **short-term to drain** the bile ducts; it is frequently associated with partial (or even complete) stone dissolution that facilitates delayed endoscopic stone removal. (Evidence level 1-).

Biliary stent placement for irretrievable stones, when used as a **long-term measure**, is associated with a high **risk of cholangitis** (Recommendation grade B).

**ESGE Guidelines on Biliary stenting. Endoscopy (in press)**
Bile duct stones

• Understand bile ducts anatomy

• Choose the appropriate device/technique

• Develop confidence with lithotripsy

• Use large balloon in appropriate cases

• Drain always the bile ducts (stent/NBD) in case of failed extraction
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12th and 13th April 2012
Catholic University Rome,
Policlinico A. Gemelli

Quality in Endoscopy: ERCP, Munich 2011