Postgraduate Course in General Surgery

Choledocholithiasis

Eric K. Nakakura
Ko Olina, HI
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Choledocholithiasis

Overview

- Epidemiology
- Diagnosis
- Treatment
  - Preoperatively suspected choledocholithiasis (CDL)
  - CDL found intraoperatively
  - CDL after cholecystectomy

Epidemiology

- ~ 10% of Americans older than 40-years-old diagnosed with cholelithiasis
- > 700,000 cholecystectomies/year in U.S.
- 10-15% have choledocholithiasis (CDL)
- ~ 40% with CDL have serious complications
  - Gallstone pancreatitis (3% mortality)
  - Cholangitis (10% mortality)

Preoperatively suspected CDL

- Preoperative ERCP, sphincterotomy, stone extraction, then laparoscopic cholecystectomy
- Laparoscopic cholecystectomy plus laparoscopic common bile duct exploration
- Open cholecystectomy with common bile duct exploration
- Preoperative ERCP, sphincterotomy, and stone extraction (poor surgical candidate)

Choledocholithiasis (CDL)

**CDL found intraoperatively**
- Flush CBD stones into duodenum
- Laparoscopic CBD exploration
- Postoperative ERCP/ES
- Open CBD exploration

**CDL after cholecystectomy**
- ERCP/ES
- Open CBD exploration

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**Choledocholithiasis**

**Randomized Controlled Trial**

- Patients with cholecystolithiasis and choledocholithiasis
- Randomized to either:
  - Laparoscopic cholecystectomy plus laparoscopic common bile duct exploration
  - Endoscopic retrograde cholangiopancreatography sphincterotomy plus laparoscopic cholecystectomy
- Primary outcome
  - Stone clearance
- Secondary end points
  - Morbidity and mortality
  - Length of stay
  - Costs
  - Patient acceptance and quality of life

Rogers SJ et al. Arch Surg 2010
Choledocholithiasis

### Table 3. Treatments and Outcomes

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>ERCP/S+LC (n=55)</th>
<th>LC+LCBDDE (n=57)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common bile duct stone detected</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Common bile duct stones cleared, No. (%)</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Minor complications</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Major complications</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Procedure time, min (SD)</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: ERCP/S+LC, preoperative endoscopic retrograde cholangiopancreatography sphincterotomy followed by laparoscopic cholecystectomy; LC+LCBDDE, laparoscopic cholecystectomy plus laparoscopic common bile duct exploration.

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### Table 4. Outcome Descriptive Statistics

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Sample Size</th>
<th>ERCP/S+LC</th>
<th>LC+LCBDDE</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time from first procedure to discharge, d</td>
<td>46</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Length of hospitalization, d</td>
<td>5</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Hospital service charges, $</td>
<td>2744 (-1909 to 9700)</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Professional (physician) fees charges, $</td>
<td>1137 (567 to 1509)</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Total charges, $</td>
<td>2942 (-1680 to 8409)</td>
<td>0.007</td>
<td>0.007</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: ERCP/S+LC, preoperative endoscopic retrograde cholangiopancreatography sphincterotomy followed by laparoscopic cholecystectomy; LC+LCBDDE, laparoscopic cholecystectomy plus laparoscopic common bile duct exploration.

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### Table 5. 95% BCa Bootstrap CI’s for the Difference in Means*

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Mean Difference Between Groups (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure time, min</td>
<td>$ (-13 to 27)$</td>
<td>0.44</td>
</tr>
<tr>
<td>Time from first procedure to discharge, h</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>Length of hospitalization, d</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>Hospital service charges, $</td>
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<tr>
<td>Professional (physician) fees charges, $</td>
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<td>0.007</td>
</tr>
<tr>
<td>Total charges, $</td>
<td>0.007</td>
<td>0.007</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; ERCP/S+LC, preoperative endoscopic retrograde cholangiopancreatography sphincterotomy followed by laparoscopic cholecystectomy; LC+LCBDDE, laparoscopic cholecystectomy plus laparoscopic common bile duct exploration.

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**Randomized Controlled Trial**

- ERCP/S+LC and LC+LCBDDE both effective for detecting and removing CBD stones
- Equivalent overall cost and patient acceptance
- Overall duration of hospitalization shorter and physician fees lower for LC+LCBDDE
Choledocholithiasis (CDL)

Complicated choledocholithiasis (cCDL): cholangitis or pancreatitis on admission

Summary

• Treatment choice may differ based on disease presentation and severity, expertise, individual training, availability of appropriate staff

• ERCP/S+LC and LC+LCBDE both effective for detecting and removing CBD stones

• Rural patients undergo CDL intervention less often and when do, more likely surgical