MANAGEMENT OF BILIARY FISTULAS

Dr T.K. Marumo

University of Witwatersrand and CMJAH
Issues

- Definition
- Severity assessment
- Risk factors
- Early Diagnosis
- Appropriate investigations
- Management
Definition

- Bile leakage is of fluid with an elevated bilirubin level in the abdominal drain or intra-abdominal fluid on or after Post-operative Day Three
- Or the need for radiological intervention (i.e. interventional drainage) owing to biliary collections or re-laparotomy due to biliary peritonitis.
- The elevated bilirubin level in the drain or intra abdominal fluid is defined as a bilirubin concentration at least three times higher than the serum bilirubin level measured at the same time.

ISGLS 2010
Severity Assessment

- Grade A.
  - Bile leakage requiring no or little change in patients' clinical management

- Grade B.
  - Bile leakage requiring a change in patients clinical management (e.g. additional diagnostic or interventional procedures) but manageable without a re-laparotomy. OR: a Grade A bile leakage lasting for > 1 week

- Grade C.
  - Bile leakage requiring re-laparotomy
<table>
<thead>
<tr>
<th>Variables</th>
<th>%</th>
<th>Unadjusted RR (95% CI)</th>
<th>P-value</th>
<th>Adjusted RR* (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laparoscopic resection (No, Yes)</td>
<td>5.9, 7.4</td>
<td>1.25 (0.47–3.33)</td>
<td>0.65</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Intra operative ablation (No, Yes)</td>
<td>7.6, 3.0</td>
<td>0.39 (0.10–1.57)</td>
<td>0.19</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Synchronous primary resection (No, Yes)</td>
<td>7.2, 8.5</td>
<td>1.18 (0.49–2.82)</td>
<td>0.71</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Portal vein embolization (No, Yes)</td>
<td>7.0, 9.4</td>
<td>1.35 (0.73–2.49)</td>
<td>0.34</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Pre-operative chemotherapy (No, Yes)</td>
<td>7.7, 6.8</td>
<td>0.89 (0.56–1.40)</td>
<td>0.60</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Vascular reconstruction (No, Yes)</td>
<td>6.8, 16.3</td>
<td>2.38 (1.16–4.88)</td>
<td>0.02</td>
<td>1.04 (0.45–2.37)</td>
<td>0.93</td>
</tr>
<tr>
<td>Klatskin tumour (No, Yes)</td>
<td>6.5, 21.7</td>
<td>3.33 (1.82–6.07)</td>
<td>&lt;0.001</td>
<td>1.29 (0.57–2.92)</td>
<td>0.54</td>
</tr>
<tr>
<td>Colorectal liver metastases (No, Yes)</td>
<td>9.5, 5.6</td>
<td>0.58 (0.37–0.92)</td>
<td>0.02</td>
<td>0.94 (0.54–1.63)</td>
<td>0.82</td>
</tr>
<tr>
<td>Liver fibrosis (No, Yes)</td>
<td>6.6, 14.5</td>
<td>2.18 (1.20–3.97)</td>
<td>0.01</td>
<td>1.47 (0.76–2.84)</td>
<td>0.25</td>
</tr>
<tr>
<td>Liver steatosis (No, Yes)</td>
<td>8.7, 4.3</td>
<td>0.49 (0.27–0.89)</td>
<td>0.02</td>
<td>0.59 (0.31–1.13)</td>
<td>0.11</td>
</tr>
<tr>
<td>Blue liver (No, Yes)</td>
<td>7.6, 4.7</td>
<td>0.62 (0.26–1.51)</td>
<td>0.29</td>
<td>0.78 (0.31–1.97)</td>
<td>0.61</td>
</tr>
<tr>
<td>Drain used (No, Yes)</td>
<td>1.2, 10.8</td>
<td>9.32 (3.43–25.37)</td>
<td>&lt;0.001</td>
<td>9.92 (3.12–31.57)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Intra-operative blood loss (ml)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 150</td>
<td>1.7</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150 to less than 300</td>
<td>2.8</td>
<td>1.62 (0.46–5.66)</td>
<td>0.45</td>
<td>1.66 (0.47–5.85)</td>
<td>0.43</td>
</tr>
<tr>
<td>300 to less than 600</td>
<td>8.4</td>
<td>4.88 (1.68–14.11)</td>
<td>&lt;0.01</td>
<td>4.32 (1.47–12.69)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>600 and more</td>
<td>14.0</td>
<td>8.13 (2.94–22.49)</td>
<td>&lt;0.001</td>
<td>6.18 (2.13–17.89)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Extent of resection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 segment or less</td>
<td>4.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 or 3 complete segments</td>
<td>6.0</td>
<td>1.21 (0.59–2.51)</td>
<td>0.60</td>
<td>1.08 (0.52–2.24)</td>
<td>0.84</td>
</tr>
<tr>
<td>4 complete segments*</td>
<td>7.9</td>
<td>1.61 (0.77–3.37)</td>
<td>0.20</td>
<td>1.00 (0.48–2.06)</td>
<td>0.99</td>
</tr>
<tr>
<td>More than 4 segments</td>
<td>10.3</td>
<td>2.10 (1.08–4.08)</td>
<td>0.03</td>
<td>0.87 (0.42–1.78)</td>
<td>0.70</td>
</tr>
<tr>
<td>Re-resection (No, Yes)</td>
<td>6.7, 10.9</td>
<td>1.63 (0.94–2.85)</td>
<td>0.08</td>
<td>1.37 (0.77–2.45)</td>
<td>0.29</td>
</tr>
</tbody>
</table>

*Each risk factor was adjusted for with all of the other risk factors listed in the table.
RR, relative risk; CI, confidence interval.
Risk factors for biliary leaks

- Varies according to type of surgery
  - Liver resection
  - Hepatholithiasis
  - Cholidocholithiasis
  - Pancreatic surgery
  - Gallbladder surgery
RISK FACTORS FOR BILE LEAKS FOLLOWING CHOLECYSTECTOMY

- Emergency surgery
- Incomplete or disrupted closure of cystic duct
- Wide and very inflammed cystic duct
- Presence of bile duct stones
PREVENTION OF BILE LEAKS

- Appropriately identify and secure cystic duct
- Avoid clip dislodgement
- Endo loop usage
- Avoid duct avulsion
- Be cautious when making use of cautery
- Appropriate plane of dissection
RISK FACTORS FOR BILE LEAKS AFTER EXTRAHEPATIC BILIOENTERIC ANASTOMOSIS

- Bile leaks occurs in 5.6%
- Preoperative chemoradiation
- Simultaneous liver resection
- Re-operation after liver transplant
- Low pre-operative albumin???
PREVENTION OF BILE LEAKS AFTER BEA

- Well vascularised bile duct
- Tension free anastomosis
- Absence of cholangitis
- Intraluminal stenting
- Access loop
RISK FACTORS FOR BILE LEAKS AFTER LIVER RESECTION

- Independent RF
  - intra operative blood loss > 600mls
  - use of intraoperative drains
- Cirrhosis
- BMI ??
- Multivisceral resection ???
- Intraoperative haemodynamics ????
PRINCIPLES OF MANAGEMENT OF BILIARY FISTULAS

• Control of the leak externally
• Control of Systemic Sepsis
• Define anatomy
• Reconstitution of biliary continuity
Management of post operative biliary fistulas has changed from aggressive surgical strategy to an aggressive, less invasive strategy in which interventional radiology plays a crucial role.
CONSERVATIVE TREATMENT

• Antibiotics
• Appropriately placed perioperative drains
• Serial Radiological imaging
MINIMALLY INVASIVE THERAPIES

• Percutaneous approach
  • Percutaneous transhepatic biliary drainage (PTBD)
  • Percutaneous pigtail insertion
  • Percutaneous transhepatic biliary embolosclerosis (SPECIALISED UNITS ONLY)
  • Percutaneous internal, external biliary drainage
  • Rendzeverous technique
• Endoscopy
  • Sphincterotomy
  • Sphincterotomy and transpapillary stenting
  • Sphincterotomy and nasobiliary drainage
  • E/S, stenting and fibrin glue insertion