Difficult bile duct stones

George Webster
HPB Medicine
University College London Hospitals
george.webster@uclh.nhs.uk

Overview

- Gallstones and disease
- Not-a-lot-of-clever-science
- What’s difficult?
- Stepwise approach to management
- New technologies/approaches

Gallstones – the stats

- Gallstones in 10-20% adult population
- 80% asymptomatic
- Symptoms in 1-3% per year of pts with gallstones
- Choledocholithiasis in 5-10% of patients undergoing cholecystectomy
- 21-34% of CBD stones spontaneously migrate (causing pancreatitis in approx 25%)

Biliary ductal stones – Epidemiology

- Phenotype:
  - Female
  - Obese
  - Pregnancy
  - 1st degree relative
  - Terminal ileal disease
  - Crohn’s
  - resection
  - 2nd to biliary stricturing/inflammation
  - PSC
  - Clonorchis
  - Iatrogenic stricture
  - Chronic pancreatitis
  - Foreign body
  - Haemolysis

What makes bile duct stone management difficult?

Stone-related factors
- Stones > 15mm
- Multiple stones
- Intrahepatic stones
- Stones above strictures
- Mirizzi syndrome

Upper gut factors
- Billroth II
- Hepaticojunostomy
- Roux-en-Y gastric bypass

79 yr man
x 3 previously failed ERCPs
Difficult stones in elderly/infirm patients

- 4 studies
- 228 frail/elderly patients with resistant CBD stones, treated with plastic stenting.
- FU 20-39 months
- Biliary morbidity (cholangitis) 36-63%
- Biliary-associated mortality 6-21%

Endoscopic Balloon Sphincteroplasty

Dos + Don’ts

- Back in favour...
- Prior sphincterotomy
- If sphincterotomy not possible (eg coagulopathy), consider pancreatic stent
- Dilate to ≤ diameter of CBD above ampulla (and rarely > 18mm)
- Ensure no stone between balloon and bile duct wall (risk of perforation)

Laparoscopy-assisted versus balloon enteroscopy-assisted ERCP in bariatric post-Roux-en-Y gastric bypass patients

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Success Rate</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEA-ERCP</td>
<td>80%</td>
<td>10%</td>
</tr>
<tr>
<td>LA-ERCP</td>
<td>90%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Initial UK experience of Spyglass cholangioscopy 2008-10

- Case series from London (UCLH + Imperial), Liverpool (Aintree), and Newcastle (Freeman)
- 165 pts (179 procedures)
- Caudate 95%
- Inadequate visualisation 13% (predictors: PSC; non-GA)
- Stone management in 33/179 (19%) – EHL in 79%
- Adequate biopsies 72% (90% if ≥ 4 Spybite, 64% if < 4 p=0.037)
- Diagnostic accuracy for malignancy 87%
- Adverse events in 9.6% (cholelithiasis 5%)
Cholangioscopy-directed lithotripsy

- 32 patients
- Mean 3.3 previous failed ERCPs
- Stones intrahepatic (N = 8), extrahepatic (N = 18); or both (N = 6). Biliary strictures present in 20 (63%) patients.
- Cholangioscopy identified additional stones not seen at ERCP in 9 (28%) patients.
- Mean of 1.4 lithotripsy sessions achieved complete (N = 26, 81%), partial (N = 5, 16%), or failed (N = 1, 3%) stone clearance.

Intrahepatic stones
Cholangioscopy + EHL

Mirizzi’s Syndrome
Cholangioscopy + EHL

CBD Stones
Cholangioscopy + EHL

CBD Stones
Cholangioscopy + EHL

Not all ‘difficult stones’ are ‘difficult stones’!
Cholangioscope as trouble-shooter “Impacted radiolucent stone”

76 yr male. Obstructive jaundice. Stones in gallbladder

Cholangioscopy – way forward

- Per-oral thin endoscopes
- Video imaging
- 2nd generation ‘mother-baby’ scopes
- Narrow-band imaging
- Confocal laser endomicroscopy
- Laser lithotripsy

Challenges
- Difficult access/ overtube
- Cost
- Biopsy facility
- Complications (eg air embolism)
- Training

Per-oral video-cholangioscopy system (PVCS)

- Field of view 90°
- Direction of view 0°
- Depth of field 2~30 mm
- Distal end OD φ 3.4 mm
- Working length 2600mm
- Channel ID φ1.2 mm

PVCS with narrow-band imaging

Bile duct stones

Management Pyramid

- Surgery
- Transhep litho
- Cholangioscopy + Electrohydraulic lithotripsy +/- B/ML
- ES + balloon sphincteroplasty +/- B/ML
- ES + B/mechanical lithotripsy (ML)
- Endoscopic sphincterotomy (ES) + balloon extraction (B)
Endoscopic management of bile duct stones

Difficult Biliary Stones

Summary

• When endoscoping the cholangitic patient with biliary stones “the enemy of good is better!”
• Follow step-wise management approach
• Consider balloon sphincteroplasty, but with care
• Seek specialist input after 2 failed attempts at stone clearance, or complex anatomy
• New innovations (eg cholangioscopy and directed electrohydraulic lithotripsy) facilitate endoscopy stone removal in great majority