Complications During A Laparoscopic Cholecystectomy

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Outline

Overview
Bleeding
Pneumoperitoneum creation
Spilled stones
Bile Injury
Overview

- 750,000 per year
- 90% of all CCY are lap
- 25% of surgeons with pneumo creation complication
- 34-49% of surgeons will have a bile duct injury
Major complications 2.6%

- Bleeding (0.11 – 1.97)
- Abscess (0.14 – 0.3)
- Bile leak (0.3-0.9)
- Bile injury (0.26 – 0.6)
- Bowel injury (0.14 – 0.35)
- Gas embolism (0.001%)
<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
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<tbody>
<tr>
<td>AC vs CC</td>
<td>1.86</td>
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<tr>
<td>Male vs female</td>
<td>1.18</td>
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<tr>
<td>Age</td>
<td>1.12 per 10 years</td>
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<tr>
<td>Body weight</td>
<td>1.25 (&gt;90 vs 60-89)</td>
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<tr>
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<td>1.34 (&gt;90 vs &lt;60)</td>
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<tr>
<td>Experience</td>
<td>1.22 (&gt;100 vs &lt;10)</td>
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<td>1.36 (&gt;100 vs 11-99)</td>
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<tr>
<td>Time</td>
<td>90% in first 30 cases</td>
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<td>1.68 for each 30 mins</td>
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<td>&gt;2hrs 4x one hr case</td>
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Bleeding (0.07-1.9%)

- Sites: liver, arterial sources, port insertion sites
- Liver: removal GB from fossa
  - Lap hemostasis –vs- open stitch ligature (8%)
- Arterial source during resection usually cystic artery – clip if anatomical landmarks ensured
Pneumo Creation

- Carbon dioxide – colorless, noncombustible, inexpensive
- Rapid absorption (good: dec gas embolism, bad: hypercarbia)
- Venous Return: decrease
  - Esp if hypovolemic, due to cava compression
- Heart Rate: increase
  - Hypercarbia causes tachycardia and PVCs
  - Peritoneal inflammation can cause vagal response and dec HR
- CVP: usually artificially elevated from inc thoracic pressures
- **FRC (functional reserve capacity)**: decreases
  - Diaphragm motion limited, inc peak airway pressures to maintain same tidal volume
- **MAP and SVR**: increase
- **CO**: decrease (inc MAP and dec venous return)
- **GFR and urine output**: decrease
  - Dec renal vein blood flow
- **pH**: decrease
  - Hypercarbia leading to respiratory acidosis
  - No adverse effects in healthy pts, corrected with inc minute ventilation
  - Problem in COPD because dec ability to get rid of CO2 (intermittent ABGs)
Complications from pneumoperitoneum creation

- Mortality 0.2%
- Incidence of injury 0.2%
- Veress & Hasson
- Only 60% dx’d at time of injury
Retro of 12,919 cases in Rome

- Overall 0.18% Veress vs 0.09 Hasson
- Major Vascular 0.07 – 0.4
  - [.02-.24 vs 0]
  - Aorta, CI, cava, IMA
  - 8-17% mortality
- Minor Vascular 0.1 – 1.2
  - Epigastrics, omental, SB mes
- Visceral 0.05 – 0.26
  - [.03-.15 vs 0-.19]
  - 80% GI, 20% urinary
- Hasson with dec vascular but inc visceral (may be pt selection), not definitive evidence superior or inferior
Veress

- Easier, less gas leakage
- 1 in 11,805 insertions cause injury
- 0 in 117 with LUQ insertion (Palmer’s point)
  - Must have NG, insert perpendicular
- Vessels can be 1-cm beneath umbilicus in thin people, umbilicus shifted over bifurcation in obese
  - At umbilicus insert 45 deg if thin, 90 if obese
- Lifting abd wall not generally helpful
  - (5% omentum with it, towel clips best)
Veress cont’d

- Safety tests not very helpful
- best indicator is pressure less than 10
- Don’t waggle needle (inc 1.6mm puncture wound to 1cm in size)
- Complications inc with tries
- Gasless entry and optiview are safe alternatives
Spilled Gallstones

- Gallbladder perf 8-40% with complications of 2.3%
- Unretrieved stones occur about 60% of the time with up to 7% complication rate
- Abscess 60%
  - Subhepatic or subphrenic
  - Duodenal obstruction, diaphragm irritation
- Wound sinus/fistula 30% and port site infections
- Others: empyema, SBO (adhesions), fistulas (SB, colon, biliary system, bladder)
- Local inflam response with omentum and local fibrosis
- Inc with bile infection, multi stones, >1.5cm, stone fragmentation and pigmented stones (80-90% w/ bacteria)
- Micro bile/stones
- Abscesses also need drainage AND stone removal
- Bottomline
Bile Injuries

- 0.2% - 0.8% lap vs up to 0.25% open
- Only up to 66% discovered at time, remainder post (usually 2-10 days, if stricture only then mean of 57 days)
- Sx: fever, abd pain, inc WBC and LFTs esp Alk Phos
Risk factors

- Inflammation (inc approximation of cystic and CBD)
- Excessive cephalad or insufficient lateral retraction (aligns ducts)
- Excessive lateral retraction (tear)
- 0 degree scope
- Excessive cautery
- Aberant anatomy
IOC?

- 50 to 70% less injuries
- Dec from .43 to .21%
- Time: +16mins
- Cost: NNT 500, not cost effective for the avg pt, but if consider cost of bile duct injury (direct and indirect) likely cost effective
- Interpretation: 79% of injuries with IOC had abnormal study that was overlooked
- ?minimization: injury can be fixed with T-tube vs. progression to transection requiring a Roux
W/U

- US or CT to look for fluid collections
- HIDA: can confirm presence of bile leak (esp if no fluid collection)
- ERCP: diagnostic as well as therapeutic
- MRCP: determines anatomy and defines injury (esp good for hilar injuries that are less well defined on ERCP)
- PTC: to eval and decompress if complete disruption or occlusion of proximal duct

- Doppler u/s: 12-32% also have vascular injury
Types – Strasberg Classification

- A: into GB bed from minor hepatic ducts, cystic duct (75%) or ducts of Luschka (6-17%)
B: occlusion of aberrant right hepatic duct

C: transection of aberrant right hepatic duct

D: lateral damage to CBD
E: injury to main duct (Bismuth)

- E1: Transection >2cm from confluence
- E2: Transection <2cm from confluence
- E3: Transection in hilum
- E4: Separation of major ducts in hilum
- E5: Type C plus injury in hilum
Management – A and D

- Fluid collection –
  - perc drain

- A and D – endoscopy stent – preferential bile flow (+sphincterotomy if retained stone)
Management – B & C

- B (usually occult resulting in segmental cholestasis in liver and yrs later causing right lobe atrophy – can get cholangitis)
  - <3mm – ligate
  - >5mm: hepatico-J +/- segmental liver resection pending degree of atrophy
Management – Type D and E

- Small lateral CBD injury (<50%, cystic avulsion) - repair over T-tube (<0.05% leak or stricture)
- >50% - Roux (primary high incidence of breakdown/stricture)
  - Mortality 2-%
  - Re-stenosis 5-28%
- *some strictures and occlusions amendable to endo dilation and stenting (50-70% success)
- ALTERNATIVE: drain and transfer – don’t open to confirm obvious injury if no intent to repair