Surgery in the Patient with Cirrhosis: Understanding and Mitigating Risk

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Cirrhotics Require a Multidisciplinary Approach

Blood Bank
GI/Hepatology
Surgeon
OR/Anesthesia
Interventional Radiology
Critical Care
Surgery in Patients with Cirrhosis

DAVID CAYER, M.D.
and
M. FRANK SOHMER, M.D., Winston-Salem, N. C.

disorders which may require elective or emergency surgery.

Surgeons have noted that patients with unsuspected extensive liver damage often

- 37 patients
  - 7 cholecystectomy, 5 hernias, 19 diagnostic lap (aborted), remainder uro/gyn
- 30 day mortality – 19%
- Morbidity – 70%

- Serum albumin, PT, and ascites found to be risk factors.

Archives of Surgery, 1955

Perioperative Mortality After Non-hepatic General Surgery in Patients with Liver Cirrhosis: an Analysis of 138 Operations in the 2000s Using Child and MELD Scores

Hannes Neeff, Dimitri Mariaskin, Hans-Christian Spangenberg, Ulrich T. Hopt, Frank Makowiec

- 138 patients (99 abdominal, 39 hernias)
- 30 day mortality - 28%
  - 47% emergency surgery, 9% elective
- Morbidity – 70%
  - 56% surgical complications

- Risk factors included transfusion, ASA, serum sodium, creatinine

JGIS 2011
A Vicious Cycle

• Cirrhosis - high morbidity and mortality

• 10% of cirrhotics will require surgery in the last years of their life

• Avoid surgery in cirrhotics unless absolutely necessary

• Increased emergent surgeries – which increase mortality, hospital stay, complications

Physiologic and Anatomic Changes
Portal Hypertension
Physiologic Changes in Cirrhosis

- Portal Hypertension
  - Collateral veins
  - Ascites
  - Encephalopathy
  - Thrombocytopenia
- Impaired Coagulation
- Malnutrition
- Poor hepatic reserve
- Excessive hemorrhage
- Cooperate with care
- Impaired wound healing
- Hepatic decompensation
- Infection/Sepsis
- Mortality

Hemodynamic issues

- Hyperdynamic circulation and increased cardiac output
- Anesthesia
  - decrease CO leading to hepatic hypoperfusion, hypoxemia, and hypotension
- Hypoxia
  - Ascites, hydrothorax, hepato/porto pulmonary
- Fluid management can be difficult – extravascular overload with intravascular depletion
- Renal insufficiency
Predicting Outcomes after Surgery

Does Child’s Turcotte Pugh score predict surgical outcome?

- 92 patients over 12 years
  - 24 emergency
- Chole (17), hernia (9), GI tract (54), other (12)

- CTP A (5-6) – mortality 10%
- CTP B (7-9) – mortality 30%
- CTP C (10-12) – mortality 80%

- 5 fold increase (57% vs. 10%) in mortality for emergency operation

Masour, Surgery, 2007
Is MELD predictive of Mortality?

- 772 patients (GI 586, Ortho 107, CV 79)
  - Mortality risk – 90 day

  - MELD 0-7  9.7%
  - MELD 8-11  17.7%
  - MELD 12-15  32.3%
  - MELD 16-20  55.8%
  - MELD 21-25  66.7%
  - MELD > 26  90%

Length of stay and hospital costs increase with MELD score

MELD Score and Surgical Mortality

- ASA correlated with mortality only class IV and V
  - severe incapacitating disease that is a constant threat to life
  - moribund patient not expected to live 24 hrs

- Class V
- MELD ≥ 26  (10 patients)

- 90% in 30 d, 100% 1 yr (85 d)

- Risk of surgery in patients with ASA Class V or MELD>26
  - Prohibitively high unless liver transplant an option

- ASA – 7 day mortality, MELD after 7 days best predictor
Cirrhosis and Surgery
Risk Factors for Complications

Increased Risk = Portal Hypertension

- Platelet count < 100,000
- Child-Pugh Score > 7
- MELD Score > 9
- HVPG > 12 mm Hg

Emergency Surgery
Splenomegaly, ascites, varicies on imaging
Type of surgery – cardiac, radical GI surgery, AAA, trauma
Advanced age

Peri-operative Management
Peri-operative Optimization

• Ascites
  – sodium restriction, diuretics, paracentesis
  – TIPS
• Varices
  – non selective B Blockers
  – Endoscopic control
  – TIPS
• Poor nutrition
  – nutrition consult
  – enteral feeds preferred over TPN
• Encephalopathy
  – Lactulose, rifaxamin, careful with bowel surgery

Peri-operative - Anesthesia

• Altered hemodynamics
  – invasive monitoring, ICU bed post op
  – A-line, central venous for infusion of volume, CVP
• Induction agent
  – avoid halothane and enflurane
  – Iso, sevo and desflurane all safe
  – Propofol can exacerbate hypotension
• Muscle relaxant
  – Cisatracurium preferred (non renal non hepatic elimination)
• Avoid hypercarbia – decrease hepatic perfusion
Peri-operative - Coagulopathy

- Correct coagulopathy
  - INR < 1.5 – FFP and vitamin K
  - Platelets > 50 day of surgery
  - Fibrinogen > 200 with cryoglobulin
  - Thromboelastogram, Blood products available, cell saver

- Fluid management
  - Saline little impact on intra-vascular volume but lead to worsening edema and ascites
  - Albumin or other colloids are encouraged
  - Renal function must be monitored carefully – watch for overload

- Antibiotics –
  - Should prophylaxis that includes GN coverage – prevent SBP

Peri-operative/Cardio-pulmonary

- Hypotension
  - Hyperdynamic, hypotensive, hepto-adrenal
  - Florinef and stress steroids, pressor support

- Hypoxia
  - Hepatopulmonary syndrome, hydrothorax, ascites
  - Para/pleurocentesis prior to surgery
  - PA O2:<60 may have significant issues with hypoxia and extubation

- Portopulmonary Sydrome
  - 35 – 50 mm HG OK to proceed unless hepatic surgery
  - > 50 mmHg – should receive treatment, increased risk of post-operative complications
Peri-operative/Hepatitis

• **Acute autoimmune hepatitis**
  – Increased operative mortality 10%
  – If possible postpone until AST/ALT < 2X normal

• **NAFLD**
  – Unsuspected cirrhosis in 4%
  – Proceed with surgery regardless
  – Increased morbidity due to obesity/diabetes

• **Alcoholic hepatitis**
  – Increased mortality risk of >30%
  – Recommend 12 week abstinence prior to surgery

Peri-operative - Medications

• **Narcotics:**
  – High extraction by liver - ↑ blood levels if ↓ hepatic blood flow
  – ↑ availability due to portosystemic shunting

• **Recommend:** Start with lower dose of narcotics

• **Dilaudid preferred** – less hepatic clearance

• **Benzodiazepines**
  – Lorazepam, oxazepam, temazepam
  – Low first pass elimination by liver, Less risk of over-sedation
  – Diazepam, chlordiazepoxide, clonazepam
  – High first pass elimination, increased risk of sedation in liver disease

• **Versed for also OK for ICU sedation**
Tips for Surgeons

- Review radiographic films and careful physical exam prior to placing ports
  - Port placement into caput medusa or large collateral can be fatal
  - Consider Hason technique, infra-umbilical ports
- Ascites after surgery
  - Consider short term drain, but need to be careful about both fluid and protein losses and replacement
  - WATER TIGHT CLOSURE
  - Mesh – less recurrence, increased infection, consider biologics
- Avoid Enterostomies

Take Home Message

- Surgery in patients with cirrhosis requires a major team effort
- Surgery is safe if MELD < 8 or CTP A
- Middle MELD, CTP B – proceed with caution
- MELD >20 or CTP C – high risk of mortality
- Consider completing transplant evaluation before surgery in patients with MELD 12-20
- Consider transferring patients to liver transplant center
- Watch the patient like a hawk post-operative – the surgeon needs you!