LIVER DISEASE AND PERIOPERATIVE RISK

Cirrhosis is an under-recognized major risk factor for perioperative complications.
Patients with compensated liver disease (mild chronic hepatitis, non-alcoholic steatohepatitis, etc.) generally tolerate surgery well.

1. Should asymptomatic patients be screened for liver disease?
Checking serum AST, ALT, alkaline phosphatase and bilirubin in asymptomatic patients without risk factors for liver disease leads to many positive tests in patients who are probably not at increased risk for surgery; this is controversial. There is general agreement, however, that screening should include a careful history and physical exploring for: jaundice, alcohol use, blood transfusions, IV drug use, sexual history; spider telangiectasias, palmar erythema, gynecomastia, testicular atrophy, splenomegaly, ascites, etc.

2. What features of liver disease raise surgical risk?
- Baseline increased cardiac index and decreased systemic vascular resistance, augmented by anesthetics and blood loss.
- Poor hepatic metabolism of anesthetic agents and other medications administered perioperatively.
- Impaired synthesis of vitamin K-dependent clotting factors and splenic platelet sequestration increase bleeding risk.
- Respiratory compromise: lung restriction from ascites, pleural effusions, pulmonary hypertension, hepatopulmonary syndrome.
- Immune compromise: impaired reticuloendothelial cell function.
- Renal compromise: diuretic therapy, hepatorenal syndrome.

3. What is the risk of morbidity/mortality for patients with hepatitis or cirrhosis?
- Acute viral hepatitis carried 10% mortality and 11% morbidity in one study of open liver biopsy.
- Older studies of alcoholic hepatitis demonstrated 55-100% mortality in patients undergoing laparotomy.
- Other risk factors for morbidity include: ascites, encephalopathy, infection, anemia, malnutrition, jaundice, hypoalbuminemia, portal hypertension, prolonged PT (that does not correct with vitamin K), hypoxemia, and renal insufficiency. Quantitative LFTs (galactose elimination capacity, aminopyrine breath test, indocyanine green clearance, etc.) provide no additional prognostic information.

Surgery is generally contraindicated with acute or fulminant hepatitis, alcoholic hepatitis, severe chronic hepatitis, Child class C cirrhosis, and/or severe complications of liver disease, such as coagulopathy, acute renal failure, hypoxic pulmonary disease, infection, etc. Surgery may be considered for patients with Child class A and B cirrhosis (and possibly a subset of patients with Child class C cirrhosis and MELD score <14) only after thorough evaluation by a hepatologist and optimization of medical management. Consideration should be given to delaying elective surgery until after liver transplantation.

Scoring systems:
a. Child-Pugh classification of cirrhosis correlates well with operative morbidity and mortality in retrospective studies. To calculate this score, total the number of points for each presentation on the following chart:

Presentation	1 Point	2 Points	3 Points
Albumin (g/dL)	>3.5	2.8-3.5	<2.8
INR (PT seconds prolonged)	1.7 (<4)	1.7-2.3 (4-6)	>2.3 (>6)
Bilirubin (mg/dL)†	<2	2-3	>3
Ascites	Absent	Slight-moderate	Tense
Encephalopathy	None	Grade I-II	Grade III-IV

† For cholestatic diseases (i.e., primary biliary cirrhosis), the bilirubin level is disproportionate to the impairment of hepatic function; therefore, assign 1 point for bilirubin <4 mg/dL, 2 points for bilirubin 4-10 mg/dL, and 3 points for bilirubin >10 mg/dL.

Class A	5-6 points	~10% mortality
Class B	7-9 points	~30% mortality
Class C	10-15 points	~75-80% mortality

b. Modified Model for End-stage Liver Disease (MELD) score: higher scores generally correlate with worse outcomes.

[MELD = 3.78 x $\log_e$ (bilirubin in mg/dl) + 11.2 x $\log_e$ (INR) = 9.57 x $\log_e$ (creatinine in mg/dL) + 6.43.*]

*Enter 1 for creatinine < 1.0 or 4 for creatinine >4 or dialysis. Round to nearest integer.

In one retrospective study, mortality risk (all surgeries) was as follows:

MELD	5	10	15	20	25	30	35	40	45
Prob. of death (%) (95% CI)	5 (2-13)	7 (3-15)	11 (6-19)	17 (11-25)	26 (17-38)	36 (21-53)	50 (27-73)	59 (31-82)	67 (34-89)

In that same study, mortality risk (intra-abdominal surgeries) was:

MELD	5	10	15	20	25	30	35	40
Prob. of death (%) (95% CI)	5 (1-16)	8 (3-20)	14 (7-27)	25 (15-39)	35 (21-51)	58 (34-79)	75 (43-92)	83 (48-96)

4. What surgeries carry the highest risk for liver patients?

- Emergency and trauma surgery.
- Surgery involving significant blood loss.
- Intra-abdominal surgery, especially if there has been previous abdominal surgery and lysis of vascular adhesions is required.
- Cardiac surgery (100% morbidity, 80% mortality with Child's B; 25% morbidity, 0% mortality with Child's A, in one study)
- Hepatic resection.

5. Consider making the following recommendations for all patients with compensated Child's class B disease:

- Delay surgery until after transplantation and/or suggest a less-invasive option. (angioplasty in place of cardiac surgery, cholecystostomy in place of cholecystectomy, etc.)
- Preoperative TIPS may reduce perioperative morbidity for patients with severe portal hypertension.
- Treat ascites with diuretics (if peripheral edema present) and/or paracentesis to reduce wound dehiscience.
- Evaluate renal function preoperatively, recalling that calculated creatinine clearance may underestimate impairment.
- Correct coagulopathy with vitamin K and FFP and/or factor VIIA to normalize PT +/- cryoprecipitate or DDAVP.
- Correct moderate anemia (hemoglobin <10g/dL) prior to proceeding with surgery; keep extra cross-matched blood on hand.
- Consider transfusing platelets if severe thrombocytopenia is present; optimal goal platelet count is unknown.

- Watch clinically for exacerbation of liver disease postoperatively: ascites, jaundice, encephalopathy, etc.
- Monitor renal function (BUN, Cr, electrolytes) and hepatic synthetic function (albumin, PT/INR, glucose) closely.
- Use short-acting analgesics, such as fentanyl; avoid benzodiazepines. (use lorazepam, if you must)
- Avoid hypercarbia, whch may cause splanchnic vasodilation and decrease portal blood flow.
- Use beta blockade (unless contraindicated) and avoid fluid overload in patients with gastroesophageal varices.
- Optimize perioperative nutritional support.

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