

# VUMC Trauma Surgery Service

## Practice Management Guideline: Cirrhosis

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### I. Purpose

Patients with cirrhosis who are admitted to a trauma surgery service have significantly higher morbidity and mortality rates than non-cirrhotic trauma patients. Cirrhosis alters resuscitation physiology, hemostasis, infection risk, and perioperative decision-making. This guideline outlines evaluation and management considerations specific to trauma patients with cirrhosis.<sup>1,2</sup>

### II. Guideline

#### A. Initial Evaluation of the Cirrhotic Trauma Patient

- Screening criteria – CT traumagram imaging with stigmata of cirrhosis (varices, ascites, splenomegaly, macronodular hepatic contour) or known pre-injury diagnosis of cirrhosis
- Add the diagnosis of *cirrhosis* to the problem list
- Stratification scores – trauma resuscitation labs including INR, and CMP which includes total bilirubin, albumin, Cr, Na<sup>1-3</sup>
  - MELD-3.0: INR, total bilirubin, Creatinine, albumin, Na, age, sex
  - Child-Pugh: INR, total bilirubin, albumin + ascites + hepatic encephalopathy
- If surgical pathology identified, consider prognostication:
  - VOCAL-Penn:<sup>3</sup> <https://www.vocalpennscore.com/>
  - Diagnosis of cirrhosis implies at least ASA 3 score. If decompensation is present as evidenced by ascites, encephalopathy, or variceal bleeding, then ASA 4

#### B. Trauma Resuscitation and Coagulopathy

- Avoid routine INR correction unless known vitamin K antagonist use and/or active bleeding<sup>2,4-6</sup>
- Platelet transfusion only if levels <30k or <50k with active bleeding/procedure<sup>2,4-6</sup>
- Maintain fibrinogen >100 mg/dL (primarily with cryoprecipitate)<sup>6</sup> if active bleeding or procedural intervention imminent
- Use TEG 6S to guide transfusion<sup>6,16</sup>
  - Utilization of FFP for coagulopathy correction outside of active bleeding or procedural intervention is unwarranted
- Use of tranexamic Acid (TXA): not routine
  - 2 gram bolus may be considered for hyperfibrinolysis and in patients receiving MTP<sup>15</sup>

#### C. Management of Liver Trauma in Cirrhosis

- Non-operative management is often less successful given that cirrhotic patients are at higher risk of delayed bleeding and infection<sup>17-20</sup> thus consider early IR consultation for embolization even in hemodynamically stable patients
- Operative intervention: high risk of bleeding and decompensation; recommend damage control principles if unavoidable
- Due to high risk of complication, consider TICU admission if MELD >25

#### D. Diuretics and Ascites Management

- Diuretics – resume home diuretic regimen when enteral access achieved<sup>11-14</sup>

- If no home regimen: initiate diuretic if ascites (noted on imaging or intraoperatively)
  - First line: spironolactone (100-400 mg q24h)
  - Second line: furosemide as second agent (40-160 mg q24h)
  - Typically, a ratio of 100S/40F results in eukalemia, but adjustments to diuretics can be made if necessary to maintain eukalemia
- Diet: Low sodium diet (2 g/day)
  - Protein enriched to 1.2-1.5 g protein/kg body weight daily
  - Free water restriction only indicated if hyponatremia ( $\text{Na} \leq 125$  mmol/L) is present<sup>14</sup>
- Large Volume paracentesis (>5L):
  - Replace output with 25% albumin (6-8 g/L removed)<sup>11-14</sup> for patients with inability to initiate diuretics, or ascites leaking from surgical incisions
- Prophylaxis for spontaneous bacterial peritonitis (SBP)
  - Continue injury-specific prophylaxis as needed
  - Defer initiation of primary SBP prophylaxis outside of GIB to hepatology or outpatient provider
  - *Primary* prophylaxis: initiate for high-risk patients with ascites<sup>14</sup>
    - High risk: elevated bilirubin, INR, or low ascites protein (<1.5g/dL)
    - Acute upper GI bleed if ascites present: ceftriaxone 1 gm IV daily for 7 days
  - *Secondary* prophylaxis
    - Following abdominal surgery, initiate antibiotics while drain is in place if the patient has already completed intra-abdominal sepsis coverage
      - If enteral access: ciprofloxacin 500mg q24 hours
      - If no enteral access: ceftriaxone 1g q24 hours
- Diagnosis and treatment of SBP
  - Up to a third of patients may be asymptomatic with only encephalopathy and/or AKI<sup>14</sup>
  - Treat empirically if strong suspicion/septic shock
  - Obtain diagnostic paracentesis if able (send for cultures, cell count, and differential)
    - Ascitic fluid with polymorphonuclear (PMN) leukocyte count >250 mm<sup>3</sup> is diagnostic of SBP
  - Antibiotic therapy:
    - Community acquired: ceftriaxone 2g IV daily
    - MDRO risk factors: piperacillin/tazobactam 4.5g IV Q8h x5-7 days<sup>14</sup>
  - Additional therapy: if Cr>1, BUN>30, or Tbili>4
    - Albumin 25% 1.5 g/kg on day 1 followed by 1 g/kg on day 3
- Surgical drain management (unless otherwise specified by surgeon)
  - Empty dry for 48h, then every 4 hours after that
  - Replace output with 25% albumin if applicable per above volume thresholds and remove as soon as possible after 72h<sup>22</sup>

## E. Venous Thromboembolism (VTE) Prophylaxis

- Do not withhold pharmacologic prophylaxis solely for elevated INR<sup>4,5,11</sup>
- Start LMWH vs SQH per VTE PMG if platelet count >50k and bleeding is controlled
- Consider pneumatic intermittent compression if unable to use heparin analogs

## F. Hepatic Encephalopathy (HE) and Analgesia

- Resume home lactulose/rifaximin if prior HE<sup>11,14</sup>
- New HE: start lactulose 20-30g PO BID or TID titrated to 2-3 BMs/day
  - If refractory, obtain pharmacy consultation to consider rifaximin
- NPO patient: lactulose enemas Q4-6h
- Avoid benzodiazepines unless home medication
  - Lorazepam is preferred if a BZD is required
- Analgesia:
  - Acetaminophen  $\leq 2$  g/day
  - Opioids (2.5-5mg PO Q6h oxycodone and/or 0.125-0.25 mg hydromorphone IV Q6h) preferred
  - Avoid NSAIDs<sup>11</sup>

### G. Fluid and Renal Considerations

- Use balanced crystalloids (LR, Plasma-Lyte) to reduce renal injury<sup>11</sup>
- If HRS suspected:
  - Discontinue diuretics; start albumin + norepinephrine (terlipressin use restricted to hepatology approval for patients in the pre-transplant setting)<sup>14</sup>
  - Albumin 25%: 1g/kg (max 100 g) on day 1 then 20-40g/day continued until SCr  $< 1.5$
  - Norepinephrine (non-titratable order allowed in non-ICU settings): start at 3 mcg/min; titrate by 5 mcg/min q4h for change in MAP  $\geq 10$  or UOP  $\geq 200$  mL/4 hours

### H. Hepatology Consult Triggers

- Hepatology consult for active GI bleeding, refractory ascites (including HRS), refractory HE, transplant candidacy, chronic portal vein thrombosis, or per trauma attending discretion<sup>2, 11</sup>
- Palliative care consult for poor prognosis or non-transplant candidates

### I. Discharge planning

- Hepatology referral: *all* patients with cirrhosis should be referred for outpatient evaluation if not already established
  - Established patients may require close follow-up after discharge for appropriate medication titration/adjustments
  - Hepatology team will arrange for follow-up if already following in the inpatient context

## III. References

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### **Authors**

Trey Sinyard, MD

Michael Derickson, MD

Roman Perri, MD

Jennifer Beavers, PharmD

Jill Streams, MD

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