Decompensated Cirrhosis

Decompensated cirrhosis is the progression of chronic liver disease to life-threatening complications, requiring urgent management.

Definition and Epidemiology

• **Definition:** Decompensated cirrhosis is advanced liver disease marked by complications:
ascites, variceal bleeding, hepatic encephalopathy (HE), or jaundice. It indicates a decline
in liver synthetic function (e.g., ↓ albumin, ↑ INR).

• **Prevalence:** ~5-7% of cirrhosis patients decompensate yearly; 50% 5-year mortality post-decompensation.

• **Risk Factors:** Alcohol use, hepatitis B/C, NAFLD, male sex, age >50.

- Pathophysiology:
  - **Mechanisms:** Cirrhosis causes portal hypertension (scarring → ↑ resistance) and liver
    dysfunction (↓ synthetic/metabolic capacity).
  - **Decompensation:**
    - Portal hypertension → Ascites, variceal bleeding, splenomegaly.
    - Liver failure → Jaundice (↑ bilirubin), coagulopathy (↑ INR), HE (↑ ammonia).
    - Systemic effects → Hepatorenal syndrome (HRS), infections (e.g., SBP).
    - **Key Pathway:** Splanchnic vasodilation (↑ NO) → ↓ effective arterial volume → RAAS
      activation → Renal vasoconstriction (HRS).

Causes and Precipitants

Category	Causes/Precipitants	Notes
Etiology	-Alcohol (40-50% of cases). -Hepatitis B/C. -NAFLD/NASH. -Autoimmune hepatitis.	Alcohol: Most common in U.S.; Hep C: Leading transplant indication.

Category	Causes/Precipitants	Notes
Precipitants	-Infection: SBP, pneumonia. -GI Bleed: Variceal, non-variceal. -Alcohol binge: Worsens HE, triggers bleed. -Medications: Opioids, sedatives (↑ HE). -Dehydration: Overdiuresis, diarrhea.	SBP: 10-30% mortality per episode.
Rare	- Wilson's disease (copper overload). -Hemochromatosis (iron overload). -Budd-Chiari syndrome (hepatic vein thrombosis).	Wilson's: Consider in young patients (<40 y/o).

MELD Score for Prognosis

MELD Score	Components	3-Month Mortality
<10	INR, bilirubin, creatinine	<2%
10-19	INR, bilirubin, creatinine	6-20%
20-29	INR, bilirubin, creatinine	20-50%
≥30	INR, bilirubin, creatinine	>50%

Clinical Presentation

- **Symptoms**
  - **Ascites:** Abdominal distension, discomfort.
  - **Variceal Bleed:** Hematemesis, melena, shock.
  - **HE:** Confusion, asterixis, coma (West Haven Grade I-IV).
  - **Jaundice:** Yellowing of skin/eyes, dark urine.
- **Exam:**
  - Spider angiomata, palmar erythema, gynecomastia (chronic liver disease).
  - **Ascites:** Shifting dullness, fluid wave.
  - **HE:** Asterixis, altered mental status.
  - **Spleen:** Splenomegaly (portal hypertension).
- **Complications:** HRS, SBP, hepatopulmonary syndrome (hypoxemia).
- **Substance Use:** Alcohol binge → Worsens HE, triggers bleed.

Diagnostic Workup

- • **Labs:**
  - **Liver Function:** ↑ Bilirubin (>3 mg/dL), ↓ albumin (<3.5 g/dL), ↑ INR (>1.5).
  - **CBC:** Anemia (GI bleed), thrombocytopenia (splenomegaly).

- **Electrolytes:** Hyponatremia (HRS), ↑ creatinine (HRS).
- **Ammonia:** ↑ in HE (not always needed).
- **Infection:** Blood culture, paracentesis (SBP: PMN >250/μL).

- **Imaging:**
  - **Ultrasound:** Nodular liver, ascites, portal vein thrombosis.
  - **CT/MRI:** Confirm cirrhosis, rule out HCC.
- **Scoring Systems:**
  - **MELD (Model for End-Stage Liver Disease):** Predicts 3-month mortality (see table).
  - **Child-Pugh:** Assesses severity (A-C; decompensated = B/C).
- **Paracentesis:** Diagnostic (SBP), therapeutic (large-volume for tense ascites).
- **Key Tip:** Always rule out infection (SBP) in decompensated cirrhosis with fever or worsening ascites.

Management Flowsheet: Decompensated Cirrhosis

- **Step 1:** Identify complication: Ascites, variceal bleed, HE, HRS.
- **Step 2:** Rule out infection: Paracentesis → SBP (PMN >250/μL) → Antibiotics (ceftriaxone 2 g IV q24h).
- **Step 3:** Manage complication:
  - **Ascites:** Na+ restriction (<2 g/day), diuretics (spironolactone 100 mg + furosemide 40 mg).
  - **Variceal Bleed:** Octreotide (50 mcg IV bolus, then 50 mcg/h), endoscopy (band ligation).
  - **HE:** Lactulose (titrate to 2-3 BM/day), rifaximin (550 mg BID).
  - **HRS:** Albumin (1 g/kg IV), midodrine (5-15 mg TID), octreotide (100-200 mcg SC TID).
- **Step 4:** Assess transplant candidacy: MELD score, sobriety (if alcohol-related).
- **Step 5:** Prevent recurrence: Beta-blockers (propranolol 20 mg BID) for varices, vaccinate (HAV, HBV).

Treatment

- **General Principles:**
  - Treat precipitant (e.g., stop alcohol, treat infection).
  - Avoid hepatotoxic drugs (e.g., acetaminophen >2 g/day).
  - Refer to hepatology for transplant evaluation (MELD >15).

- **Ascites:**
  - Na+ restriction (<2 g/day), spironolactone (100 mg daily), furosemide (40 mg
    daily; 100:40 ratio).
  - Large-volume paracentesis (>5 L) → Albumin (6-8 g/L removed).
- **Variceal Bleed:**
  - **Resuscitate:** 2 large-bore IVs, PRBCs (target Hgb 7-8 g/dL).
  - **Octreotide** (50 mcg IV bolus, then 50 mcg/h x 3-5 days).
  - **Endoscopy:** Band ligation or sclerotherapy.
  - **Antibiotics:** Ceftriaxone (1 g IV q24h x 7 days) for prophylaxis.
- **Hepatic Encephalopathy (HE):**
  - Lactulose (30 mL q2-4h until 2-3 BM/day, then titrate).
  - Rifaximin (550 mg BID) if refractory.
  - **Identify trigger:** Infection, GI bleed, constipation.
- **Hepatorenal Syndrome (HRS):**
  - Albumin (1 g/kg IV Day 1, then 20-40 g/day).
  - **Vasoconstrictors:** Midodrine (5-15 mg TID) + octreotide (100-200 mcg SC TID).
  - **Definitive:** Transplant.
- **Spontaneous Bacterial Peritonitis (SBP):**
  - Ceftriaxone (2 g IV q24h x 5-7 days).
  - **Prophylaxis:** Norfloxacin (400 mg daily) if prior SBP.
- • **Substance Use:** Alcohol cessation (counseling, naltrexone 50 mg daily if sober), monitor
  for withdrawal.
- • **Key Tip:** Avoid over-transfusion in variceal bleed (↑ portal pressure); target Hgb 7-8
  g/dL.

Examples

- **Case 1:** Variceal Bleed (Alcohol-Related Cirrhosis)
- **Presentation:** 55 y/o M, alcohol use, hematemesis, BP 90/60, Hgb 6.5 g/dL, INR 1.8, bilirubin 4 mg/dL.
- **Interpretation:** Decompensated cirrhosis (variceal bleed), MELD ~20 (20-50% 3-month mortality).
- **Management:** PRBCs (target Hgb 7-8 g/dL), octreotide (50 mcg/h IV), ceftriaxone (1 g IV), urgent endoscopy (band ligation), alcohol cessation.

- **Case 2:** Hepatorenal Syndrome (HRS)

- **Presentation:** 60 y/o F, cirrhosis (Hep C), ascites, SCr 2.8 (baseline 1.0), Na+ 128 mEq/L, no infection.
- **Interpretation:** HRS (↑ SCr, no other cause), Child-Pugh C (decompensated).
- **Management:** Albumin (1 g/kg IV), midodrine (10 mg TID), octreotide (100 mcg SC TID), hepatology referral for transplant.

Complications

• **Short-Term:** Variceal bleed, SBP, HE, HRS, HCC.

• **Long-Term:** Liver failure, portal vein thrombosis, 50% 5-year mortality.

Prognosis

• **Mortality:** 20-50% 1-year mortality post-decompensation; MELD >20 → High risk.

• **Transplant:** Only cure; MELD >15 → Consider listing.

Key Pearls

- • Decompensation = Ascites, variceal bleed, HE, or jaundice.
- • Rule out SBP in worsening ascites (PMN >250/µL).
- • MELD >15 → Refer for transplant evaluation.
- • Avoid hepatotoxins (e.g., acetaminophen >2 g/day).
- • Alcohol cessation critical in substance use cases.

References

- • **UpToDate:** “Decompensated Cirrhosis” (2025).
- • **AASLD Guidelines:** Cirrhosis Management (2023).
- • **NEJM:** “Cirrhosis Complications” (Garcia-Tsao, 2017).