Complications of Cirrhosis Requiring Hospital Management

Definition and Overview

Cirrhosis complications arise from chronic liver scarring, portal hypertension, and synthetic dysfunction, often requiring hospital management for acute decompensation. This guide focuses on hepatorenal syndrome (HRS), high-output heart failure, pulmonary hypertension, shunting, portopulmonary hypertension (PoPH), hepatic encephalopathy (HE), and the role of transjugular intrahepatic portosystemic shunt (TIPS) in worsening HE, alongside other critical complications like variceal bleeding, ascites, and spontaneous bacterial peritonitis (SBP).

- Prevalence
  - Cirrhosis affects ~0.3-1% of the global population, with 20-30% of patients hospitalized annually for complications. HRS occurs in 10-20% of advanced cirrhosis, variceal bleeding in 25-40%, and HE in 30-50%. PoPH is rare (1-5%).
- Risk Factors
  - Alcohol use, viral hepatitis, NAFLD, decompensation (MELD >15), malnutrition.
- Rare Demographics
  - Pediatric cirrhosis (e.g., biliary atresia), genetic disorders (e.g., Wilson's disease), autoimmune hepatitis complications.

Common Complications and Management

Complication	Description	Causes	Management	Notes
Hepatorenal Syndrome (HRS)	Acute kidney injury due to splanchnic vasodilation, renal vasoconstriction	SBP, GI bleed, diuretics	Albumin 1 g/kg IV day 1, 20-40 g/day; terlipressin 1 mg IV q6h or norepinephrine 0.5-3 mg/h. Liver transplant	Type 1: Cr doubles in <2 weeks; Type 2: Chronic. MELD priority
High-Output Heart Failure	Increased cardiac output, low SVR from vasodilation	Portal hypertension, AV shunting	Vasopressors (norepinephrine), diuretics (furosemide 40 mg IV), TIPS if refractory	Monitor CO (Swan-Ganz); avoid beta-blockers

Complication	Description	Causes	Management	Notes
Portopulmonary Hypertension (PoPH)	Pulmonary arterial hypertension from portal hypertension	Porto-systemic shunting, vasoactive mediators	Sildenafil 20 mg PO TID, ambrisentan 5 mg PO daily; liver transplant if mPAP <35 mmHg	mPAP >25 mmHg; right heart cath confirms
Hepatopulmonary Syndrome (HPS)	Hypoxemia from intrapulmonary shunting	Vasodilation, angiogenesis	O2 2-6 L/min, embolotherapy for shunts, liver transplant	PaO2 <80 mmHg; bubble echo detects shunts
Hepatic Encephalopathy (HE)	Neurocognitive dysfunction from ammonia, inflammation	GI bleed, infection, TIPS	Lactulose 30 mL PO q2-4h (titrate to 2-3 BMs/day), rifaximin 550 mg PO BID. Treat trigger	West Haven grade 2-4 requires admission; TIPS worsens HE in 20-30%
Variceal Bleeding	Bleeding from esophageal/ gastric varices	Portal hypertension	Octreotide 50 mcg/h IV, band ligation, blood transfusion (Hgb ~7 g/dL). TIPS if refractory	Propranolol 20 mg PO BID prophylaxis post-bleed
Ascites	Fluid accumulation in peritoneal cavity	Portal hypertension, hypoalbuminemia	Spironolactone 100 mg PO daily, furosemide 40 mg PO, paracentesis (>5 L). Albumin 6-8 g/L removed	Diagnostic tap for SBP; TIPS for refractory
Spontaneous Bacterial Peritonitis (SBP)	Bacterial infection of ascites	Gut translocation, immune dysfunction	Ceftriaxone 2 g IV q24h x 5-7d, albumin 1.5 g/kg day 1, 1 g/ kg day 3. Prophylaxis (norfloxacin 400 mg PO daily)	PMN >250 cells/mm³; 10-20% mortality

TIPS Procedure and HE

Transjugular Intrahepatic Portosystemic Shunt (TIPS): A radiologic procedure creating a shunt between the portal and hepatic veins to reduce portal hypertension, used for refractory ascites or variceal bleeding.

- **Mechanism:** Decreases portal pressure, diverting blood flow, but increases ammonia shunting to systemic circulation, worsening HE in 20-30% of patients.
- **HE Management Post-TIPS:** Lactulose 30-60 mL PO q2-4h, rifaximin 550 mg PO BID, monitor ammonia levels (non-specific), treat precipitating factors (e.g., infection, dehydration).
- **Contraindications:** Severe HE (grade 3-4), MELD >18, severe right heart failure.

Clinical Scenarios

Case 1 Hepatorenal Syndrome

- Presentation
  - 50 y/o M with cirrhosis, jaundice, oliguria. Vitals BP 90/60, HR 110, SpO2 96%, RR 18. Exam Ascites, edema.
- Labs/Studies
  - Cr 3.5 mg/dL (baseline 1.2), Na+ 128 mEq/L, urine Na+ <10 mEq/L. US Enlarged liver, ascites.
- Interpretation
  - HRS Type 1, decompensated cirrhosis.
- Management
  - Albumin 1 g/kg IV, norepinephrine 0.5 mg/h, hold diuretics. Transplant referral. Cr improves to 2 mg/dL by day 5.

Case 2 Variceal Bleeding

- Presentation
  - 45 y/o F with cirrhosis, hematemesis, hypotension. Vitals BP 80/50, HR 120, SpO2 94%, RR 20. Exam Pallor, melena.
- Labs/Studies
  - Hgb 6 g/dL, INR 1.8. Endoscopy Bleeding esophageal varices.
- Interpretation
  - Acute variceal bleeding.
- Management
  - Octreotide 50 mcg/h IV, PRBC transfusion, band ligation. Propranolol 20 mg PO BID started. Stable by day 3.

Case 3 Hepatic Encephalopathy Post-TIPS

- Presentation
  - 60 y/o M, 1 month post-TIPS for ascites, with confusion, asterixis. Vitals BP 130/80, HR 90, SpO2 96%, RR 16. Exam Grade 2 HE.
- Labs/Studies
  - Ammonia 100 µmol/L, normal LFTs. CT Patent TIPS.
- Interpretation
  - HE, TIPS-related.
- Management
  - Lactulose 30 mL PO q2h, rifaximin 550 mg PO BID. Monitor BMs, mental status. HE resolves by day 4.
- Expert Tips

Check diagnostic paracentesis in all ascites admissions; PMN >250 confirms SBP

Use octreotide, band ligation for variceal bleeding; TIPS only if refractory

Monitor CO in high-output heart failure; avoid beta-blockers in cirrhosis

Treat HE triggers (infection, bleed) before escalating lactulose

Sildenafil for PoPH; right heart cath before transplant to assess mPAP

Pitfall Missing HRS; low urine Na+ (<10 mEq/L) and no response to diuretics key

Advanced Bubble echo for HPS; rifaximin prophylaxis post-TIPS for HE

Key Pearls

HRS requires albumin, vasopressors; transplant is definitive

Variceal bleeding needs octreotide, ligation; TIPS for failures

TIPS worsens HE in 20-30%; lactulose, rifaximin mitigate

SBP needs ceftriaxone, albumin; prophylaxis prevents recurrence

PoPH, HPS require specialized management; transplant viable if controlled

References

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