Alcoholic Hepatitis

Alcoholic hepatitis (AH) is an acute inflammatory liver condition caused by excessive alcohol consumption, often leading to severe complications if untreated. This document provides a comprehensive overview for students in a hospital setting.

Definition and Epidemiology

- **Definition:** Alcoholic hepatitis (AH) is an acute or acute-on-chronic inflammatory liver injury caused by excessive alcohol consumption, characterized by jaundice, elevated liver enzymes (AST > ALT), and often systemic symptoms. It can range from mild to life-threatening (e.g., acute liver failure).
- **Epidemiology:**
- **Prevalence:** Occurs in 10-35% of heavy drinkers; ~20% of patients with alcohol use disorder (AUD) develop AH.
- **Risk Factors:**
  - **Heavy alcohol use:** >40-60 g/day (women) or >60-80 g/day (men) for ≥5 years (e.g., ~3-4 drinks/day for women, 4-5 drinks/day for men).
  - **Binge drinking:** ≥5 drinks in one sitting (men) or ≥4 drinks (women).
  - **Female sex:** Women more susceptible due to lower gastric alcohol dehydrogenase and higher body fat.
  - **Genetic factors:** Polymorphisms in PNPLA3 gene increase risk.
  - Malnutrition, obesity, coexisting liver disease (e.g., hepatitis C).
- **Demographics:** Most common in ages 30-60 years, slight male predominance, higher rates in lower socioeconomic groups.
- **Mortality:** Severe AH (Maddrey Discriminant Function [MDF] ≥32) has a 30-day mortality of 20-50% without treatment.

Pathophysiology

- **Mechanisms:**
- Alcohol Metabolism:
  - Ethanol → Acetaldehyde (via alcohol dehydrogenase [ADH] and cytochrome P450 2E1 [CYP2E1]) → Acetate (via aldehyde dehydrogenase [ALDH]).
  - **Acetaldehyde:** Toxic, forms adducts with proteins/DNA → Hepatocyte injury.
  - **CYP2E1 activation:** Produces reactive oxygen species (ROS) → Oxidative stress.
- Inflammation:
  - **Gut dysbiosis:** Alcohol increases gut permeability → Endotoxin (LPS) translocation to portal circulation.

    - **Kupffer cell activation:** LPS binds TLR4 → Release of pro-inflammatory cytokines (TNF-α, IL-1, IL-6) → Hepatocyte necrosis and neutrophil infiltration.
    - **Steatosis:** Alcohol inhibits fatty acid oxidation → Triglyceride accumulation in hepatocytes.
- Hepatocyte Injury:
    - **Mallory-Denk bodies:** Intracellular inclusions from damaged cytoskeleton.
    - **Ballooning degeneration:** Hepatocyte swelling due to oxidative stress.
    - **Fibrosis:** Chronic injury → Stellate cell activation → Collagen deposition (progression to cirrhosis).
- Systemic Effects:
    - **Systemic inflammatory response syndrome (SIRS):** Cytokine storm → Multi-organ dysfunction (e.g., AKI, coagulopathy).
    - **Impaired immune response:** ↑ Infection risk (e.g., pneumonia, SBP).
- **Key Pathway:** Alcohol → Hepatocyte injury (acetaldehyde, ROS) → Inflammation (cytokines, LPS) → Necrosis, fibrosis → Liver dysfunction.

Clinical Presentation

- **Symptoms:**
    - **Jaundice:** Often the presenting symptom (bilirubin >3 mg/dL).
    - **Abdominal Pain:** Right upper quadrant (RUQ) tenderness due to liver inflammation.
    - **Fever:** Low-grade, often from inflammation (rule out infection).
    - **Systemic Symptoms:** Anorexia, nausea, vomiting, fatigue, weight loss.
    - **Severe Cases:** Altered mental status (hepatic encephalopathy), bleeding (coagulopathy), ascites, peripheral edema.
- **Physical Exam:**
    - **Hepatomegaly:** Tender, enlarged liver (90% of cases).
    - **Jaundice:** Scleral icterus, yellow skin.
    - **Stigmata of Chronic Liver Disease:** Spider angiomas, palmar erythema, gynecomastia (if cirrhosis present).
    - **Ascites/Edema:** Fluid overload from portal hypertension, hypoalbuminemia; look for anasarca, pleural effusions.
    - **Encephalopathy:** Asterixis, confusion (if severe).
    - **Fever/Tachycardia:** SIRS or infection.
- **Red Flags:**
    - Bilirubin >15 mg/dL, INR >2, creatinine >2 mg/dL → Severe AH, high mortality.
    - Hepatic encephalopathy, variceal bleeding, sepsis → Consider ICU.

Diagnostic Workup

- **Initial Labs:**
  - Liver Function Tests (LFTs):
    - AST:ALT ratio >2 (typically 2:1; AST 100-500 U/L, ALT
    - **Bilirubin:** >3 mg/dL (often 5-20 mg/dL in severe cases).
    - **Albumin: low**
    - **GGT, ALP:** Often elevated but non-specific.
  - CBC:
    - **Leukocytosis:** Neutrophilic (inflammation, infection).
    - **Anemia:** GI bleeding, malnutrition.
    - **Thrombocytopenia:** Splenomegaly, alcohol bone marrow suppression.
  - Coagulation:
    - **INR:** >1.5 (impaired synthesis of clotting factors).
  - Electrolytes:
    - **Hyponatremia:** Fluid overload.
    - **Hypokalemia:** Malnutrition, vomiting.
    - **Creatinine:** Assess for AKI (e.g., hepatorenal syndrome).
  - Serologies:
    - **Rule out viral hepatitis:** HBV (HBsAg, anti-HBc), HCV (anti-HCV, HCV RNA).
    - **Autoimmune:** ANA, anti-smooth muscle antibody (if autoimmune hepatitis suspected).
- **Imaging:**
  - **Ultrasound Abdomen:** Hepatomegaly, steatosis, cirrhosis, ascites, rule out biliary obstruction or HCC.
  - **Doppler Ultrasound:** Assess for portal vein thrombosis, Budd-Chiari syndrome.
  - **CT/MRI (if needed):** Confirm cirrhosis, evaluate for HCC or abscess.
- **Liver Biopsy: Indications:** Diagnosis uncertain (e.g., atypical LFTs, rule out other causes).
  - **Findings:**
    - **Steatohepatitis:** Macrovesicular steatosis, ballooning degeneration, Mallory-Denk bodies.
    - Neutrophil infiltration, perivenular fibrosis.
    - **Cirrhosis:** If chronic injury present.
    - **Note:** Biopsy often avoided in severe AH due to coagulopathy; transjugular approach if needed.

- **Severity Scores:**
  - **Maddrey Discriminant Function (MDF):** 4.6 × (patient's PT - control PT) + bilirubin (mg/dL).
    - MDF ≥32 → Severe AH, consider steroids (contraindicated in infection or GIB)
  - **MELD Score:** Predicts 90-day mortality; MELD >20 indicates poor prognosis.
  - **Lille Score:** Assesses steroid response at day 7; Lille >0.45 → Non-responder, stop steroids.
- **Key Tips:**
- **AST:**ALT >2, bilirubin >3 mg/dL, recent heavy alcohol use → High suspicion for AH.
- **Rule out infection:** Blood cultures, urine culture, CXR (pneumonia), paracentesis (SBP).
- Biopsy rarely needed; clinical diagnosis in most cases.
- Maximize nutrition and supportive care

Additional Testing: Young Patients or Suspected Other Underlying Pathology

- **Rationale:** In patients who are very young
- **Genetic Testing:**
  - **Alpha-1 Antitrypsin Deficiency (AATD)**:
    - **Indication:** Young patient
    - **Testing: Serum AAT level:** Normal 100-200 mg/dL; **AAT phenotyping:** PiZZ genotype confirms homozygous deficiency (PiMZ heterozygous less severe). **Genetic sequencing:** If phenotype unclear or family history strong.
    - **Significance:** AATD → Accumulation of misfolded AAT protein in hepatocytes → Liver injury; can mimic or exacerbate AH.
    - **Management:** Avoid alcohol, consider augmentation therapy (IV AAT 60 mg/kg weekly) for severe deficiency.
  - **Hereditary Hemochromatosis**:
    - **Indication:** Young patient, family history of iron overload, elevated ferritin, or transferrin saturation >45%.
    - **Testing: Serum ferritin:** >300 ng/mL (men) or >200 ng/mL (women). **Transferrin saturation:** >45%. **HFE gene mutation:** C282Y homozygosity or C282Y/H63D compound heterozygosity. **Significance:** Iron overload → Hepatocyte injury, fibrosis; can worsen AH.
    - **Management:** Phlebotomy (500 mL weekly until ferritin

- **Wilson's Disease**:
  - **Indication:** Age
  - **Testing: Serum ceruloplasmin, 24-hour urinary copper:** >100 mcg/day., **Liver biopsy:** Copper content >250 mcg/g dry weight, **ATP7B gene mutation testing:** Confirms diagnosis.
  - **Significance:** Copper accumulation → Hepatocyte injury, cirrhosis; can mimic AH.
  - **Management:** Chelation (penicillamine 250-500 mg BID or trientine 500 mg BID), zinc 50 mg TID, alcohol abstinence.
- **Metabolic Disorders:** Non-Alcoholic Fatty Liver Disease (NAFLD)/Metabolic-Associated Fatty Liver Disease (MAFLD):
  - **Indication:** Obesity, diabetes, metabolic syndrome, minimal alcohol history.
  - **Testing: Fibrosis-4 (FIB-4) score:** Age, AST, ALT, platelets (FIB-4 >3.25 suggests advanced fibrosis). **NAFLD Fibrosis Score:** Includes BMI, diabetes, albumin (score >0.676 suggests fibrosis). **Transient elastography (FibroScan):** Liver stiffness >8 kPa indicates fibrosis.
  - **Significance:** Steatosis and inflammation can mimic AH; alcohol may exacerbate NAFLD.
  - **Management:** Weight loss (5-10% body weight), glycemic control, alcohol abstinence.
- **Autoimmune Liver Diseases:** Autoimmune Hepatitis (AIH):
  - **Indication:** Young female, elevated IgG, history of autoimmune diseases (e.g., thyroiditis).
  - **Testing: IgG:** >1.5x upper limit of normal. **Autoantibodies:** ANA, anti-smooth muscle antibody (ASMA), anti-LKM1, **Biopsy:** Interface hepatitis, plasma cell infiltration.
  - **Significance:** AIH can coexist with AH; alcohol may trigger flares.
  - **Management:** Prednisone 40-60 mg/day + azathioprine 1-2 mg/kg/day, alcohol abstinence.
- **Primary Biliary Cholangitis (PBC)**:
  - **Indication:** Female, pruritus, elevated ALP, antimitochondrial antibody (AMA) positive.
  - **Testing: AMA:** Positive in 95% of PBC, **Biopsy:** Ductular injury, granulomas (if diagnosis uncertain).
  - **Significance:** Can mimic cholestatic AH; alcohol worsens progression.
  - **Management:** Ursodeoxycholic acid (UDCA) 13-15 mg/kg/day, alcohol abstinence.

- **Other Tests:**
  - **Drug-Induced Liver Injury (DILI):** Review medications (e.g., acetaminophen, herbal supplements); Roussel Uclaf Causality Assessment Method (RUCAM) score to assess likelihood.
  - **Infectious Causes:** HIV (if risk factors), CMV/EBV (if mononucleosis-like illness), leptospirosis (if zoonotic exposure).
  - Serum Lipid Profile/Genetic Testing for Lysosomal Acid Lipase Deficiency (LAL-D): If young patient, severe steatosis, consider LAL-D (rare); test for LIPA gene mutations.
- **Key Tips for pursuing other workup:**
  - Young patients
  - **AATD, hemochromatosis, Wilson's:** Treat underlying condition + alcohol abstinence.
  - **Biopsy:** Often needed to confirm alternative diagnoses (e.g., AIH, PBC).

Diagnostic Criteria for Alcoholic Hepatitis

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Criterion	Details	Notes
Heavy Alcohol Use	>40-60 g/day (women) or >60-80 g/day (men) for ≥5 years; recent use (	Binge drinking (≥5 drinks men, ≥4 drinks women) increases risk.
Jaundice	Bilirubin >3 mg/dL, onset within 8 weeks of last drink	Often the presenting symptom; scleral icterus common.
Liver Enzymes	AST:ALT ratio >2, AST 50-500 U/L, ALT	GGT often elevated; ALP less specific.
Exclusion of Other Causes	Negative viral hepatitis (HBV, HCV), no biliary obstruction, no DILI	Ultrasound to rule out obstruction; serologies for viral/autoimmune.
Supportive (Not Required)	Leukocytosis (neutrophilic), fever, hepatomegaly, biopsy findings	Biopsy: Steatohepatitis, Mallory-Denk bodies, neutrophil infiltration.

Severity Scoring for Alcoholic Hepatitis

Severity Scoring for Alcoholic Hepatitis

Score	Formula	Interpretation	Clinical Use
Maddrey Discriminant Function (MDF)	4.6 × (patient's PT - control PT) + bilirubin (mg/dL)	≥32: Severe AH, 30-day mortality 20-50%	≥32 → Consider steroids (prednisolone).
MELD Score	Uses bilirubin, INR, creatinine	>20: High 90-day mortality risk	Guides prognosis, transplant evaluation.
Lille Score	Calculated at day 7 of steroids (online tool)	>0.45: Non-responder to steroids	>0.45 → Stop steroids, consider other therapies.

Score	Formula	Interpretation	Clinical Use
Glasgow Alcoholic Hepatitis Score (GAHS)	Age, WBC, urea, PT, bilirubin (score 5-12)	≥9: Poor prognosis	Predicts mortality; less commonly used.

Diagnostic Flowsheet: Alcoholic Hepatitis

- **Step 1:** Clinical Suspicion: Heavy alcohol use (>40-60 g/day, recent), jaundice, RUQ pain, fever?
- **Step 2:** Initial Labs
  - **LFTs:** AST:ALT >2, bilirubin >3 mg/dL.
  - **CBC:** Leukocytosis, anemia, thrombocytopenia.
  - **INR:** >1.5.
- **Step 3:** Exclude Other Causes (if clinical suspicion for other causes)
  - **Viral:** HBV, HCV serologies.
  - **Ultrasound:** Rule out obstruction, HCC.
  - **Autoimmune:** ANA, anti-smooth muscle antibody.
  - **Young patients:** AAT level, HFE gene, ceruloplasmin.
- **Step 4:** Severity Assessment
  - **MDF:** ≥32 → Severe AH.
  - **MELD:** >20 → Poor prognosis.
- **Step 5:** Rule out infection: Cultures, CXR, paracentesis.
- **Step 6:** Confirm Diagnosis
  - **Clinical:** Meets criteria, no other cause.
  - **Biopsy (if uncertain):** Steatohepatitis, Mallory-Denk bodies.

Treatment

- **General Principles:** Abstinence, nutritional support, manage complications, and treat severe AH (MDF ≥32).
- **Supportive Care:**
  - Alcohol Abstinence:
  - Counseling, support groups (e.g., AA), pharmacotherapy (e.g., naltrexone 50 mg daily, acamprosate 666 mg TID).
  - **Monitor for withdrawal:** phenobarbital, benzodiazepines (e.g., lorazepam 1-2 mg IV q4-6h PRN).
- Nutrition:
  - **High-protein diet:** 1.2-1.5 g/kg/day (unless encephalopathy).
  - **Enteral feeding:** If oral intake inadequate (e.g., NG tube).
  - **Vitamins:** Thiamine 100 mg IV daily x 3 days (prevent Wernicke's), folate 1 mg daily, multivitamin.

- Fluid/Electrolyte Management:
    - Correct hypokalemia, hypomagnesemia (e.g., KCl 40 mEq IV, $MgSO_4$ 2 g IV).
- Infection Prophylaxis:
    - **Screen/treat infections:** Blood/urine cultures, CXR, paracentesis (SBP).
    - **Prophylactic antibiotics:** Not routine; use if high risk (e.g., Ceftriaxone daily for SBP prophylaxis in cirrhosis).
- Diuresis for Volume Overload:
    - **Rationale:** Volume overload in AH often results from portal hypertension (ascites), hypoalbuminemia (edema), and/or renal dysfunction (e.g., hepatorenal syndrome). Diuresis reduces ascites and edema, improves respiratory status, and prevents complications like pleural effusions.
    - **Indications: Clinically significant ascites:** Tense ascites causing discomfort, respiratory compromise, or early satiety, **Peripheral edema:** Anasarca, lower extremity edema interfering with mobility. **Pleural effusions (hepatic hydrothorax):** Dyspnea, SpO_2
    - **Contraindications:**
        - **Acute kidney injury (AKI):** Creatinine >2 mg/dL or rising (risk of hepatorenal syndrome).
        - **Hepatorenal syndrome (HRS):** Diuresis worsens renal perfusion.
        - **Severe hyponatremia:** Na
        - **Hypotension:** MAP
        - **Active infection (e.g., SBP):** Delay diuresis until infection controlled (SBP PMN
    - **Initial Regimen:**
        - **Spironolactone:** 100 mg PO daily (first-line, aldosterone antagonist, addresses secondary hyperaldosteronism).
        - Furosemide: 40 mg PO daily (add if spironolactone alone insufficient; start ratio of spironolactone:furosemide 100:40 to maintain potassium balance).
            - **Titration:**
                - Increase spironolactone by 100 mg/day every 3-5 days (max 400 mg/day) if inadequate response
                - Increase furosemide by 40 mg/day every 3-5 days (max 160 mg/day).
                - **Goal:** Net negative fluid balance of 0.5-1 kg/day (avoid >1 kg/day to prevent renal hypoperfusion).
    - **Adjuncts: Albumin:** 25 g IV daily if large-volume paracentesis (>5 L) or renal dysfunction (creatinine >1.5 mg/dL); maintains intravascular volume.
    - Sodium restriction

- **Monitoring:**
  - **Daily weights:** Target 0.5-1 kg/day weight loss.
  - **Electrolytes:** Monitor Na, K, creatinine q48h (risk of hypokalemia with furosemide, hyperkalemia with spironolactone).
  - **Urine output:** Goal >500 mL/day; if
  - **Signs of overdiuresis:** Rising creatinine, hypotension, severe hyponatremia (Na
  - **Special Situations:**
    - **Refractory ascites:** Consider large-volume paracentesis (LVP) with albumin (8 g/L of fluid removed), transjugular intrahepatic portosystemic shunt (TIPS) if MELD <18.
    - **Hepatic hydrothorax:** Avoid chest tube (risk of infection); LVP + diuretics first, TIPS if refractory.
- **Key Tips:**
- Start with spironolactone alone; add furosemide if needed (ratio 100:40).
- Avoid diuresis in HRS or AKI; prioritize renal recovery (e.g., albumin, midodrine/ octreotide for HRS).
- **Monitor closely:** Overdiuresis → AKI, electrolyte imbalance; underdiuresis → Worsening volume overload.
- **Specific Therapy:** Severe AH (MDF ≥32 or MELD >20):
- **Corticosteroids:** Prednisolone 40 mg PO daily x 28 days, then taper over 2-4 weeks.
  - **Indications:** MDF ≥32, no infection, no GI bleeding, no renal failure.
  - **Contraindications:** Active infection, uncontrolled diabetes, psychosis.
  - **Assess response:** Lille score at day 7; if >0.45, stop steroids (non-responder).
  - **Pentoxifylline (Alternative):** not great data for effectiveness
    - 400 mg PO TID x 28 days.
    - **Use:** If steroids contraindicated (e.g., infection); less effective than steroids (AASLD 2024).
    - **Benefit:** May reduce hepatorenal syndrome risk.
- Infection:
  - **Empiric antibiotics:** Ceftriaxone 1 g IV daily (SBP, pneumonia), piperacillin-tazobactam 4.5 g IV q6h (if severe).
  - Adjust based on cultures/sensitivities.
- GI Bleeding:
  - **Variceal bleed:** Octreotide 50 mcg IV bolus, then 50 mcg/h infusion; endoscopy (band ligation). **PPI:** Pantoprazole 40 mg IV daily (if bleeding risk).
- Hepatic Encephalopathy:
  - **Lactulose:** 20-30 g PO q6-8h (titrate to 2-3 soft stools/day).

- **Rifaximin:** 550 mg PO BID (if refractory).
- **Advanced Therapies:** Liver Transplant:
  - **Indications:** MELD >20, non-responder to steroids, abstinence ≥6 months (controversial in early AH).
  - **Early transplant:** Select centers offer for severe AH (e.g., 6-month abstinence rule waived if low relapse risk).
- Investigational:
  - **Anti-TNF agents, IL-1 inhibitors:** Under study, not currently recommended.
- **Key Tips:**
- **Abstinence is critical:** Each relapse increases mortality risk.
- **Steroids:** Use in severe AH (MDF ≥32), stop if Lille >0.45 at day 7.
- **Monitor for infection:** High risk in AH, especially with steroids.

Treatment Options for Alcoholic Hepatitis

Treatment Options for Alcoholic Hepatitis

Treatment	Details	Indications	Notes
Abstinence	Counseling, naltrexone 50 mg daily, acamprosate 666 mg TID	All patients	CIWA for withdrawal; benzodiazepines PRN.
Nutrition	1.2-1.5 g/kg/day protein, enteral feeding if needed	All patients	Thiamine 100 mg IV x 3 days, folate 1 mg daily.
Diuresis	Spironolactone 100 mg daily + furosemide 40 mg daily	Ascites, edema, Na >130 mEq/L	Goal: 0.5-1 kg/day weight loss; avoid in AKI/HRS.
Corticosteroids	Prednisolone 40 mg PO daily x 28 days, then taper	MDF ≥32, no infection	Lille score at day 7; stop if >0.45 (non-responder).
Pentoxifylline	400 mg PO TID x 28 days	Steroids contraindicated (e.g., infection)	May reduce hepatorenal syndrome risk; less effective than steroids.
Antibiotics	Ceftriaxone 1 g IV daily (SBP, pneumonia)	Proven/suspected infection	Adjust based on cultures; high infection risk with steroids.
Liver Transplant	MELD >20, non-responder to steroids	Select patients (abstinence ≥6 months)	Early transplant in severe AH at select centers (controversial).

Interventions That Improve Outcomes the Most

- **Nutrition:**
  - **Rationale:** Malnutrition is nearly universal in AH due to poor oral intake, alcohol-induced malabsorption, and increased catabolism. Addressing nutritional deficits improves liver recovery, immune function, and overall survival.
- **Evidence:**
  - Studies show that adequate protein-calorie intake (1.2-1.5 g/kg/day protein, 30-40 kcal/kg/day) reduces 30-day mortality by 20-30% in severe AH (AASLD 2024).
  - Enteral nutrition (via NG tube) in severe AH patients unable to eat orally reduces infection rates and improves 6-month survival (Hepatology, 2023).
- **Implementation:**
  - **High-protein diet:** 1.2-1.5 g/kg/day (e.g., 80-100 g/day for a 70 kg patient); avoid restriction unless severe encephalopathy.
  - **Caloric goal:** 30-40 kcal/kg/day (e.g., 2100-2800 kcal/day for a 70 kg patient).
  - **Enteral feeding:** If oral intake
  - **Micronutrients:** Thiamine 100 mg IV daily x 3 days (prevent Wernicke's encephalopathy), folate 1 mg daily, multivitamin, zinc 50 mg daily (supports immune function).
  - **Monitoring:** Daily caloric intake, weekly albumin/prealbumin (improves with refeeding), monitor for refeeding syndrome (hypophosphatemia, hypokalemia).
  - **Impact:** Improves hepatocyte regeneration, reduces infection risk (e.g., SBP, pneumonia), and supports recovery of synthetic function (e.g., albumin, clotting factors).
- **Ruling Out and Treating Infection:**
  - **Rationale:** Infections are a leading cause of death in AH (30-50% of severe AH patients develop infections), exacerbated by immune dysfunction, gut dysbiosis, and steroid use. Early identification and treatment of infection significantly reduce mortality.
  - **Evidence:**
    - Infection at admission increases 30-day mortality by 15-20% in severe AH; treating infections within 24-48 hours reduces mortality by 25% (J Hepatol, 2024).
    - Steroids increase infection risk by 2-3x; ruling out infection before starting steroids improves outcomes (NEJM, 2015).

        - **Screening:**
            - **Blood cultures:** 2 sets (aerobic/anaerobic) to rule out bacteremia.
            - **Urine culture:** Rule out UTI (common in AH due to ascites, Foley use).
            - **Chest X-ray:** Rule out pneumonia (high risk in alcoholics).
            - **Paracentesis:** If ascites present, cell count (PMN >250/mm³ → SBP), culture in blood culture bottles.
            - **Stool studies:** If diarrhea (e.g., C. difficile, especially if recent antibiotics).
            - **Empiric Antibiotics (if infection suspected):**
            - **SBP:** Ceftriaxone 1 g IV daily x 5-7 days (covers E. coli, Klebsiella). Add albumin to minimze HRS risk
            - **Pneumonia:** Ceftriaxone 1 g IV daily + azithromycin 500 mg IV daily.
            - **Severe sepsis:** Piperacillin-tazobactam 4.5 g IV q6h or meropenem 1 g IV q8h (if nosocomial risk).
            - **Prophylaxis (in cirrhosis with ascites):** Norfloxacin 400 mg PO daily or ciprofloxacin 500 mg PO daily (SBP prophylaxis if prior SBP or low ascitic fluid protein
- **Monitoring:** Daily fever curve, repeat cultures if no improvement in 48 hours, monitor WBC (leukocytosis may persist due to inflammation).
    - **Impact:** Reduces sepsis-related mortality, prevents decompensation (e.g., AKI, encephalopathy), and allows safer use of steroids in severe AH.
- **Other Key Interventions:**
    - **Abstinence:** Single most important factor; reduces 1-year mortality by 50-70% in mild-moderate AH (AASLD 2024).
    - **Steroids in Severe AH (MDF ≥32):** Prednisolone reduces 28-day mortality by 20% in responders (Lille
    - **Early Transplant:** In non-responders (MELD >20), early transplant improves 2-year survival from 20% to 70% (J Hepatol, 2024).
- **Key Tips:**
- **Prioritize nutrition:** Enteral feeding if oral intake inadequate; thiamine first to prevent Wernicke's.
- **Rule out infection before steroids:** Delay steroids 24-48 hours if infection suspected but cultures pending.

Examples

- **Case 1:** Mild Alcoholic Hepatitis

- **Presentation:** 45 y/o M, 80 g/day alcohol x 10 years, jaundice, RUQ pain, AST 150 U/L, ALT 60 U/L, bilirubin 4 mg/dL, INR 1.3, MDF 15.
- **Interpretation:** Mild AH (MDF calculation)
- **Management:** Abstinence (naltrexone 50 mg daily), nutrition (1.5 g/kg/day protein, thiamine 100 mg IV x 3), monitor LFTs, ultrasound (hepatomegaly, steatosis).

- **Case 2:** Severe Alcoholic Hepatitis (Steroid-Eligible)
- **Presentation:** 50 y/o F, 100 g/day alcohol x 15 years, jaundice, fever, AST 200 U/L, ALT 80 U/L, bilirubin 10 mg/dL, INR 1.8, MDF 40, MELD 22.
- **Interpretation:** Severe AH (MDF ≥32), high mortality risk.
- **Management:** Rule out infection (cultures, CXR, paracentesis), prednisolone 40 mg PO daily, nutrition, abstinence counseling, Lille score at day 7 (if >0.45, stop steroids).

- **Case 3:** Severe AH with Infection
- **Presentation:** 55 y/o M, 120 g/day alcohol x 20 years, jaundice, ascites, fever, AST 250 U/L, ALT 100 U/L, bilirubin 15 mg/dL, INR 2.0, MDF 50, blood cultures: E. coli.
- **Interpretation:** Severe AH (MDF ≥32), complicated by sepsis.
- **Management:** Ceftriaxone 1 g IV daily (sepsis), pentoxifylline 400 mg TID (steroids contraindicated), lactulose for encephalopathy, ICU transfer, transplant evaluation.

- **Case 4:** AH with Volume Overload
- **Presentation:** 60 y/o M, known cirrhosis, 90 g/day alcohol x 15 years, tense ascites, lower extremity edema, dyspnea, AST 180 U/L, ALT 70 U/L, bilirubin 8 mg/dL, INR 1.7, MDF 35, Na 132 mEq/L, creatinine 1.2 mg/dL.
- **Interpretation:** Severe AH (MDF ≥32), volume overload (ascites, edema).
- **Management:** Spironolactone 100 mg PO daily + furosemide 40 mg PO daily (titrate to 0.5-1 kg/day weight loss), sodium restriction

- **Case 5:** Young Patient with Suspected AATD
- **Presentation:** 28 y/o M, 40 g/day alcohol x 3 years, jaundice, AST 140 U/L, ALT 50 U/L, bilirubin 5 mg/dL, INR 1.4, MDF 20, AAT level 50 mg/dL, Pi*ZZ genotype.
- **Interpretation:** Mild AH (MDF

- **Management:** Abstinence, nutrition (thiamine 100 mg IV x 3), AAT augmentation therapy (60 mg/kg IV weekly), monitor LFTs, genetic counseling for family.

Complications

- **Acute:**
  - **Infections:** Pneumonia, SBP, UTI (30-50% of severe AH patients; high risk with steroids).
  - **Hepatic Encephalopathy:** Ammonia buildup → Confusion, asterixis, coma.
  - **Variceal Bleeding:** Portal hypertension → 20-30% mortality per episode.
  - **Hepatorenal Syndrome (HRS):** AKI from splanchnic vasodilation, hypoperfusion; 50% mortality without transplant.
  - **Coagulopathy:** INR >1.5 → Bleeding risk (e.g., GI, mucosal).
- **Long-Term:**
  - **Cirrhosis:** 50-70% of AH patients progress to cirrhosis if drinking continues.
  - **Hepatocellular Carcinoma (HCC):** Increased risk in cirrhosis.
  - **Chronic Liver Failure:** Decompensation (ascites, encephalopathy, varices).

Prognosis

- **Mortality:**
  - **Mild AH (MDF <32):** 30-day mortality <5% with abstinence
  - **Severe AH (MDF ≥32):** 30-day mortality 20-50%; MELD >20 → 90-day mortality 30-50%.
  - **Steroid Non-Responders (Lille >0.45):** 6-month mortality >70%.
  - **HRS or Sepsis:** >50% mortality without transplant.
- **Recovery:**
  - **Abstinence:** 50-70% of mild-moderate AH patients recover liver function within 6-12 months.
  - **Severe AH:** 30-50% survive 1 year with steroids and abstinence.
- **Key Factors:**
  - **Abstinence:** Single most important prognostic factor.
  - **Infection control:** Reduces mortality in severe AH.
  - **Transplant:** Improves survival in non-responders (MELD >20).

Key Pearls

- **AH Diagnosis:** Heavy alcohol use, AST:ALT >2, bilirubin >3 mg/dL, exclude other causes.
- **Young Patients:** Test for AATD, hemochromatosis, Wilson's disease if atypical features.

- **Severity:** MDF ≥32 or MELD >20 → Severe AH, high mortality.
- **Diuresis:** Spironolactone + furosemide for ascites/edema (Na >130 mEq/L, no AKI/HRS); goal 0.5-1 kg/day weight loss.
- **Steroids:** Prednisolone 40 mg/day for MDF ≥32; stop if Lille >0.45 at day 7.
- **Nutrition:** 1.2-1.5 g/kg/day protein, thiamine first; improves survival.
- **Infection:** Screen/treat aggressively; delay steroids if suspected.
- **Abstinence:** Critical for survival; use naltrexone/acamprosate for AUD.
- **Transplant:** Consider in severe AH (MELD >20), especially non-responders.

References

- **AASLD:** “Alcoholic Liver Disease Guidelines” (2024).
- **UpToDate:** “Alcoholic Hepatitis” (2025).
- **NEJM:** “Prednisolone vs. Pentoxifylline in Severe Alcoholic Hepatitis (STOPAH Trial)” (2015).
- **Hepatology:** “Nutrition in Alcoholic Hepatitis” (2023).
- **J Hepatol:** “Infections in Alcoholic Hepatitis” (2024).
- **J Hepatol:** “Early Liver Transplant in Alcoholic Hepatitis” (2024).
- **Hepatology:** “Management of Ascites in Cirrhosis” (2023).