Diagnosis, Evaluation, and Management of Ascites, Spontaneous Bacterial Peritonitis and Hepatorenal Syndrome: 2021 Practice Guidance by the American Association for the Study of Liver Diseases (AASLD)

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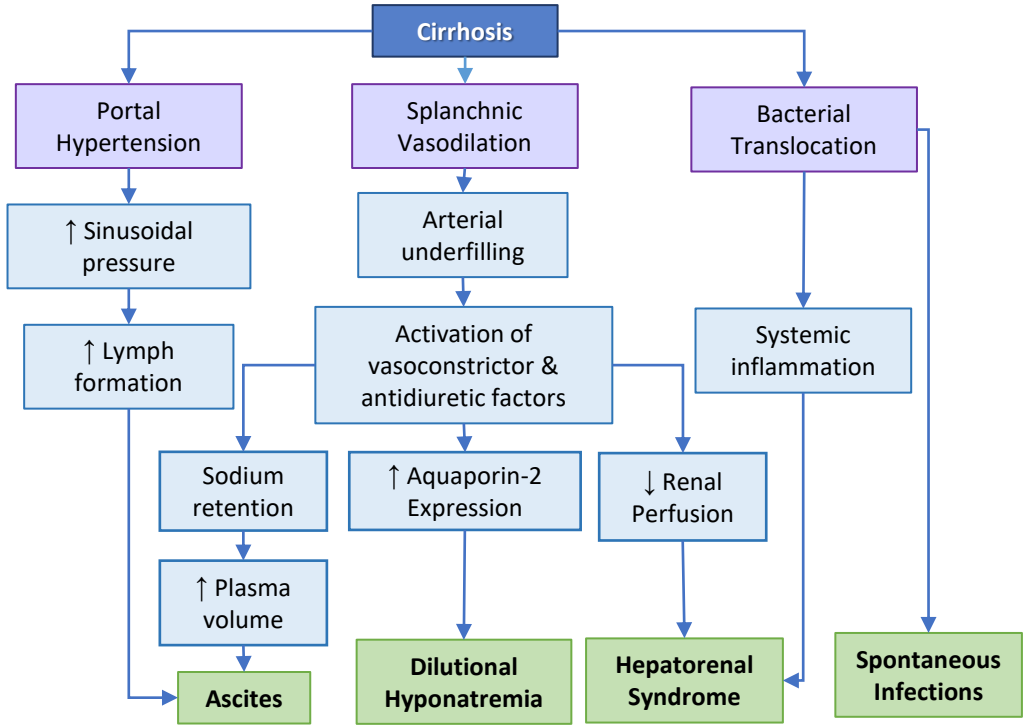
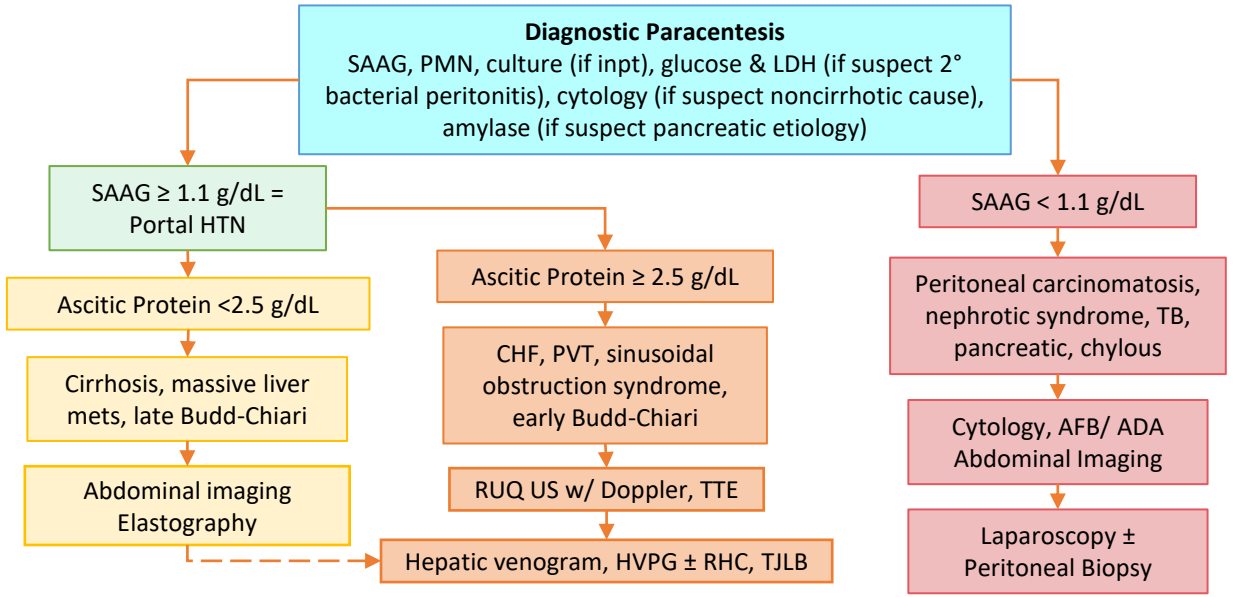
Epidemiology

- 5-10% patients w/ compensated cirrhosis develop ascites annually
- Ascites ⇒ ↓ 5 year survival from 80% to 30%
  - Bacterial infections, electrolyte abnormalities, hepatorenal syndrome (HRS), nutritional imbalances
- HRS associated w/ ~46% inpatient mortality



Ascites Work Up



Ascites Management

- 2g (90 mmol)/ day dietary Na restriction
- 1L fluid restriction only once **Na ≤125**
- Urine Na: urine K >1 ⟶ sufficient diuresis ⇒ if not losing fluid weight, think dietary noncompliance
- Spironolactone 100: furosemide 40 ⇒ step-wise increase to up to 400: 160
- Grade 3 ascites ⟶ LVP, Na restriction, & diuretics
- Grade 2 or 3 ascites ⟶ refer for LT evaluation
- Controversial & insufficient data re long-term albumin in diuretic responsive & refractory ascites, respectively

Diuretic Adverse Drug Effects (ADEs)

- AKI, ↓ Na, ↓ K (loop diuretics) or ↑ K (aldosterone antagonists)
- HE w/ electrolyte abnormalities
- Painful gynecomastia 2/2 spironolactone ⇒ switch to amiloride or eplerenone
- Severe muscle cramps ⇒ try baclofen (10 mg/d, ↑ 10mg/d weekly to 30 mg/d), albumin 20-40g/wk, orphenadrine, methocarbamol, or quinidine 400mg/d x 4 wks (but use limited by diarrhea)

Biggins SW, Angeli P, Garcia-Tsao G, Ginès P, Ling SC, Nadim MK, Wong F, Kim WR. Diagnosis, Evaluation, and Management of Ascites, Spontaneous Bacterial Peritonitis and Hepatorenal Syndrome: 2021 Practice Guidance by the American Association for the Study of Liver Diseases. Hepatology. 2021 Aug;74(2):1014-1048. doi: 10.1002/hep.31884.

Refractory Ascites

- Refractory ascites (RA)- ascites that can't be mobilized or recurs after LVP despite ↓ Na diet and diuretics
  - **Diuretic resistant**- despite max dose diuretics
  - **Diuretic intractable**- can't max diuretic doses 2/2 ADEs
- Recurrent ascites- recurs ≥3x in 1 year despite ↓ Na + diuretics; ?forerunner to RA
- LVP (>5L) ⇒ Give 6-8g albumin for every 1L ascites removed to ↓ risk postparacentesis circulatory dysfunction (PPCD)
  - ↑ Risk PPCD w/ >8L removed
- TIPS ⇒ ascites should resolve over 4-6 mo (need to stay on ↓ Na diet)
  - Smaller bore (8-10mm) ↓ risk HE
- Consider OLT
- Cautious use of NSBB, esp if SBP<90, Na <130, or Cr >1.5

Hyponatremia

- Na ≤ 130 → ↑ risk HE, HRS, & SBP, in-patient & waitlist mortality
- Mild (Na 126-135) ⇒ monitor & ↓ water
- Moderate (Na 120-125) ⇒1L water restriction, stop diuretics
- Severe (Na <120) ⇒ more severe water restriction, **albumin**; ↑ risk osmotic demyelination syndrome (ODS) with LT
- Cautious vasopressin-R antagonist (vaptan) use, ≤30d if done; hepatotoxicity in polycystic kidney disease
- Hypertonic saline only for short term tx for symptomatic or severe ↓ Na or those with imminent LT; can worsen hypervolemia
- Goal ↑ Na 4-6 mEq/L per 24h to ↓ risk ODS

Hepatic Hydrothorax (HH)

- Serum: pleural albumin >1.1
- If serum: pleural albumin <1.1, L-sided, or no ascites ⇒ think infection, pancreatitis, malignancy, or cardiopulm etiology
- Na restriction + diuretics + thoracentesis PRN
- Refractory or recurrent HH ⇒ TIPS or LT
- **Avoid chest tubes** (risk fistula, ↑ morbidity & mortality) **& chemical pleurodesis** (loculated collections)
- If not TIPS candidate ⇒ consider indwelling tunneled catheters → risk ↓ protein & malnutrition

Spontaneous Bacterial Peritonitis (SBP)/ Spontaneous Bacterial Empyema (SBE)

- Diagnostic tap if admitted regardless of symptoms (up to 1/3 asymptomatic), possible infection (+thora if effusion), or tense ascites + AKI
- **Culture at bedside** in aerobic & anaerobic BCx bottles before abx
  - MCC= *E. coli, Klebsiella pneumoniae, Staph aureus, E. faecalis, E. faecium*
- Start IV 3rd generation cephalosporins if PMN >250
- Start broad spectrum abx if health-care assoc or nosocomial infection, recent broad-spectrum abx, or sepsis/ septic shock
- No chest tube for SBE
- Repeat diagnostic para/thora 2 days after abx ⇒ if ↓ PMN <25% baseline ⇒ broaden abx & rule out 2° bacterial peritonitis
- PMN <250 but positive Cx (bacteriascites) w/o symptoms⇒ no abx, repeat para
- IV albumin 1.5 g/kg on day 1 + 1.0 g/kg on day 3
  - Most benefit in BUN >30, Cr >1, or bili >5
- Hold NSBBs if MAP <65 or AKI

SBP Prophylaxis

- Hx SBP ⇒ long term norfloxacin or ciprofloxacin
- Cirrhosis + UGIB w/ ceftriaxone 1g QD x max 7 days
- Cirrhosis + ascites protein <1.5 ⇒ consider if renal dysfunction (Cr >1.2, BUN >25, or Na <130), advanced cirrhosis (CTP > 9 & bili >3)

Abdominal Hernias

- Defer until during or after LT if in near future
- Control ascites before & after
- Consider TIPS in RA before elective hernia repair or after emergent operation

Cirrhotic Ascites in Kids

- Refer for LT eval
- Tx- Na <2 mmol/kg/d, spironolactone, & furosemide
- Symptomatic grade 3 & treatment RA ⇒ therapeutic tap (?risks & benefits)
- LVP ⇒ 25% albumin 0.5- 1.0 g/kg, or 6-8 g/ 1 L removed
- Diagnostic tap if F, abdominal pain, clinical deterioration
- Proven or suspected SBP ⇒ **broad spectrum abx**

Meds to Avoid

- **NSAIDS-** precipitate ↓ Na, diuretic refractoriness, & AKI
- ACE-I, ARBs, α1 blockers, dipyridamole
- Aminoglycosides

AKI in Cirrhosis

- ↑ Cr ≥ 0.3 mg/dL w/in 48h or ↑ Cr ≥ 50% w/in 7d
- MCC= prerenal (hypovolemia & HRS-AKI) & ATN (septic or hypovolemic shock > nephrotoxins)
- Hold diuretics
- Consider holding NSBBs esp if ↓BP

HRS-AKI

- Previously known as **type-1 HRS**
- Tx- vasoconstrictors (terlipressin bolus or gtt > norepinephrine) + albumin (1g/kg on day 1 then 40-50g/d)
- If terlipressin or NE not available, consider midodrine PO 5-15mg q8h + octreotide 100- 200 µg q8h or 50 µg/hr IV (low efficacy)
- Response= Cr <1.5 or return to w/in 0.3 baseline over max 14 days
- OK to DC vasoconstrictors if Cr at/ above pretreatment level >4d on max tolerated doses
- Cirrhosis + AKI ⇒ consider urgent LT eval
- RRT in LT candidates with worsening renal function, electrolyte disturbances, ↑ volume overload unresponsive to vasoconstrictors