

# Ascites

## Definition

- Accumulation of peritoneal fluid

## Symptoms

- Abdominal Distention and discomfort
- Anorexia
- Nausea
- Early satiety
- Heartburn (Gastroesophageal Reflux)
- Flank Pain
- Respiratory distress

## Signs

- Umbilicus may evert
- Bulging flanks with the patient lying supine
- Fluid Wave Test
- Shifting Dullness Test
- Puddle Sign

## Most common etiologies

- Cirrhosis (Cirrhotic Ascites): 85% of cases
- Cancer (Malignant Ascites)
- Congestive Heart Failure
- Tuberculosis

## Labs

- Diagnostic abdominal Paracentesis
- Ascites Fluid: Cell Count with Differential, albumin/protein concentration and ascitic fluid inoculation in blood culture bottles, Serum Ascites albumin gradient (SAAG), cytology

## Ascites fluid assorted labs

- Lactate
- Amylase
- pH
- Lipids
- Fluid total protein
- Fluid Glucose
- Fluid LDH

## Serum

- CBC, CMP (electrolyte imbalance, LFT, hepatorenal), BNP, PT, aPTT, INR,

## Imaging

- Ultrasound Abdomen or
- CT Abdomen

## Medication Management

1. Spironolactone and
2. Thiazide or Loop Diuretic (diuretic dosage should be adjusted to a daily weight loss of no more than 500 g/day in patients without peripheral edema and 1 kg/day in patients with peripheral edema)
3. Electrolyte correction
4. Consider Hepatic encephalopathy management
5. Paracentesis (consider Albumin)
6. Antibiotic (therapeutic/prophylaxis for SBP)
7. Electrolyte replacement, restriction of daily sodium intake to 80–120 mmol

## Executive summary of recommendations

### 1. Diagnostic paracentesis in new- onset ascites

- 1.1. A diagnostic paracentesis is recommended in all patients with new-onset ascites. (*Quality of evidence: moderate; Recommendation: strong*)
- 1.2. The initial ascitic fluid analysis should include total protein concentration and calculation of the serum ascites albumin gradient (SAAG). (*Quality of evidence: moderate; Recommendation: strong*)
- 1.3. Ascites fluid analysis for cytology, amylase, brain natriuretic peptide (BNP), and adenosine deaminase should be considered based on the pretest probability of specific diagnosis (*Quality of evidence: moderate; Recommendation: weak*)

## 2. Spontaneous bacterial peritonitis

- 2.1. Diagnostic paracentesis should be carried out without delay to rule out spontaneous bacterial peritonitis (SBP) in all cirrhotic patients with ascites on hospital admission. (*Quality of evidence: moderate; Recommendation: strong*)
- 2.2. A diagnostic paracentesis should be performed in patients with GI bleeding, shock, fever or other signs of systemic inflammation, gastrointestinal symptoms, hepatic encephalopathy, and in patients with worsening liver or renal function. (*Quality of evidence: moderate; Recommendation: strong*)
- 2.3. Ascitic neutrophil  $>250/\text{mm}^3$  count remains the gold standard for the diagnosis of SBP and this can be performed either by manual microscopy or using automated counts, based on flow cytometry for counting and differentiating cells. (*Quality of evidence: moderate; Recommendation: strong*)
- 2.4. Ascitic fluid culture with bedside inoculation of blood culture bottles should be performed to guide the choice of antibiotic treatment when SBP is suspected. (*Quality of evidence: moderate; Recommendation: strong*)
- 2.5. Immediate empirical antibiotic therapy should be determined with due consideration of the context of SBP (community-acquired or healthcare-associated), the severity of the infection, and the local bacterial resistance profile. **Cefotaxime** has been widely studied, but the choice of antibiotic should be guided by local resistance patterns and protocol. (*Quality of evidence: moderate; Recommendation: strong*)
- 2.6. A second diagnostic paracentesis at 48 hours from the start of treatment to check the efficacy of antibiotic therapy should be considered in those who have an apparently inadequate response or where secondary bacterial peritonitis is suspected. (*Quality of evidence: low; Recommendation: weak*)
- 2.7. Patients presenting with gastrointestinal bleeding and underlying ascites due to cirrhosis should receive prophylactic antibiotic treatment (cefotaxime has been widely studied but the antibiotic should be chosen based on local data) to prevent the development of SBP. (*Quality of evidence: strong; Recommendation: strong*)
- 2.8. Patients who have recovered from an episode of SBP should be considered for treatment with norfloxacin (400 mg once daily), ciprofloxacin (500 mg once daily, orally), or co-trimoxazole (800 mg sulfamethoxazole and 160 mg trimethoprim daily, orally) to prevent a further episode of SBP. (*Quality of evidence: low; Recommendation: weak*)
- 2.9. Primary prophylaxis should be offered to patients considered at high risk, as defined by an ascitic protein count  $<1.5$  g/dL. However, it is important that the potential risks and benefits and existing uncertainties are communicated to patients. (*Quality of evidence: low; Recommendation: weak*)

## 3. Dietary salt restriction

- 3.1. Patients with cirrhosis and ascites should have a moderately salt-restricted diet with a daily salt intake of no more than 5–6.5 g (87–113 mmol sodium). This translates to a no added salt diet with avoidance of precooked meals. (*Quality of evidence: moderate; Recommendation: strong*)
- 3.2. Patients with cirrhosis and ascites should receive nutritional counseling on the sodium content in the diet. (*Quality of evidence: weak; Recommendation: strong*)

## 4. Diuretics

- 4.1. In patients with the first presentation of moderate ascites, spironolactone monotherapy (starting dose 100 mg, increased to 400 mg) is reasonable. In those with recurrent severe ascites, and if faster diuresis is needed (for example, if the patient is hospitalized), combination therapy with spironolactone (starting dose 100 mg, increased to 400 mg) and furosemide (starting dose 40 mg, increased to 160 mg) is recommended. (*Quality of evidence: moderate; Recommendation: strong*)
- 4.2. All patients initiating diuretics should be monitored for adverse events. Almost half of those with adverse events require diuretic discontinuation or dose reduction. (*Quality of evidence: low; Recommendation: weak*)
- 4.3. Hypovolaemic hyponatremia during diuretic therapy should be managed by discontinuation of diuretics and expansion of plasma volume with normal saline. (*Quality of evidence: low; Recommendation: weak*)
- 4.4. Fluid restriction to 1–1.5 L/day should be reserved for those who are clinically hypervolaemic with severe hyponatremia (serum sodium <125 mmol/L). (*Quality of evidence: low; Recommendation: weak*)
- 4.5. Hypertonic sodium chloride (3%) administration should be reserved for those who are severely symptomatic with acute hyponatremia. Serum sodium should be slowly corrected. (*Quality of evidence: low; Recommendation: weak*)
- 4.6. It may be appropriate to consider the use of midodrine in refractory ascites on a case-by-case basis. (*Quality of evidence: low; Recommendation: weak*)

## 5. Large volume paracentesis (LVP)

- 5.1. Patients should give informed consent for a therapeutic or diagnostic paracentesis. (*Quality of evidence: low; Recommendation: strong*)
- 5.2. Ultrasound guidance should be considered when available during LVP to reduce the risk of adverse events (*Quality of evidence: low; Recommendation: weak*)
- 5.3. Routine measurement of the prothrombin time and platelet count before therapeutic or diagnostic paracentesis and infusion of blood products are not recommended. (*Quality of evidence: moderate; Recommendation: strong*)

## 6. Use of human albumin solution (HAS)

- 6.1. Albumin (as 20% or 25% solution) should be infused after paracentesis of >5 L is completed at a dose of 8 g albumin/L of ascites removed. (*Quality of evidence: high; Recommendation: strong*)
- 6.2. Albumin (as 20% or 25% solution) can be considered after paracentesis of <5 L at a dose of 8 g albumin/L of ascites removed in patients with ACLF or high risk of post-paracentesis acute kidney injury. (*Quality of evidence: low; Recommendation: weak*)
- 6.3. In patients with SBP and increased serum creatinine or rising serum creatinine, infusion of 1.5 g albumin/kg within 6 hours of diagnosis, followed by 1 g/kg on day 3, is recommended. (*Quality of evidence: low; Recommendation: weak*)

## 7. Transjugular intrahepatic portosystemic shunt (TIPSS)

- 7.1. TIPSS should be considered in patients with refractory ascites. (*Quality of evidence: high; Recommendation: strong*)
- 7.2. Caution is required if considering TIPSS in patients with age >70 years, serum bilirubin >50 µmol/L, platelet count <75×10<sup>9</sup>/L, a model for end-stage liver disease (MELD) score ≥18, current hepatic encephalopathy, active infection or hepatorenal syndrome. (*Quality of evidence: moderate; Recommendation: strong*)

## 8. Umbilical hernia

- 8.1. Suitability and timing of surgical repair of umbilical hernia should be considered in discussion with the patient and multidisciplinary team involving physicians, surgeons, and anesthetists. (*Quality of evidence: low; Recommendation: strong*)

## 9. Hepatic hydrothorax (HH)

- 9.1. TIPSS should be considered in patients with HH after discussion with the multidisciplinary team. (*Quality of evidence: low; Recommendation: strong*)
- 9.2. In patients with HH who are not undergoing a TIPSS and/or a liver transplant evaluation, alternative palliative interventions should be considered. (*Quality of evidence: low; Recommendation: strong*)

## 10. Non-selective beta-blockers (NSBB) and ascites

- 10.1. Refractory ascites should not be viewed as a contraindication to NSBB. (*Quality of evidence: moderate; Recommendation: strong*)
- 10.2. Patients with refractory ascites who are taking NSBB should be monitored closely, and dose reduction or discontinuation may be appropriate in those who develop hypotension or acute/progressive renal dysfunction. (*Quality of evidence: moderate; Recommendation: strong*)

# Reference

1. Pedersen JS, Bendtsen F, Møller S. Management of cirrhotic ascites. *Ther Adv Chronic Dis*. 2015;6(3):124-137. doi:10.1177/2040622315580069
2. Aithal GP, Palaniyappan N, China L, et al Guidelines on the management of ascites in cirrhosis *Gut* 2021;70:9-29.

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