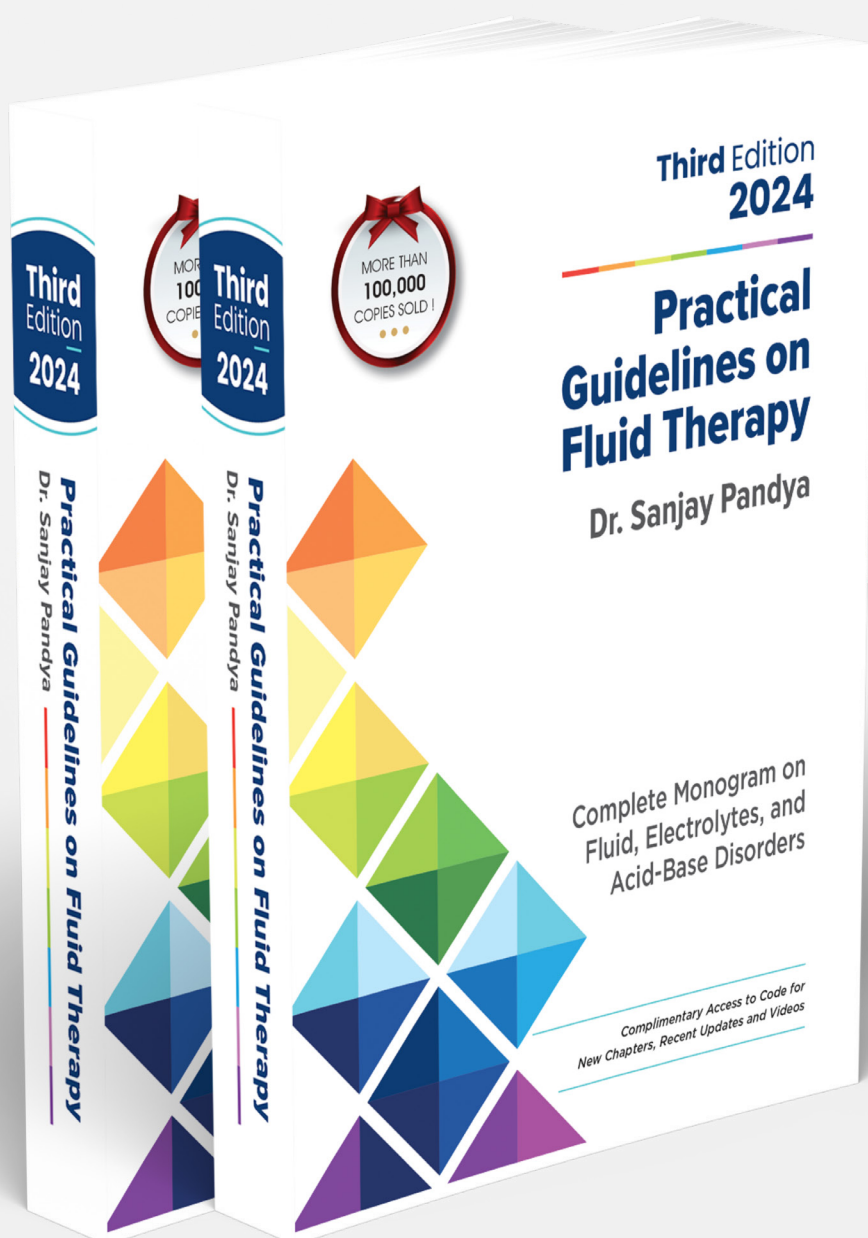


Chapter 35:

Ascites in Cirrhosis



To get a copy of the book, visit: www.fluidtherapy.org

Table of Contents

Part 1 Physiology

Overview of total body fluid distribution, water balance, and electrolyte compartments.

Chapter 1

Part 2 Basics of Intravenous Fluids and Solutions

Introduction to crystalloids and colloids, their composition, clinical use, precautions, and contraindications.

Chapter 2-5

Part 3 Fluid Replacement Strategies

Principles of fluid therapy, including maintenance, resuscitation, and special considerations for the elderly.

Chapter 6-9

Part 4 Parenteral Additives

Composition, clinical applications, and precautions for various parenteral additives.

Chapter 10-14

Part 5 Hemodynamic Monitoring

Principles and techniques for assessing fluid status and cardiac output, using basic and advanced methods.

Chapter 15-19

Part 6 Electrolyte Disorders

Causes, presentation, diagnosis, and management of various electrolyte imbalances.

Chapter 20-29

Part 7 Acid-Base Disorders

Concepts, interpretation, and management of metabolic and respiratory acid-base disorders.

Chapter 30-33

Part 8 Fluid Therapy in Medical Disorders

Guidelines for fluid management in conditions like GI diseases, liver disorders, respiratory issues, and diabetic emergencies.

Chapter 34-41

Part 9 Fluid Therapy in Surgical Disorders

Fluid management before, during, and after surgery, including TURP syndrome and burns.

Chapter 42-47

Part 10 Fluid Therapy in Pediatrics

Special considerations for fluid management in children and neonates, including resuscitation, maintenance, and oral rehydration.

Chapter 48-50

Part 11 Fluid Therapy in Obstetrics

Fluid management strategies for pregnancy, cesarean delivery, preeclampsia, and labor-related hyponatremia.

Chapter 51-54

Part 12 Parenteral Nutrition

Principles, indications, and administration of parenteral nutrition, with disease-specific guidelines and complication management.

Chapter 55-57

35 | Ascites in Cirrhosis

Pathophysiology.....	423	Diuretics	425
Management.....	424	Large volume paracentesis	425
Goals of therapy	424	Drugs in ascites.....	427
Salt restriction.....	425	Other measures.....	427
Fluid restriction and bed rest	425	Monitoring.....	428

The term ascites is defined as a pathologic fluid accumulation in the peritoneal cavity. The most common cause of ascites is decompensated cirrhosis which accounts for about 80% of the cases.

In patients with cirrhosis, ascites is the most common complication, which suggests the progression of diseases from a compensated to a decompensated stage [1]. About 60% of patients with compensated cirrhosis develop ascites within 10 years of its diagnosis [2]. Development of ascites in cirrhotic patients carries a poor prognosis as the five-year survival rate is significantly low in decompensated cirrhosis with ascites compared with compensated cirrhosis (about 30% vs. 80%) [1, 3].

Refractory ascites (RA) is defined as ascites that cannot be mobilized or recurs after large volume paracentesis (LVP) despite dietary sodium restriction and diuretic therapy. Refractory ascites is one of the most serious signs of the decompensated stage in liver cirrhosis which is associated with poor survival [4].

PATHOPHYSIOLOGY

In cirrhosis of the liver, the development of ascites is determined by four major factors: portal hypertension, splanchnic vasodilatation, renal sodium and water retention, and hypoalbuminemia.

A. Portal hypertension: The development of intrahepatic portal hypertension plays a crucial role in ascites formation. The normal value of portal pressure (pressure gradient between the hepatic and portal vein) is approximately <5 mm Hg. However, a portal pressure of usually >12 mmHg is required for ascites to develop. Without elevated portal pressure, ascites or edema do not occur.

Portal hypertension occurs in liver cirrhosis because of both increased resistance to portal blood flow (increase in intrahepatic resistance due to distortion of the hepatic vascular architecture) and increased portal venous inflow (due to splanchnic vasodilatation). This increased portal hypertension increases hydrostatic

pressure within the hepatic sinusoids, causing excessive fluid transudation

into the peritoneal space, leading to ascites.

Want to read more?

Get Printed Version

Get Kindle Version

REFERENCE

1. D'Amico G, Garcia-Tsao G, Pagliaro L. Natural history and prognostic indicators of survival in cirrhosis. A systematic review of 118 studies. *J Hepatol* 2006;44(1):217–31.
2. Ginès P, Quintero E, Arroyo V, et al. Compensated cirrhosis: natural history and prognostic factors. *Hepatology* 1987;7(1):122–8.
3. European Association for the Study of the Liver. EASL Clinical Practice Guidelines for the management of patients with decompensated cirrhosis. *J Hepatol*. 2018;69(2):406–460.
4. Zhao R, Lu J, Shi Y, et al. Current management of refractory ascites in patients with cirrhosis. *J Int Med Res* 2018;46(3):1138–1145.
5. Yoshiji H, Nagoshi S, Akahane T, et al. Evidence-based clinical practice guidelines for Liver Cirrhosis 2020. *J Gastroenterol*. 2021;56(7):593–619.
6. Aithal GP, Palaniyappan N, China L, et al. Guidelines on the management of ascites in cirrhosis. *Gut*. 2021;70(1):9–29.
7. Baiges A, Hernández-Gea V. Management of Liver Decompensation in Advanced Chronic Liver Disease: Ascites, Hyponatremia, and Gastroesophageal Variceal Bleeding. *Clin Drug Investig*. 2022;42(Suppl 1):25–31.
8. Gauthier A, Levy VG, Quinton A, et al. Salt or no salt in the treatment of cirrhotic ascites: a randomised study. *Gut* 1986;27(6):705–9.
9. Morando F, Rosi S, Gola E, et al. Adherence to a moderate sodium restriction diet in outpatients with cirrhosis and ascites: A real-life cross-sectional study. *Liver Int*. 2015;35(5):1508–1515.
10. Reynolds TB, Lieberman FL, Goodman AR. Advantages of treatment of ascites without sodium restriction and without complete removal of excess fluid. *Gut*. 1978;19(6):549–53.
11. Biggins SW, Angeli P, Garcia-Tsao G, et al. 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;74(2):1014–1048.
12. Pérez-Ayuso RM, Arroyo V, Planas R, et al. Randomized comparative study of efficacy of furosemide versus spironolactone in nonazotemic cirrhosis with ascites. Relationship between the diuretic response and the activity of the renin-aldosterone system. *Gastroenterology*. 1983;84(5 Pt 1):961–8.
13. Slotki IN, Skorecki K. Disorders of Sodium Balance. In: Brenner and Rector's The Kidney, 11th ed, Yu A, Chertow G, Luyckx V, et al (Eds), W.B. Saunders & Company, Philadelphia 2020.p.437.
14. Angeli P, Fasolato S, Mazza E, et al. Combined versus sequential diuretic treatment of ascites in non-azotemic patients with cirrhosis: results of an open randomised clinical trial. *Gut* 2010;59(1):98–104.
15. Ginès P, Arroyo V, Quintero E, et al. Comparison of paracentesis and diuretics in the treatment of cirrhotics with tense ascites. Results of a randomized study. *Gastroenterology* 1987;93(2):234–241.
16. Alsebaey A, Rewisha E, Waked I. Paracentesis-induced circulatory dysfunction: are there albumin alternatives? *Egypt Liver Journal* 2020;10:39.
17. Lin CH, Shih FY, Ma MH, et al. Should bleeding tendency deter abdominal paracentesis? *Dig Liver Dis*. 2005;37(12):946–51.
18. Mercaldi CJ, Lanes SF. Ultrasound guidance decreases complications and improves the cost of care among patients undergoing thoracentesis and paracentesis. *Chest*. 2013;143(2):532–538.
19. Cho J, Jensen TP, Reiersen K, et al. Recommendations on the Use of Ultrasound Guidance for Adult Abdominal Paracentesis: A Position Statement of

-
- the Society of Hospital Medicine. *J Hosp Med.* 2019;14:E7–E15.
20. Runyon BA, AASLD Practice Guidelines Committee. Management of adult patients with ascites due to cirrhosis: an update. *Hepatology* 2009;49(6):2087–2107.
 21. Moreau R, Valla DC, Durand-Zaleski I, et al. Comparison of outcome in patients with cirrhosis and ascites following treatment with albumin or a synthetic colloid: a randomised controlled pilot trial. *Liver Int* 2006;26(1):46–54.
 22. Bernardi M, Caraceni P, Navickis RJ, et al. Albumin infusion in patients under-going large-volume paracentesis: a meta-analysis of randomized trials. *Hepatology* 2012;55(4):1172–1181.
 23. Ginès P, Titó L, Arroyo V, et al. Randomized comparative study of therapeutic paracentesis with and without intravenous albumin in cirrhosis. *Gastroenterology*. 1988;94(6):1493–502.
 24. Bernardi M, Angeli P, Claria J, et al. Albumin in decompensated cirrhosis: new concepts and perspectives. *Gut* 2020;69(6):1127–38.
 25. Tan HK, James PD, Wong F. Albumin may prevent the morbidity of paracentesis-induced circulatory dysfunction in cirrhosis and refractory ascites: a pilot study. *Dig Dis Sci* 2016;61(10):3084–3092.
 26. Dwyer JP, Jayasekera C, Nicoll A. Analgesia for the cirrhotic patient: a literature review and recommendations. *J Gastroenterol Hepatol.* 2014;29(7):1356–60.
 27. Elia C, Graupera I, Barreto R, et al. Severe acute kidney injury associated with non-steroidal anti-inflammatory drugs in cirrhosis: a case-control study. *J Hepatol* 2015;63(3):593–600.
 28. Pariente EA, Bataille C, Bercoff E, et al. Acute effects of captopril on systemic and renal hemodynamics and on renal function in cirrhotic patients with ascites. *Gastroenterology* 1985;88(5 Pt 1):1255–1259.
 29. Albillos A, Lledó JL, Rossi I, et al. Continuous prazosin administration in cirrhotic patients: effects on portal hemodynamics and on liver and renal function. *Gastroenterology* 1995;109(4):1257–1265.
 30. Korean Association for the Study of the Liver (KASL). KASL clinical practice guidelines for liver cirrhosis: Ascites and related complications. *Clin Mol Hepatol.* 2018;24(3):230–277.
 31. Llach J, Ginès P, Arroyo V, et al. Prognostic value of arterial pressure, endogenous vasoactive systems, and renal function in cirrhotic patients admitted to the hospital for the treatment of ascites. *Gastroenterology* 1988;94(2):482–7.
 32. Sersté T, Melot C, Francoz C, et al. Deleterious effects of beta-blockers on survival in patients with cirrhosis and refractory ascites. *Hepatology.* 2010;52(3):1017–22.
 33. Moore KP, Aithal GP. Guidelines on the management of ascites in cirrhosis. *Gut.* 2006;55 Suppl 6(Suppl 6):vi1–vi12.
 34. Runyon BA; AASLD Practice Guidelines Committee. Management of adult patients with ascites due to cirrhosis: Update 2012. *Hepatology.* Visit: https://www.aasld.org/sites/default/files/2019-06/141020_Guideline_Ascites_4UfB_2015.pdf.
 35. García-Pagán JC, Saffo S, Mandorfer M, et al. Where does TIPS fit in the management of patients with cirrhosis? *JHEP Rep.* 2020;2(4):100122.
 36. Boike JR, Thornburg BG, Asrani SK, et al. North American Practice-Based Recommendations for Transjugular Intrahepatic Portosystemic Shunts in Portal Hypertension. *Clin Gastroenterol Hepatol.* 2021:S1542–3565(21)00749–7.
 37. Copelan A, Kapoor B, Sands M. Transjugular intrahepatic portosystemic shunt: indications, contraindications, and patient work-up. *Semin Intervent Radiol.* 2014;31(3):235–242.
 38. Bureau C, Thabut D, Oberti F, et al. Transjugular intrahepatic portosystemic shunts with covered stents increase transplant-free survival of patients with cirrhosis and recurrent ascites. *Gastroenterology.* 2017;152(1):157–163.
 39. Will V, Rodrigues SG, Berzigotti A. Current treatment options of refractory ascites in liver cirrhosis - A systematic review and meta-analysis. *Dig Liver Dis.* 2022 8:S1590–8658(21)00894-X.
 40. Aagaard NK, Malago M, De Gottardi A, et al. Consensus care recommendations for alfapump® in cirrhotic patients with refractory or recurrent ascites. *BMC Gastroenterol.* 2022;22(1):111.
 41. Bureau C, Adebayo D, Chalret de Rieu M, et al. Alfapump® system vs. large volume paracentesis for refractory ascites: A multicenter randomized controlled study. *J Hepatol* 2017;67(5):940–949.
 42. Stepanova M, Nader F, Bureau C, et al. Patients with refractory ascites treated with alfapump® system have better health-related quality of life as compared to those treated with large volume paracentesis: the results of a multicenter randomized controlled study. *Qual Life Res* 2018;27(6):1513–1520.
 43. Lepida A, Marot A, Trépo E, et al. Systematic review with meta-analysis: automated low-flow ascites pump therapy for refractory ascites. *Aliment Pharmacol Ther.* 2019;50(9):978–987.
 44. Wong F, Bendel E, Sniderman K, et al. Improvement in quality of life and decrease in large volume paracentesis requirements with the automated low flow ascites pump. *Liver Transpl.* 2020;26(5):651–61.
-



Join the Mission to Fight Kidney Diseases

Explore the world's largest multilingual website created by a global team of over 100 nephrologists.

www.KidneyEducation.com

- » Read online or download the 200-page book "Save Your Kidneys" in 40 languages—completely free.
- » This comprehensive resource offers valuable information on preventing and managing common kidney problems, tailored for kidney patients and their families.
- » It's an authentic guide, prepared by nephrologists and free from any external funding.