

Suspected Hepatic Encephalopathy

Chronic liver disease and/or portosystemic shunting + altered mental status

Initial assessment:

History
Physical exam

West Haven Criteria for Hepatic Encephalopathy Grading

- Grade 0:** Abnormal psychometric or neuropsychiatric tests (not an ED dx)
- Grade 1:** Lack of awareness, euphoria, anxiety, short attention span, impairment of addition or subtraction, altered sleep rhythm
- Grade 2:** Asterixis, disorientation for time, obvious personality change, inappropriate behavior, dyspraxia
- Grade 3:** Somnolence, confusion, disorientation for both space and time, bizarre behavior
- Grade 4:** Coma – not responding to painful stimuli

HE Precipitants

- GI Bleed
- Infection
- Constipation
- Dehydration
- Electrolyte derangement
- Medication non-adherence
- Change in gut microbiome
- Change in dietary protein\
- New portosystemic shunt
- Recent TIPS procedure
- Large volume paracentesis

Consider [precipitant](#) or [alternative diagnosis](#)

Determine testing, as indicated:

CBC/diff	UDS
BMP	VBG + lactate
LFTs	CXR
UA	PT/INR
EtOH.	± ammonia
CT head	Paracentesis
DRE	

Alternative diagnoses:

- ICH/Stroke
- EtOH ingestion/withdrawal
- Hypo/Hyperglycemia
- Meningitis
- Wernicke's encephalopathy
- Drug toxicity

West Haven Criteria

WHC Grade 0/1

Mild Hepatic Encephalopathy

No dangerous precipitant identified

Indication for admission?

No Yes

1. Contact hepatology fellow to discuss initiation of lactulose therapy
2. Ensure patient has close hepatology follow-up

Admit to GI service

WHC Grade 2/3/4

Moderate or severe Hepatic Encephalopathy

Precipitating cause identified?

Yes

No

Treat precipitant

Start oral or rectal lactulose:
25 mL q1-2h with goal of 2-3 BM per day

Admit to MICU or GI service

Hepatic Encephalopathy [References](#) (see next page)

OI/KT Hepatic Encephalopathy References

Atluri DK, Prakash R, Mullen KD. Pathogenesis, diagnosis, and treatment of hepatic encephalopathy. *Journal of clinical and experimental hepatology*. 2011 Sep 1;1(2):77-86.

Bajaj et al. Important unresolved questions in the management of hepatic encephalopathy: An ISHEN Consensus. *Am J Gastroenterol*. 2020 (00): 1-14.

Bustamante J, Rimola A, Ventura PJ, Navasa M, Cirera I, Reggiardo V, Rodés J. Prognostic significance of hepatic encephalopathy in patients with cirrhosis. *Journal of hepatology*. 1999 May 1;30(5):890-5.

Coronel-Castillo CE, Contreras-Carmona J, Frati-Munari AC, Uribe M, Mendez-Sanchez N. Efficacy of rifaximin in the different clinical scenarios of hepatic encephalopathy. *Revista de Gastroenterologia de Mexico*. 2020; 85 (1): 56-68.

Dellatore P, Cheung M, Mahpour NY, Tawadros A, Rustgi VK. Clinical Manifestations of Hepatic Encephalopathy. *Clinics in Liver Disease*. 2020 May 1;24(2):189-96.

Dhiman RK, Thumburu KK, Verma N, et al. Comparative efficacy of treatment options for minimal hepatic encephalopathy: A systematic review and network meta-analysis. *Clinical Gastroenterology and Hepatology*. 2020; 18(4): 800-812.

Glud, LL, Vilstrup H, Morgan MY. Nonabsorbable Disaccharides for Hepatic Encephalopathy: A systematic Review and Meta-analysis. *Hepatology*. 64;3 (2016); 908-922.

Gundling F, Zelihic E, Seidl H, et al. How to diagnose hepatic encephalopathy in the emergency department. *Annals of Hepatology*. 2013; 12(1): 108-114.

Haj M, Rockey D. Ammonia levels do not guide clinical management of patients with hepatic encephalopathy caused by cirrhosis. *Am J Gastroenterol*. 2020; 115: 723-728.

Kabir A, Chowdhury J, et al. Detection of precipitating factors of hepatic encephalopathy in chronic liver disease patients in a tertiary hospital. *J Medicine*. 2018 (19): 10-14.

Kimer N., Krag A., Møller S., et al: Systematic review with meta-analysis: the effects of rifaximin in hepatic encephalopathy. *Aliment Pharmacol Ther* 2014; 40: pp. 123-132

Morando F, Maresio G, et al. How to improve care in outpatients with cirrhosis and ascites: a new model of care coordination by consultant hepatologists. *Journal of Hepatology*. 2013 (59): 257-264

Nardelli S, Riggio O, Gioia S, Puzzono M, Pelle G, Ridola L. Spontaneous porto-systemic shunts in liver cirrhosis: Clinical and therapeutic aspects. *World Journal of Gastroenterology*. 2020; 25(15): 1726-1732.

Ong JP, Aggarwal A, Krieger D, Easley KA, Karafa M, Van Lente F, Arroliga AJ, Mullen KD. Correlation between ammonia levels and the severity of hepatic encephalopathy. *American Journal of Medicine* 2003;114(3):188–93.

Pantham G, Post A, Venkat D, Einstadter D, Mullen K. A new look at precipitants of overt hepatic encephalopathy in cirrhosis. Online. 2017.

Ropper AH, Samuels MA, Klein JP, Prasad S. eds. *Adams and Victor's Principles of Neurology, 11e* New York, NY: McGraw-Hill.

Sakamoto M, Perry W, Hilsabeck RC, Barakat F, Hassanein T. Assessment and usefulness of clinical scales for semiquantification of overt hepatic encephalopathy. *Clinics in liver disease*. 2012 Feb 1;16(1):27-42.

Salehi S, Tranah TH, Lim S, et al. Rifaximin reduces the incidence of spontaneous bacterial peritonitis, variceal bleeding, and all cause admissions in patients on the liver transplant waiting list. *APT Alimentary Pharm and Therapeutics*. 2019;50:435-441.

Scaglione S, Kliethermes S, Cao G, Shoham D, Durazo R, Luke A, Volk ML. The epidemiology of cirrhosis in the United States. *Journal of clinical gastroenterology*. 2015 Sep 1;49(8):690-6.

Schulz C, Schutte K, Vargas R, Vasapolli R, Malfertheiner P. Long-term effect of rifaximin with and without lactulose on the active bacterial assemblages in the proximal small bowel and faeces in patients with minimal hepatic encephalopathy. *Dig Dis*. 2019; 37(2):161-169.

Sharma B.C., et al: A randomized, double-blind, controlled trial comparing rifaximin plus lactulose with lactulose alone in treatment of overt hepatic encephalopathy. *Am J Gastroenterol* 2013; 108: pp. 1458-1463.

Stepanova M, Mishra A, Venkatesan C, Younossi ZM. In-hospital mortality and economic burden associated with hepatic encephalopathy in the United States from 2005 to 2009. *Clinical gastroenterology and hepatology*. 2012 Sep 1;10(9):1034-41.

Stewart CA, Malinchoc M, Kim WR, Kamath PS. Hepatic encephalopathy as a predictor of survival in patients with end-stage liver disease. *Liver transplantation*. 2007 Oct;13(10):1366-71.

Tapper EB, Aberasturi D, Zhao Z, Hsu CY, Parikh ND. Outcomes after hepatic encephalopathy in population based cohorts of patients with cirrhosis. *Aliment Pharmacol Ther*. 2020 (00) 1-9.

Tsai CF, et al. Proton pump inhibitors increase risk for hepatic encephalopathy in patients with cirrhosis in a population study. *Clinical Liver*. 2017 (152);134-141.

Vilstrup H, Amodio P, Bajaj J, et al. Hepatic encephalopathy in chronic liver disease: 2014 Practice Guideline by the American Association for the Study of Liver Diseases and the European Association for the Study of the Liver. *Hepatology*. 2014; 60:715-35.

Wang QM, Ji Q, Duan Z, Zhang M, Chang Q. A study on the position and etiology of infection in cirrhotic patients; A potential precipitating factor contributing to hepatic encephalopathy. *Experimental and therapeutic medicine*. 2013 (6): 584-590.

Wang Z, Chu P, Wang W. Combination of rifaximin and lactulose improves clinical efficacy and mortality in patients with Hepatic Encephalopathy. *Drug Des Devel Ther*. 2019;13:1-11.

Wijdicks EF. Hepatic encephalopathy. *New England Journal of Medicine*. 2016 Oct 27;375(17):1660-70.