

AMSER Case of the Month

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69 y/o F presenting with unresponsiveness

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Patient Presentation

- **HPI:** 69 y/o F presenting with unresponsiveness (LKW 1 d). Per family, alert and ambulatory at baseline. Admitted to MICU from OSH ED.
- **PMH and PSH:** Biopsy-proven MASH cirrhosis complicated by portal HTN, esophageal varices s/p EVL, recurrent hepatic hydrothorax, refractory ascites s/p TIPS (03/27/2026), HFpEF (EF 60), T2DM, COPD, OSA, deafness (ASL)
- **Vitals:** T 97.7 °F | BP 186/99 | HR 99 | RR 23 | SpO2 98%
- **Exam:** lethargic with intermittent vocal noises, fixed downward gaze with bilaterally dilated pupils, eyes do not spontaneously open or to noxious stimuli, withdraws all limbs to noxious stimuli → GCS 6

Pertinent ED Labs

- WBC 6.94 (normal)
- CT brain w/o contrast negative for intracranial bleed
- CTA brain negative for large vessel occlusion
- pH 7.45, no metabolic acidosis
- AST 71 (normal 10 – 35), ALT 37 (normal 10 – 35)
- ALP 252 (normal 34 – 123)
- Ammonia 105 (normal 11-51)

Key Clinical Question

- Patient transferred to MICU for higher level of care
- Initial MICU workup included evaluation of TIPS patency

What Imaging Should We Order?

Applicable ACR Appropriateness Criteria

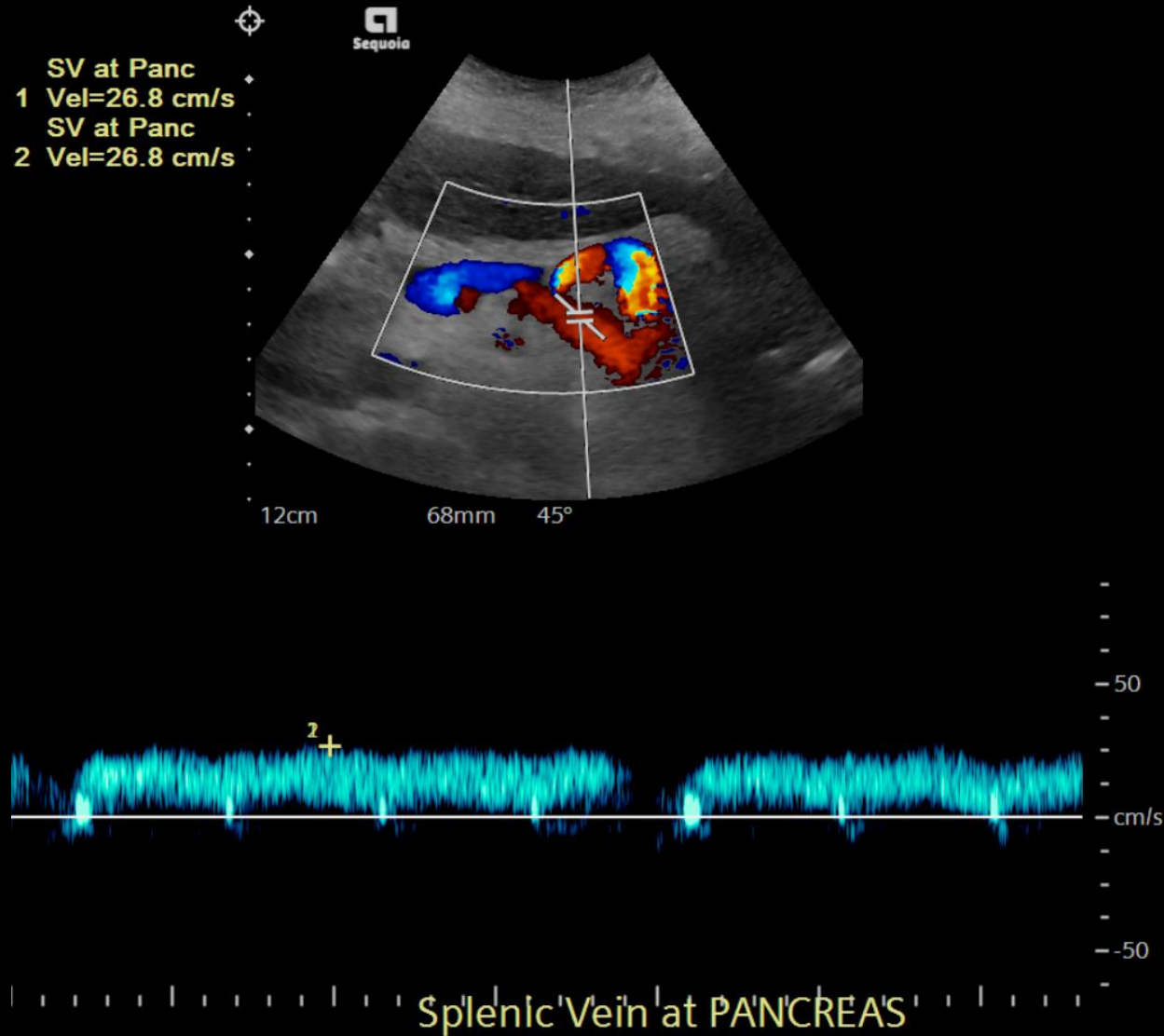
Variant: 3 Abnormal liver function tests. Cholestatic predominance. Elevated alkaline phosphatase with or without elevated gamma-glutamyl transpeptidase. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
US abdomen	Usually Appropriate	○
MRI abdomen without and with IV contrast with MRCP	Usually Appropriate	○
CT abdomen and pelvis with IV contrast	Usually Appropriate	⊕⊕⊕
US duplex Doppler abdomen	May Be Appropriate	○
MRI abdomen without IV contrast with MRCP	May Be Appropriate	○
CT abdomen and pelvis without IV contrast	May Be Appropriate	⊕⊕⊕
US abdomen with IV contrast	Usually Not Appropriate	○
US shear wave elastography abdomen	Usually Not Appropriate	○
MR elastography abdomen	Usually Not Appropriate	○
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	⊕⊕⊕⊕

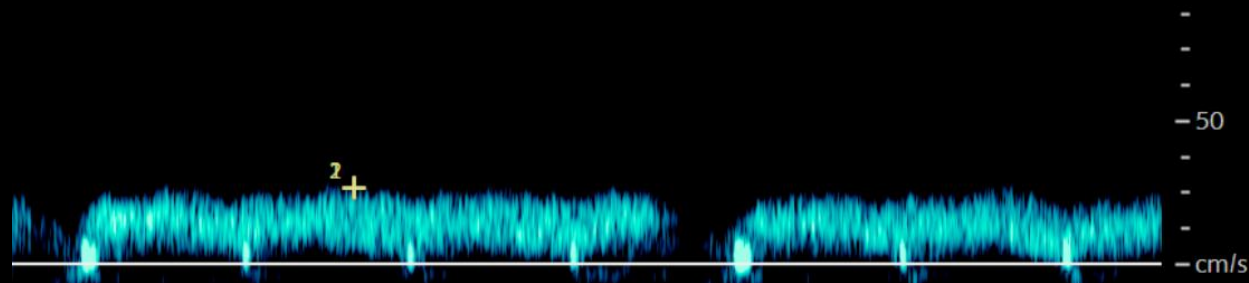
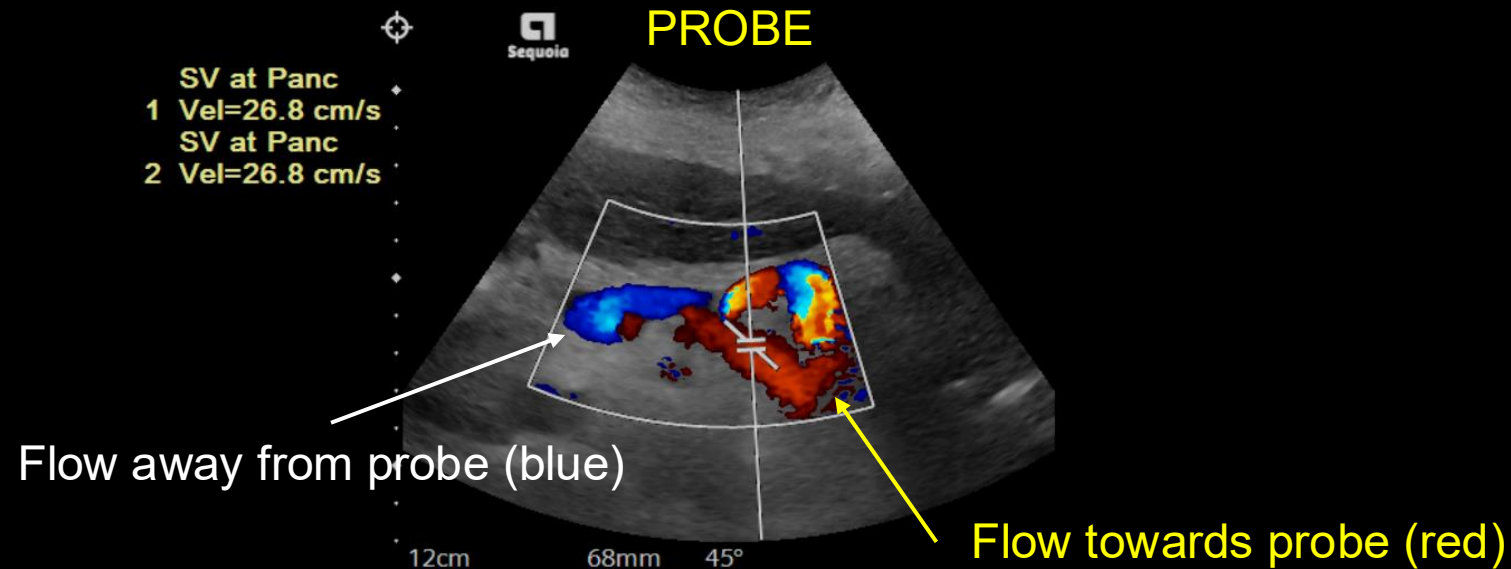
This imaging modality was ordered by the MICU team

- In context of TIPS patency evaluation, this imaging test is appropriate

Findings (Unlabeled)



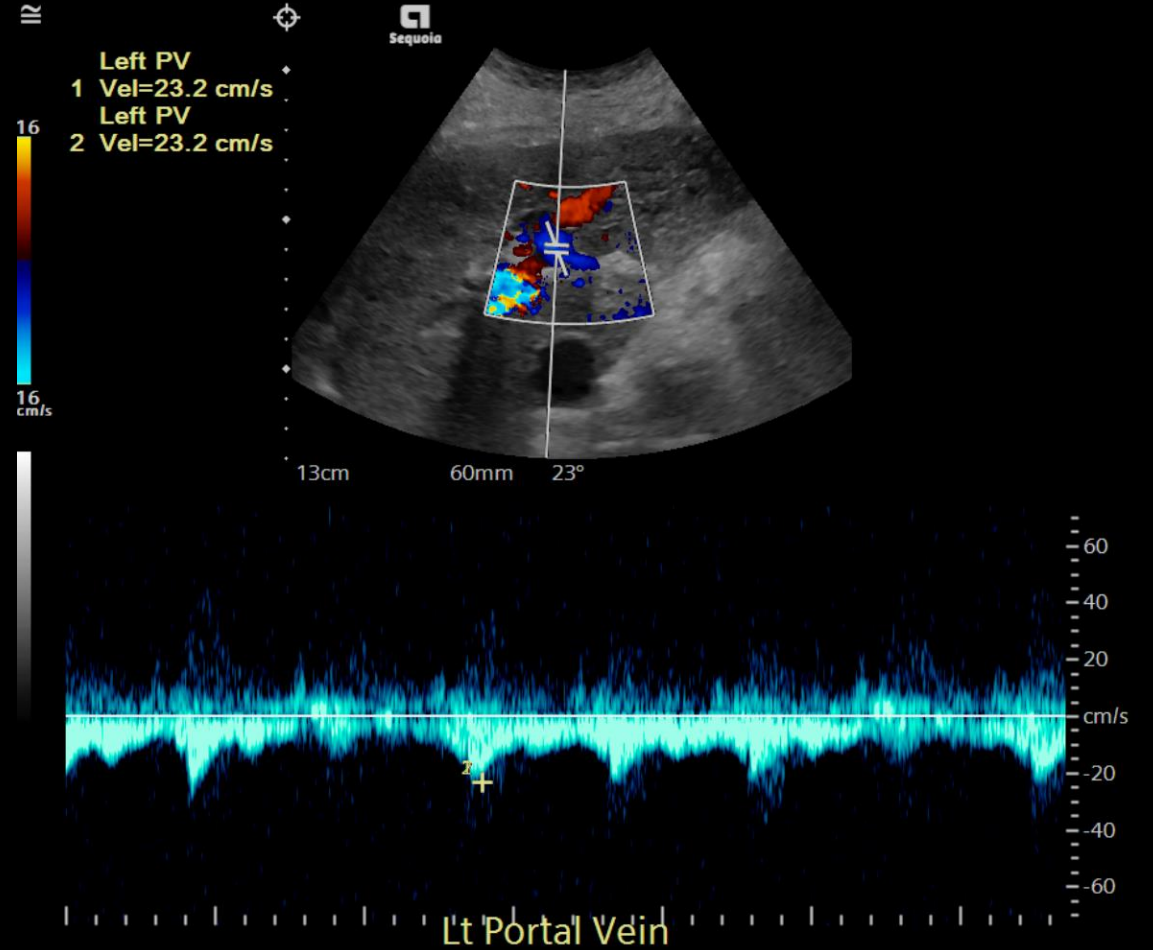
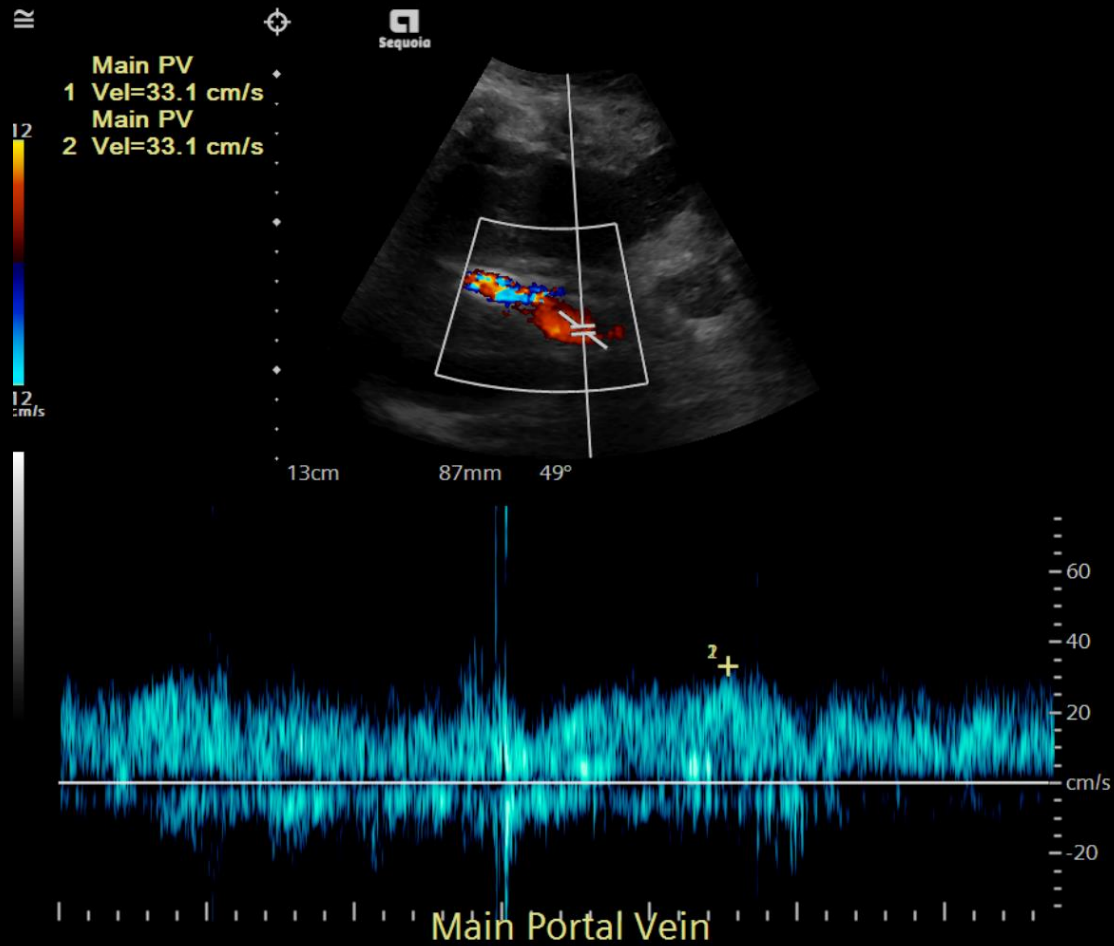
Findings (Labeled)



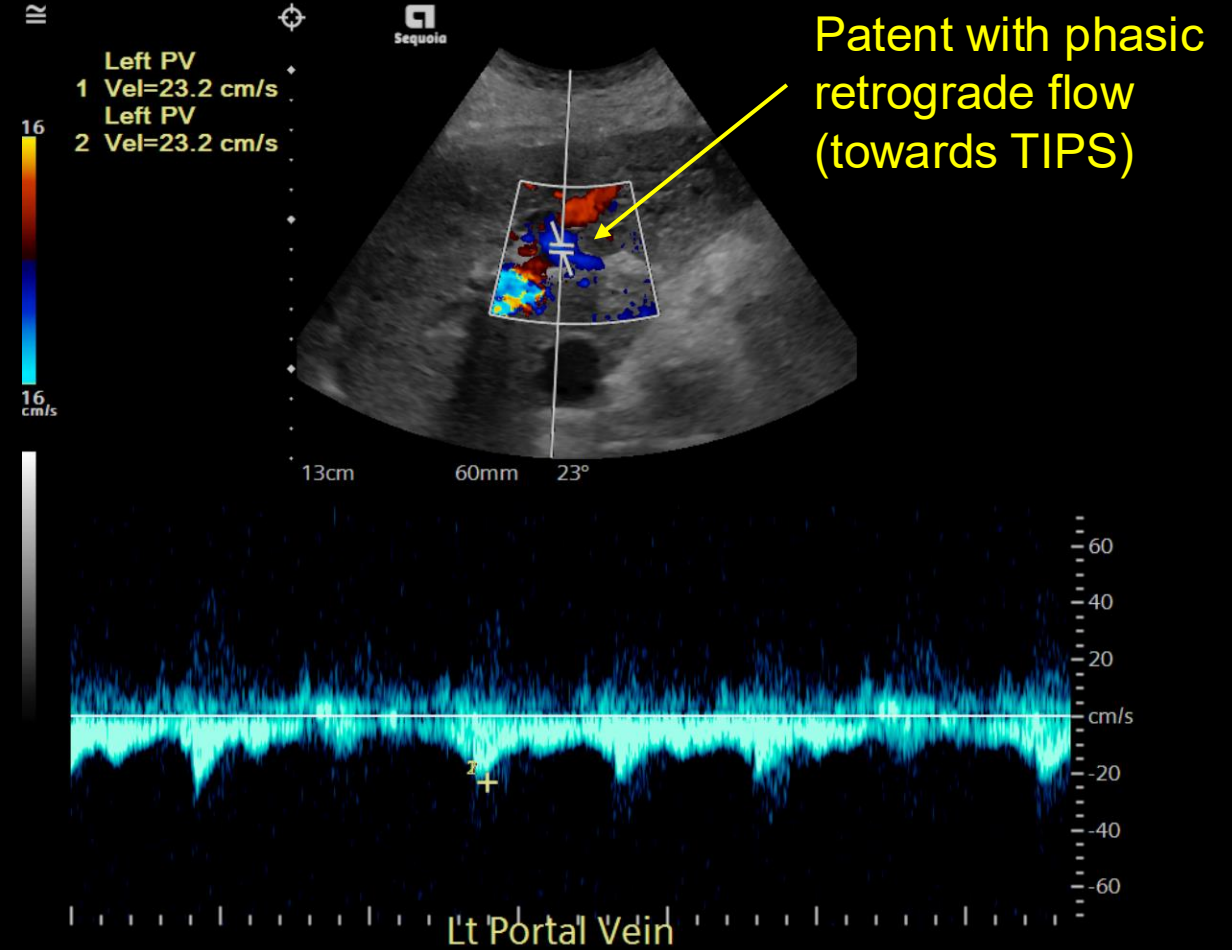
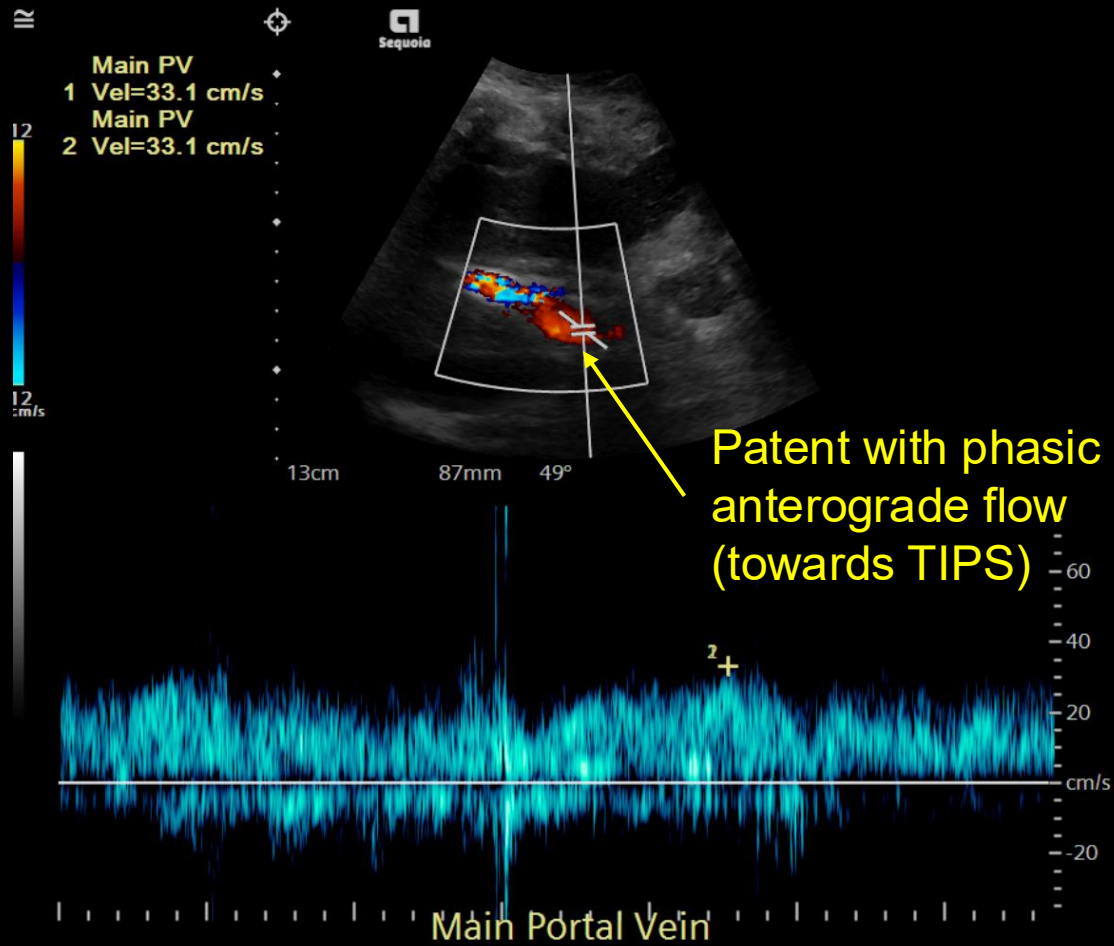
Splenic vein shows antegrade flow towards the liver

Splenic Vein at PANCREAS

Findings (Unlabeled)



Findings (Labeled)



Portal vein with flow towards TIPS
(and subsequently hepatic vein → IVC)

Hospital Course

- US confirms TIPS is patent
- Patient started on PEG laxative and lactulose, titrated to 3-4 BMs daily
- Following mentation improvement, transferred from MICU to Hepatology service and started on rifaximin
- With continued improvement, patient was stably discharged home 4 days later with prescriptions for PEG and lactulose

Final Dx:

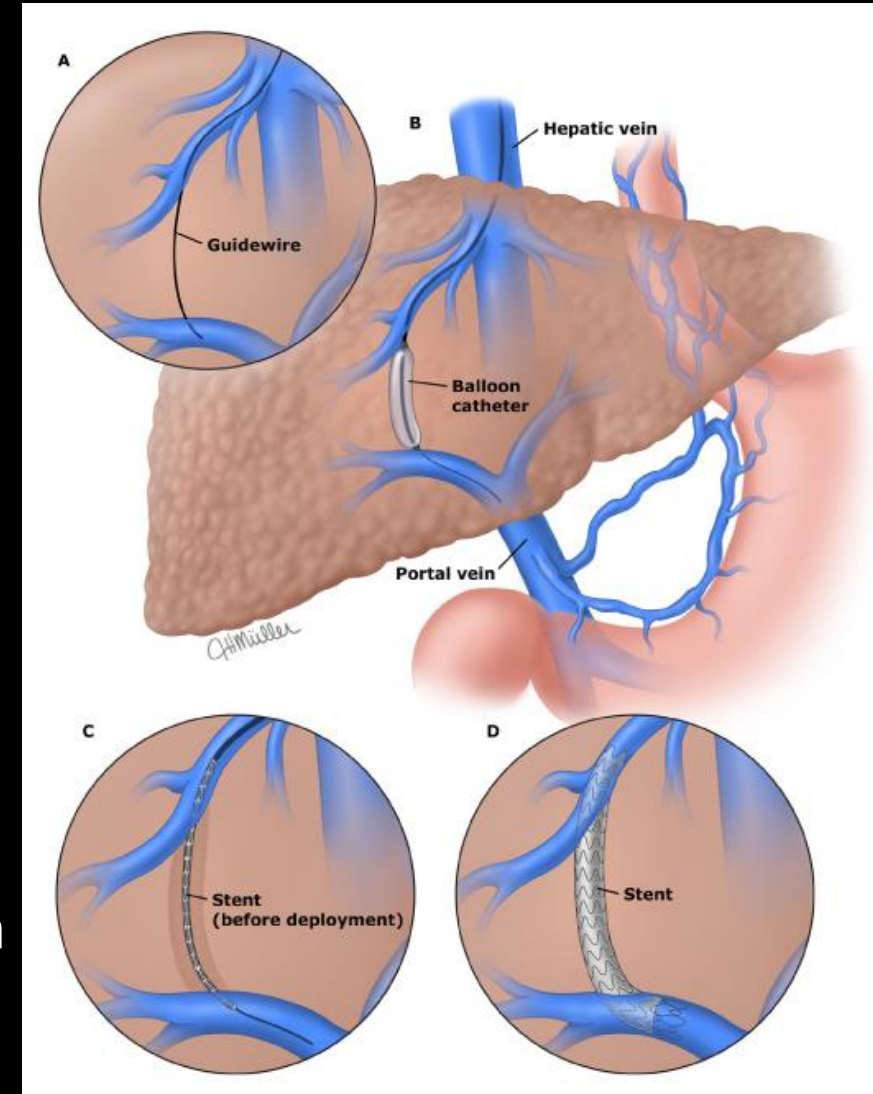
Hepatic Encephalopathy (with patent TIPS)

Hepatic Encephalopathy (HE)

- A spectrum of neurological disturbances caused by advanced liver disease (e.g., cirrhosis, portal HTN, etc.)¹
- Elevated ammonia levels are commonly implicated, which is a GI waste product normally metabolized by healthy liver (to urea)²
- HE can present as mild mental status changes to LOC or coma
- Overt HE is present in 10% of patients at time of cirrhosis diagnosis
- Risk factors include EtOH or MASH cirrhosis, diabetes, renal impairment, and sarcopenia

Post-TIPS HE

- HE is a known TIPS complication, usually presenting within 2-3 weeks^{2,3}
- Caused by TIPS shunting ammonia directly to systemic circulation via the hepatic vein into the IVC, bypassing first pass metabolism
- HE usually responds to medical therapy⁴
 - Lactulose reduces colonic pH to convert ammonia to ammonium
 - Rifaximin reduces ammonia-producing gut bacteria
 - Laxatives like PEG can also flush ammonia via stool
- For medically refractory HE, consider TIPS reduction or occlusion to reduce flowthrough³



References

1. European Association for the Study of the Liver. EASL Clinical Practice Guidelines on the management of hepatic encephalopathy. *J Hepatol*. 2022;77(3):807-824. doi:10.1016/j.jhep.2022.06.001
2. Overview of transjugular intrahepatic portosystemic shunts (TIPS), Bajaj JS, Sanyal AJ, Collares FB. UpToDate, Post TW (Ed), UpToDate, Waltham, MA.
3. Expert Panels on Interventional Radiology and Vascular Imaging, Pinchot JW, Kalva SP, et al. ACR Appropriateness Criteria® Radiologic Management of Portal Hypertension. *J Am Coll Radiol*. 2021;18(5S):S153-S173. doi:10.1016/j.jacr.2021.02.013
4. Madoff DC, Wallace MJ, Ahrar K, Saxon RR. TIPS-related hepatic encephalopathy: management options with novel endovascular techniques. *Radiographics*. 2004;24(1):21-37. doi:10.1148/rg.241035028