Transjugular Intrahepatic Portosystemic Shunt (TIPS)

J. Michael Daw 8/15/23



### Focused patient history and workup

- 29-year-old male with cirrhosis (dx 2022) due to EtOH and untreated HCV, ascites, HE, G2EV and G1GV, polysubstance use
- Presented to UNC ED with diffuse abdominal pain and swelling with diuretic refractory ascites requiring frequent scheduled paracenteses
- S/p LVP 1 week prior
- Vitals: T 98.5 F | BP 128/96 | HR 100 | RR 20 | SpO2 100%
- Significantly distended, ascitic fluid wave, bilateral LEE, scrotal swelling
- Unable to uptitrate diuretics given electrolyte abnormalities



⊠ ⊗	
	5.6
	3.28 ¥
	10.1 ¥
	29.2 ¥
	89.0
	30.7
	34.5
	17.7 🔺
	6.9
	238

PROTIME W/ INR	⊠ ⊗	
PT		18.7 🔺
INR		1.62

**MELD = 12** 

CHEM	∞ ≈	
Sodium		127 👻
Potassium		4.4
Chloride		97 ¥
C02		24.0
Bun		14
Creatinine		0.86
BUN/Creatinine Ratio		16
eGFR CKD-EPI (2021) Male		>90 🗈
Anion Gap		6
Glucose		107
Calcium		8.4 👻
Magnesium		1.7
Albumin		2.9 👻
Total Protein		5.0 ¥
Total Bilirubin		2.2 *
Bilirubin, Direct		1.10 🔺
SGOT (AST)		57 🔺
ALT		39
Alkaline Phosphatase		62



## List of imaging studies

- CT Abdomen Pelvis W/o Contrast
- Chest X-ray



### **Imaging studies from PACS 1**





#### **CT Abdomen/Pelvis Without Contrast**

- Moderate to large volume ascites
- Hepatic heterogeneous attenuation, caudate lobe enlargement and surface nodular contour
- Portosystemic collateral varicosities





### Imaging studies from PACS 2



Portable Chest X-ray

• Elevated right hemidiaphragm



### Patient treatment or outcome: TIPS!



- Placed pigtail catheter for LVP
- Obtain RIJ access
- Advance 10-Fr TIPS sheath and obtain baseline RA pressure
- Select a hepatic vein using 5-Fr diagnostic curved catheter
- Advance TIPS sheath cannula
- Perform wedged CO2 portovenogram



- Access portal vein through liver parenchyma using TIPS needle
- Obtain portal venogram and pre-TIPS direct portal venous pressure







- Balloon dilate intrahepatic tract to 8 mm and measure for graft length
- Deploy covered stent across intrahepatic tract



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- Obtain post-TIPS venogram and portosystemic gradient
- Goal endpoints:
  - Esophageal varices: ≤ 12 mm Hg
  - Refractory ascites: Approximately ≤ 8 mm Hg
- 9L of ascites drained Total Sheath Time = 30 min
  - No immediate or postprocedural complications
  - Discharged next day

# Why Perform a TIPS?

- To relieve portal hypertension and prevent its complications
  - Variceal bleeding, ascites, HRS
- Establish low-resistance portacaval shunt via deployment of an expandable stent
- Minimally invasive procedure, avoid risks associated with major surgery



Figure: Shah ND. A Clinical Guide to Cirrhosis and It's Complications. Lecture. April 6, 2021; Chapel Hill, NC.



- HVPG = HV Pressure Wedged HV Pressure
- Pressure gradient predicts complications and mortality

**Table 38.1** Clinical complications of cirrhosis with associated portosystemic gradient thresholds

Pressure gradient (mmHg)	Clinical implication
0–5	Normal portosystemic gradient
10	Development of gastroesophageal varices
12	Esophageal variceal bleeding
16	Increased mortality/clinical
	decompensation in patients with varices
>20	Increased risk of failed medical therapy in acute variceal bleeds

Keefe et al. IR Playbook. 2018



## Imaging Workup – Portal Hypertension & TIPS Workup

- Portal HTN:
  - Hepatic vein pressure gradient
  - Ultrasound with Doppler
    - Ascites, splenomegaly, nodular liver, mean portal flow <12 cm/s, portal vein diameter >13 mm, portosystemic collaterals, portal thrombosis
    - Specificity >80%, sensitivity 40-70%<sup>11</sup>
    - \$150-300, no radiation
- TIPS Workup:
  - Abdominal CT or MRI w or wo contrast
    - \$1000-5000, 1-10 mSv
  - ACR: CT abdomen and pelvis without IV contrast usually appropriate as initial imaging for adults with acute nonlocalized abdominal pain

Radiology

- CXR
- Consider echo for further cardiac evaluation





Main portal vein diameter: 12 mm Main portal vein velocity: 30 cm/s















### On lateral, RPV is coming towards you

Courtesy of Dr. Commander







Courtesy of Dr. Commander



### **UNC Top Three**

- 1. Portal hypertension can be diagnosed clinically with known risk factor (e.g. cirrhosis), but has radiologic findings
- TIPS relieves portal hypertension and treats its complications (variceal bleeding, ascites, hepatorenal syndrome), but may worsen hepatic encephalopathy or CHF
- 3. MELD Score predicts post-TIPS mortality, avoid TIPS if MELD >18



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