CIRA Case of the Week

Case Courtesy of Drs. Michael D. Rivers-Bowerman, K.T. Tan, Paul D. Greig, and Dheeraj K. Rajan

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UNIVERSITY OF TORONTO

Clinical history

ID: 58 year-old with recurrent ileal parastomal bleeding

PMH:

- History of Crohn disease with remote total proctocolectomy and ileostomy
- Cryptogenic cirrhosis and portal hypertension
    - 4 previous percutaneous glue embolization procedures for ileal parastomal variceal bleeding
- Remote left hepatectomy for cholangiocarcinoma

Meds: No anticoagulants

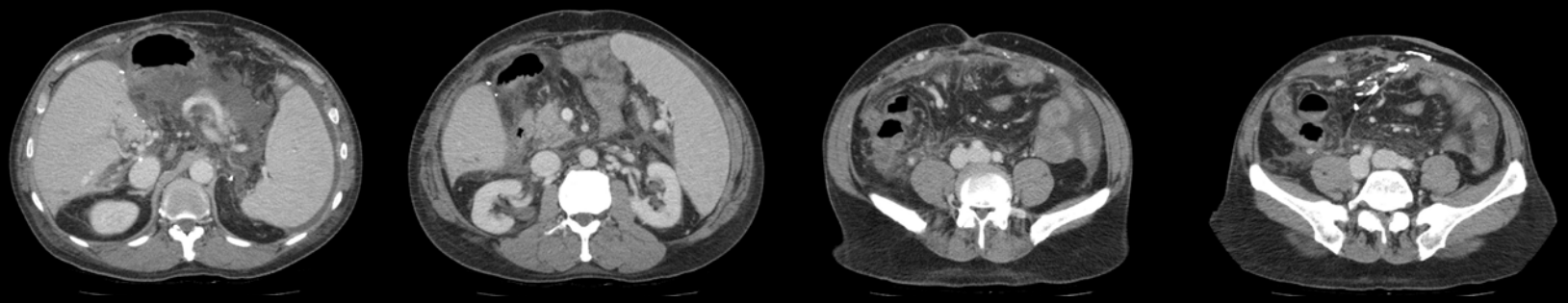
Vitals: BP 110/60, HR 80

Labs: Hgb 73 (low), platelets 57 (low), INR 1.7 (high)

Imaging work-up

CT:

- Thrombosis of the intrahepatic and extrahepatic portal vein with cavernous transformation
- Splenomegaly, ascites
- Status post-glue embolization of ileal parastomal varices
- No active contrast extravasation



Assessment/Plan

- The patient was referred for surgical evaluation due to the recurrence and increasing frequency of the variceal bleeding episodes

Portosystemic vs mesosystemic decompression

Treatment options

-Surgical

- Liver transplantation
- Surgical shunt

-Endovascular/interventional

- TIPS/DIPS
- Splenorenal shunt
- Mesocaval shunt

Treatment options

-Surgical

- Liver transplantation → *history of malignancy*
- Surgical shunt creation → *post-surgical scarring*

-Endovascular/interventional

- TIPS/DIPS → *intra/extrahepatic PV thrombosis*
- Splenorenal shunt creation → *unfavourable anatomy*
- **Mesocaval shunt creation**

Mesocaval shunt creation: technique

- Conscious sedation, antibiotic prophylaxis
- US-guided access to the splenic vein with a 21G needle and placement of a 3F dilator
- US-guided access to the right IJV with a 19G needle and placement of a 10F Rosch-Uchida transjugular liver access set (Cook, Bloomington, Indiana)
- Venography performed to delineate SMV and IVC anatomy

Mesocaval shunt creation: technique

- Puncture the SMV from the suprarenal IVC with a 21G needle

IVC to SMV distance: 1.6 cm

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Mesocaval shunt creation: technique

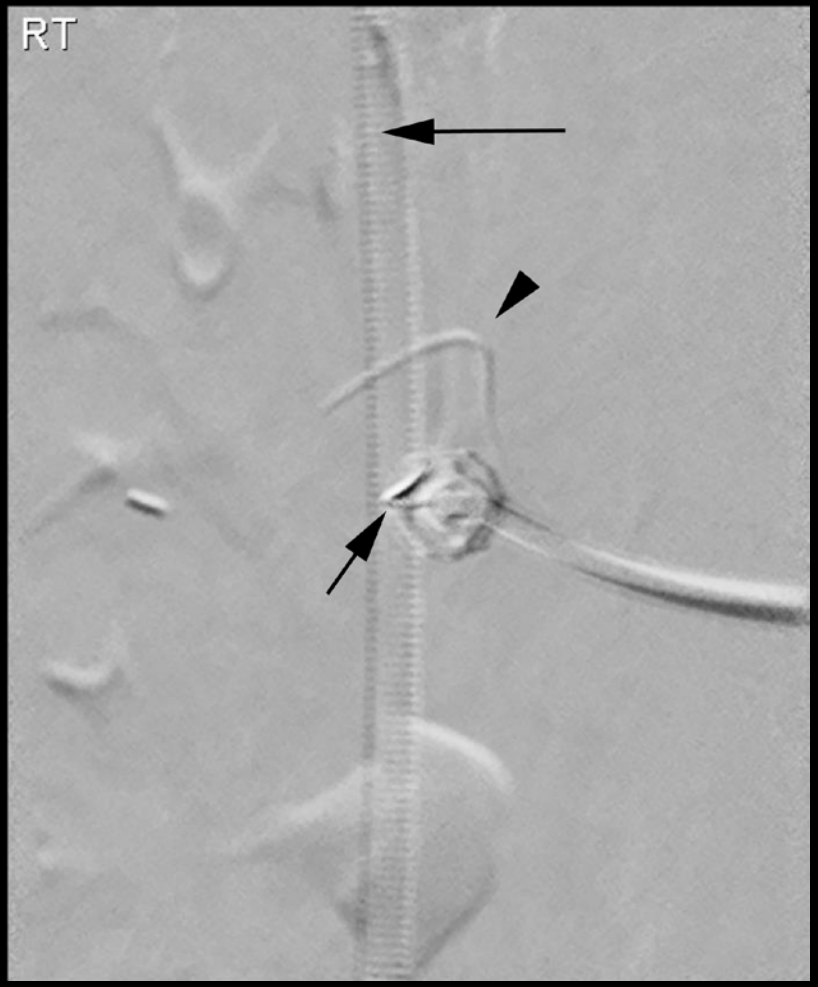
- Puncture the SMV from the suprarenal IVC with a 21G needle
    - Multiple attempts were unsuccessful
        - Intravascular US (IVUS) unavailable in our department at the time of the procedure

Decided to puncture the SMV and IVC percutaneously

Mesocaval shunt creation: technique

- SMV and suprarenal IVC aligned with fluoroscopic guidance
- The abdominal wall was directly punctured with a 21G needle which was successfully passed through the SMV and into the IVC

Fluoroscopic alignment of the SMV/IVC



21G needle (short arrow)

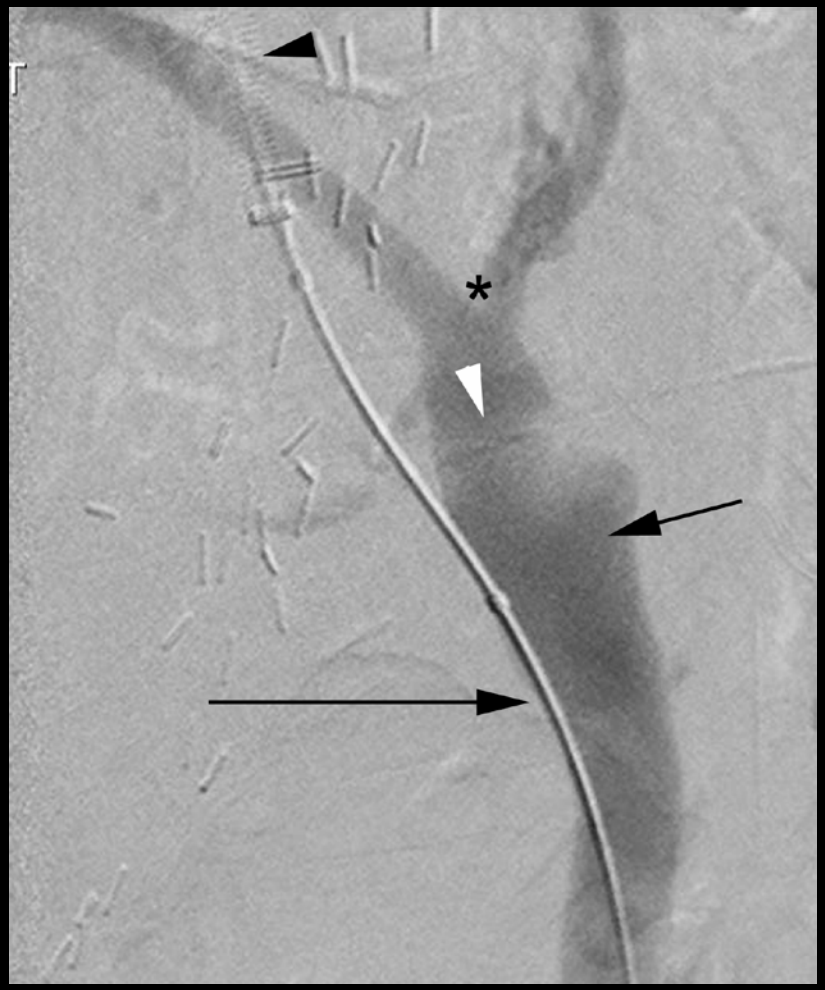
10F IVC sheath (long arrow)

Tip of the 3F dilator in the splenic vein at the portal venous confluence (arrowhead)

Mesocaval shunt creation: technique

- A 0.014” guidewire was advanced through the needle into the IVC and snared from the right IJV for through-and-through access
- A 5F catheter was inserted over the 0.014” guidewire from the right IJV access site
- Contrast injection through a side-arm adapter was performed to confirm catheter positioning within the SMV
- A 0.018” guidewire was passed from the IVC to the SMV via the catheter and exchanged for a 0.035” wire using a 4F Cxi angled tip catheter (Cook)

SMV to IVC access



SMV (short arrow)

0.035” guidewire (long arrow)

Tip of the 3F dilator in the splenic vein at the portal venous confluence (white arrowhead)

10F IVC sheath (black arrowhead)

Portal venous stump with cavernous transformation (*)

Mesocaval shunt creation: technique

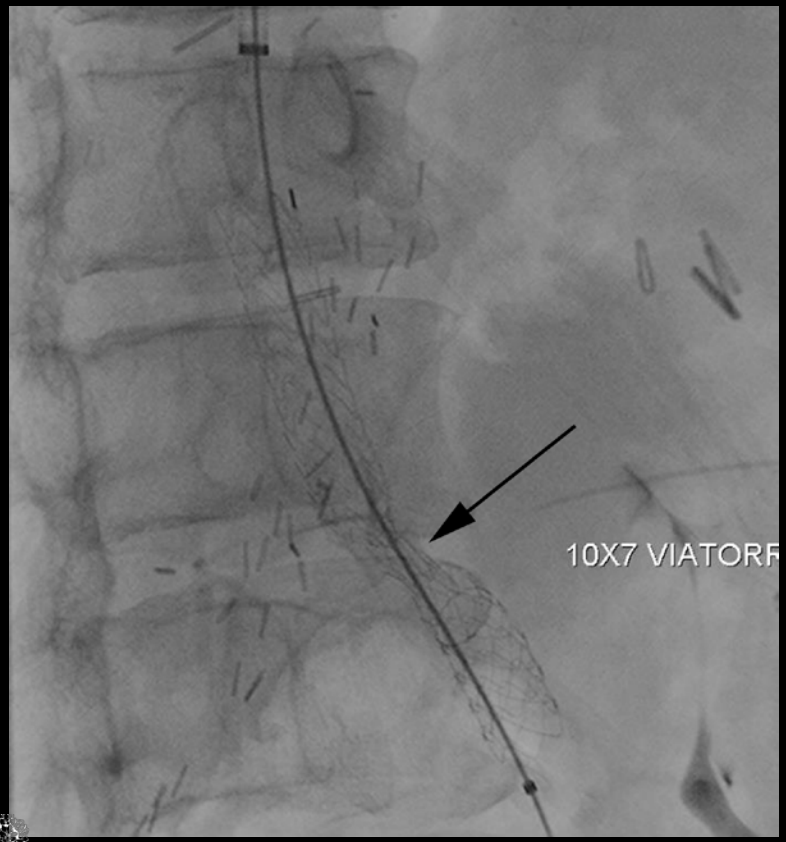
- The shunt tract was dilated with 4 mm x 40 mm and 6 mm x 40 mm balloon dilatation catheters
- The length of the Viatorr TIPS endoprosthesis stent graft (Gore Flagstaff, Arizona) required to cover the shunt tract was determined using the crimped catheter technique
- Shunt tract
  - Oblique course in AP direction from SMV to portal venous confluence, across the retroperitoneal space, and into the IVC

Mesocaval shunt creation: technique

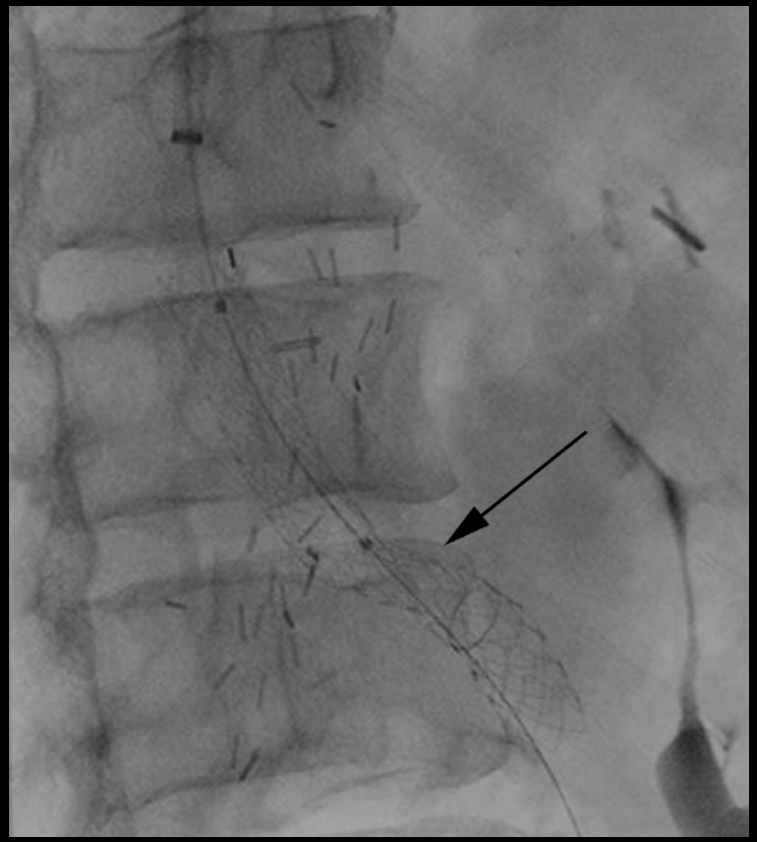
- Viatorr TIPS endoprosthesis stent graft (Gore)
  - 2 cm graft unlined length
    - proximal SMV to portal venous confluence
  - 7 cm graft lined length
    - portal venous confluence to IVC

Mesocaval shunt placement

Pre-angioplasty



Post-angioplasty to 8 mm



Mesocaval shunt creation: technique

- Post-stent pressures were measured
  - *Mesocaval shunt gradient: 9 mmHg*

Mesocaval shunt creation: summary

- Procedural time: 2 hours
- Fluoroscopy time: 33.2 minutes
- Contrast: 150 ml

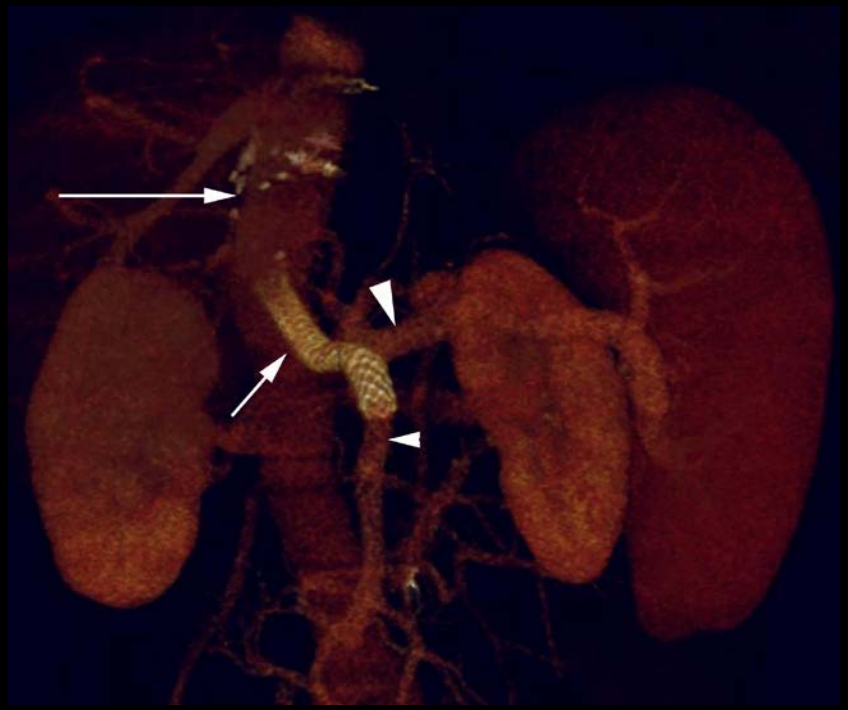
Post-procedural course

- Unremarkable
  - No abdominal pain, variceal bleeding, or encephalopathy

- Baseline CT (post-procedure day #2)
  - Patent mesocaval shunt with no migration
  - No contrast extravasation, no venous thrombosis
  - Improved ascites and small bowel wall edema

- Discharged on post-procedure day #4

CT venography of the mesocaval shunt



IVC (long arrow)
Mesocaval shunt (short arrow)
SMV (small arrowhead)
Splenic vein (large arrowhead)

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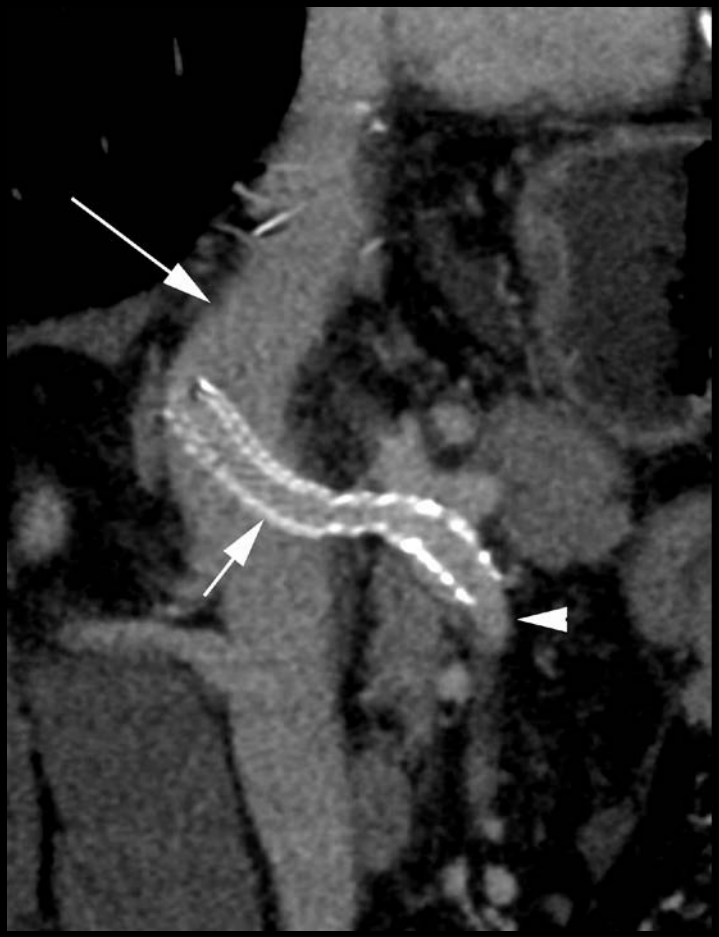
CT venography of the mesocaval shunt



IVC (long arrow)
Mesocaval shunt (short arrow)
SMV (small arrowhead)

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Patient follow-up

- Anticoagulation
    - Apixiban 2.5 mg PO BID
        - IBD/VTE risk
- 9 months post-procedure
    - No recurrent variceal or other bleeding
    - No venous or stent thrombosis
    - No stent migration
    - No encephalopathy

Discussion

- Mesocaval shunt - options for image guidance:

a) *Intravascular approach*

- IVUS (Hong et al 2012)
- Fluoroscopy (Moriarty et al 2012, Kobe et al 2016)

b) *Percutaneous approach*

- CT (Moriarty et al 2012, Burke et al 2013, Nyman et al 1996)
- Fluoroscopy and US (Bercu et al 2015)

Discussion

- Mesocaval shunt – potential complications
  - peritonitis
  - stent infection
  - mesenteric vascular injury
  - organ injury (pancreas, stomach, colon)

Discussion

- Differences in our technique with respect to existing literature include:

  a) splenic vein access for direct mesentericoportography

  b) percutaneous fluoroscopic only guided access of the SMV

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Summary

- Technically successful percutaneous mesocaval shunt insertion was performed in a patient with chronic portal venous thrombosis

- This procedure should be considered in similar patients appropriately selected by a multidisciplinary team including hepatology, hepatobiliary/transplant surgery, and interventional radiology

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