Trans-hepatic portal vein thrombectomy

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Our Patient - Clinical Presentation

- 66 yo F s/p laparoscopic-assisted partial left colectomy with pull down of splenic flexure for exacerbation of long-standing history of diverticulitis.
- Presents 15 days post procedure, to the ED with complains of epigastric and left upper quadrant pain, associated with nausea and vomiting.
- Continues to pass flatus. Denies use of any new medications.
- PMH – diverticulitis, cholelithiasis, HTN, GERD w/Barett’s esophagus and hypothyroidism
- PSH – Cholecystectomy, partial left colectomy
- FH – Mother died of colon cancer at the age of 80.
• On examination, patient is AOx3, appears uncomfortable.
• Vitals – T97.4, P94, BP169/65, RR15, O2 sat – 100% RA
• RRR no m/r/g, chest b/l clear, air entry equal
• Tenderness in epigastrium and LUQ, no peritoneal signs, rectal exam WNL
• Mild edema b/l LE
Pertinent labs –

- WBC – 28.2, DLC – 82.5/12.4/4.3/0.5/0.4 (NLMEB)
- FBS – 221mg/dL
- ALT – 210, AST – 415, AlkPhos – 88, TotBili – 2.8
- S.Ca – 7.5, Phos – 3.4, Mg – 1.7
- S.Lactate – 2.2, S.Lipase – 22
Our Patient - Differential Diagnosis

- Gastritis / Peptic ulcer disease
- Partial small bowel obstruction
- Anastomotic leak
- Abscess formation
Imaging Studies

• Given her acute condition and recent surgical history, she was taken up for a CT scan.
CT Abdomen & Pelvis w/ oral contrast – Coronal Section

- Superior Mesenteric Vein thrombus
- Fat Stranding
- Surrounding free fluid
- Bowel wall edema
- ? Bowel infarction
Fat Stranding
Bowel wall edema
Surrounding free fluid
?
Bowel infarction

Superior Mesenteric Vein &
Main Portal Vein thrombus

CT Abdomen & Pelvis w/ oral contrast – Coronal Section
CT Abdomen & Pelvis w/ oral contrast – Coronal Section

- Main Portal Vein thrombus
- Aortic calcific atherosclerosis
- Surrounding free fluid
- Bowel wall edema
- ? Bowel infarction
Summary of CT Findings

• Superior mesenteric vein and main portal vein thrombi
• Ischemic jejunal small bowel segment
  • fat stranding +,
  • bowel wall edema +,
  • surrounding free fluid in the abdomen
• Aortic calcific atherosclerosis
• Multiple colonic diverticula without active diverticulitis
Welcome to the IR Suite!!
Interventional Radiology Goals & Rationale

- **Start tPA infusion** into the Superior Mesenteric Artery to lyse the clots in smaller jejunal and ileal branches of the superior mesenteric vein and promote forward flow in the SMV and portal vein.

- **Remove the SMV and portal vein thrombus** – to restore venous outflow of the bowel into the IVC and reduce venous ischemia of the bowel loops.

- **Primum non nocere** – avoid further injury to the liver tissue and the hemodynamics of the patient.
Let’s do a time out!!
Procedural steps

Right common femoral artery access gained

SMA Arteriogram
Marginal artery

Digital Subtraction Angiogram of the Superior Mesenteric Artery
Placement of an infusion catheter into the proximal SMA

DO NOT START TPA INFUSION NOW
(We have to puncture the liver now, tPA might result in excessive bleeding – “Primum non nocere”)

Procedural steps

Attempt trans-hepatic portal vein access

Multiple attempts

Right portal vein accessed!!
Digital Subtraction Angiogram of the Portal Venous System

http://hepatologist.sharepoint.com/
Filling defect in the main portal vein
Portal Vein Thrombus

Filling defect in the superior mesenteric vein
SMV Thrombus
Let’s clean it up...
Use the AngioJet device to lyse the portal vein, SMV and jejunal-ileal branches’ clots

AngioJet is basically a thrombectomy device using irrigation and aspiration as its tools to lyse clots

Multiple passes are made through the portal, SMV and other branches
Procedural steps

Use the balloon to macerate the clots

Multiple passes are made through the portal vein and SMV with the balloon
Fluoroscopic images of the Portal Vein during balloon dilation
Let’s hook up...
Post-procedure Digital Subtraction Angiogram showing partially recanalized portal venous system
Procedural steps

Decision to repeat portal vein and SMV thrombolysis next day

- tPA Infusion started (@1mg/hour) through the infusion catheter placed in SMA earlier

- tPa not used in the portal vein because of the risk of bleeding as multiple passes were made to gain access (primum non nocere)
DAY 2
Let’s hook up...
Digital Subtraction Angiogram showing filling defect in the splenic vein - FRESH Splenic Vein Thrombus
Procedural steps

1. AngioJet device used to lyse splenic vein clot and redo portal-SMV thrombolysis

2. Balloon dilation used to macerate the clots

3. Portal vein catheter removed and gel foam torpedoes used to seal the liver tract

4. Right common femoral sheath removed and AngioSeal device used for closure
AngioSeal Device

Collagen Plug at vessel-puncture site

https://professional-intl.sjm.com/
Post Procedure Digital Subtraction Angiogram showing partially recanalized splenic vein
Findings & Impression

• Occlusive thrombus in the right portal vein, non-occlusive thrombus in the main portal vein, superior mesenteric vein and the splenic vein
• Slow portal venous flow and some spleno-renal shunting noted

• Persistent right portal vein outflow obstruction
• Endovascular recanalization of the thrombus in portal vein, SMV and splenic vein
• Systemic anti-coagulation recommended to prevent re-thrombosis
• Diet low in fiber predisposes to less bulky, hard stools which require increased peristaltic activity to push them through

• Diverticuli form at weak points, where vasa recta penetrate the muscularis layer of the colon, due to this increased intraluminal pressure

• Diverticulitis results from inflammation of colonic diverticuli

• Mesenteric and portal vein thrombosis is a rare complication of diverticulitis which results due to the inflammatory cells travelling from the colon into these veins

• The resulting slow venous flow and congestion can cause bowel ischemia, like in this patient

• The probable reason for recurrence of thrombi was the obstruction and poor outflow in peripheral branches of the portal vein, therefore systemic anti-coagulation was recommended in this patient
References


• Stollman N, Jeffrey BR. Diverticular Disease of the colon. The Lancet 2004. Feb; 363:631-639


• Dr. Ian Brennan
• Dr. Felipes Collares
• Dr. Salomao Faintuch
• Dr. Michael Johnson
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Thank you