Mesenteric Venous Thrombophlebitis: A Complication of Diverticulitis

Rashmi Jayadevan, MSIV
Albany Medical College

Dr. Gillian Lieberman
Outline

- Our Patient
- Diverticulitis
  - Pathogenesis
  - Complications
- Unique Complication
- Companion Cases
- Back to our patient
Our Patient J.S.: History

**HPI**
- 60 year-old male with one week history of nausea, vomiting, epigastric pain and intermittent diarrhea
- Unable to tolerate PO intake except for clear liquids
- PE: T 101
- Labs: WBC-33,300, Mildly elevated LFT’s and Alk Phos

**PMH**
- Adenocarcinoma of the lung, Hodgkin’s Lymphoma, MI, TIA, SBOx2, skin cancer, hyperlipidemia, HTN

**Surgical Hx**
- Splenectomy, cholecystectomy, CABG, Mohs resection
Our Patient J.S.: RUQ Doppler U/S

- Antegrade minimally pulsatile flow consistent with portal waveform
- Confirms that ultrasound images included the portal vein
Our Patient J.S.: RUQ U/S

Echogenic filling defect in portal vein
Non-Occlusive Portal Venous Thrombosis:
• No wall to wall flow seen
• Filling defect does not show signs of vascularity
• Flow seen distal to thrombus
Portal Venous Thrombosis: Differential Diagnosis

Local Factors
- Liver cirrhosis
- Hepatobiliary Malignancy
- Intra-abdominal infection
  - Diverticulitis
  - Pancreatitis
  - Appendicitis
  - IBD
- Injury to portal vein
  - Splenectomy
  - Abdominal Surgery

Systemic Factors
- Inherited
  - Factor V Leiden
  - Protein C/S deficiency
  - Antithrombin III deficiency
- Acquired
  - OCPs
  - Pregnancy
  - Malignancy
  - Myeloproliferative Disorders

Let's continue on to see the next study that our patient received.
Our Patient J.S.: Portal Venous Thrombosis on CT

Hypodense filling defect at the portal confluence
Our Patient J.S.: Portal Venous Thrombosis on CT

Thrombosis of posterior branch of right portal vein

BIDMC PACS Axial C+ CT Image

AJR Online:
http://www.ajronline.org/cgi/content-nw/full/183/4/1055/FIG1
Our Patient J.S.: Portal Venous Thrombosis on CT

Thrombus at the portal vein/SMV confluence
But wait... there's more!
Our Patient J.S.: Diverticulitis on CT

- Diverticulosis of the sigmoid colon
- Fat stranding
- Diffuse colonic wall thickening

BIDMC PACS Axial C+ CT Image
Our Patient J.S.: Complication of Diverticulitis on CT

Air and lack of contrast in the Inferior Mesenteric Vein
Our Patient J.S.: Complication of Diverticulitis on CT

Thrombus in the Inferior Mesenteric Vein
Diagnosis

- Imaging Findings
  - Diverticulitis
  - Thrombosis of Inferior Mesenteric Vein
  - Thrombosis of Portal Vein
  - Air in Inferior Mesenteric Vein
    - Differential for Portal Venous Gas:
      - Bowel ischemia, thrombophlebitis, iatrogenic, IBD

Diagnosis:
Diverticulitis Complicated by Mesenteric Venous Thrombophlebitis
Diverticular Disease

- More prevalent in western countries

- Prevalence increases with age
  - Younger than 40: 10%
  - 80 or older: 50-70%

- Terminology:
  - Diverticula: saccular outpouchings of mucosa and submucosa—most commonly in the sigmoid colon
  - Diverticulosis/diverticular disease: uninflamed diverticula
  - Diverticulitis: Inflammation of diverticulum or diverticula
Pathogenesis of Diverticulosis

* Formation of diverticula
  * Foci of muscular weakness in colonic wall, where arterial vasa recta penetrate muscularis
  * Increased Intraluminal pressure

* Low fiber diet → Less bulky stools → Retain less water → Increased peristaltic activity → Increased colonic pressure

* High fiber diet is bulky and increases colonic diameter
  * La Place’s Law: Larger radius decreases intraluminal pressure
Pathogenesis of Diverticulitis

Obstruction of the narrow neck

Distension of the Sac

Bacterial Overgrowth

Vascular Compromise

Micro Perforation and pericolic inflammation

Clinical Presentation of Diverticulitis

- Clinical presentation: Can be sufficient to make diagnosis
  - Abdominal pain-Left lower quadrant
  - Fever
  - Leukocytosis
  - Peritoneal signs indicating complications

- Imaging is important:
  - If the diagnosis is uncertain
  - If there is failure to improve clinically with empiric treatment
  - If there are signs of complications
Imaging Characteristics of Diverticulitis: X-ray

- Abdominal X-Ray:
  - Abdominal X-Ray is important in any patient with significant acute abdominal pain
  - R/O free air or obstruction

- Uncomplicated diverticulitis does not have specific findings on X-ray

- Findings on X-ray in complicated diverticulitis can include:
  - Pneumoperitoneum
  - Bowel obstruction
  - Ileus
  - Abnormal gas or soft tissue mass

Imaging Characteristics of Diverticulitis: Contrast Enema

- **Contrast Enema**
  - Previously the gold standard
  - Demonstrates diverticula and spasm
  - Extravasated contrast outlining an abscess, intramural sinus tract, or fistula


Confined perforation or abscess
Imaging Characteristics of Diverticulitis: Contrast Enema

CT with IV/oral contrast is now the modality of choice

- Air filled outpouchings
- Colonic thickening
- Fat Stranding
- Signs of complication: peridiverticular abscess

Complicated Diverticulitis

- Diverticulitis plus any of the following
  - Abscess
  - Perforation
  - Fistula
  - Obstruction
  - Mesenteric venous thrombophlebitis
Now lets discuss the complication in this case: Mesenteric Venous Thrombophlebitis
Mesenteric Venous Thrombophlebitis

- Also termed Pyelephlebitis
- Acute infection of the portal system from a primary gastrointestinal inflammatory source
  - Colonic diverticulitis
  - Appendicitis
  - IBD
  - Suppurative pancreatitis
  - Pelvic Infections
- Rare complication of diverticulitis
  - Thrombosis of IMV is especially rare
- Mortality can be high
Mesenteric Venous Thrombophlebitis: Anatomical Correlation

* Why the Inferior Mesenteric Vein (IMV) in Diverticulitis?
  * Inferior mesenteric vein drains the descending and sigmoid colon

Cichoz-Lach et al.: http://www.jpp.krakow.pl/journal/archive/0808_s2/articles/16_article.html
Pathogenesis of Mesenteric Venous Thrombophlebitis

- Possible Pathogenesis
  - Diverticulitis: Inflammation involves the IMV
  - Pericolonic abscesses can decompress into the vein
  - Fistulas can communicate with the IMV
- Thrombosis is likely a secondary event
  - Inflammatory mediators cause endothelial injury
  - Activation of coagulation cascade
- Pathologic examination has shown inflammation of the wall of the mesenteric vein
Clinical Presentation of Mesenteric Venous Thrombophlebitis

- Clinical Presentation:
  - Depends on the location and severity of primary inflammatory process
  - Can be very nonspecific
    - Fever
    - Chills
    - Upper abdominal pain
    - Leukocytosis
  - Review of 22 cases of pylephlebitis caused by diverticulitis, 30% of patients had localizing signs of a primary source of infection\(^1\)

Imaging is very important for diagnosis!

Imaging Characteristics of Mesenteric Venous Thrombophlebitis

- Imaging
  - CT is modality of choice
  - CT findings can include
    - Localizing the primary source of infection
    - Involvement of the mesenteric branches and portal vein
      - Intravascular air
      - Peripheral or central thrombi
    - Intrahepatic abnormalities, i.e. abscess
Companion Patient #1:

34 year-old male with pylephlebitis secondary to diverticulitis of sigmoid colon

Inflammation of mesentery and air in peripheral branches of IMV

Air in IMV

Companion Patient #1:

- Follow up CT 7 days Later

Other Imaging Modalities of Mesenteric Venous Thrombophlebitis

- Selective angiography: Filling defect in the lumen during the venous phase
- Contrast Enema: Colovenous fistula may be seen
- Doppler Ultrasound can demonstrate portal venous thrombosis
Now let's discuss a complimentary case
Companion Patient # 2: Thrombophlebitis of SMV and Portal Vein

- 16 year old male presents with fever, nausea, vomiting and leukocytosis

- U/S images on hospital day 9

RUQ U/S: White arrowheads show thrombus and thickened extrahepatic portal vein

RUQ Doppler U/S: Antegrade continuous blood flow demonstrates patency of portal vein

Companion Patient # 2: Thrombophlebitis of Portal Vein and SMV on CT

Axial C+ CT Image: White arrowhead shows thrombus of the portal vein with extension into the SMV

Companion Patient # 2: Appendicitis on CT

Axial C+ CT Image: Black arrow shows abscess caused by appendicitis

Discussion of Companion Patient # 2

- Abscess formation from appendicitis contributed to thrombophlebitis of the SMV and portal vein
- Similar pathogenesis as thrombophlebitis of the IMV seen in diverticulitis
- Appendicitis was previously a more common cause of this complication
  - Advances in antibiotic treatment and improved surgical techniques has decreased the incidence greatly

Let's go back to our discussion of Mesenteric Venous Thrombophlebitis as a complication of diverticulitis.
Companion Patient # 3: Hepatic Complications of Mesenteric Venous Thrombophlebitis

- Hepatic Complications
  - Hepatic Abscesses:
    Pyelephlebitis can extend into the portal vein and into the hepatic parenchyma
  - Commonly Isolated Bacteria\(^1\):
    - *Escheriichia coli*
    - *Proteus mirabilis*
    - *Bacteroides fragilis*
    - Aerobic gram-negative bacilli

Treatment of Mesenteric Venous Thrombophlebitis

- Broad spectrum antibiotics that target
  - Enteric gram-negative bacilli
  - Anaerobes
  - Streptococcus species

- Anticoagulation
  - Was controversial in the past but seems to be currently accepted

- Surgery
  - Dependent on source of infection, clinical presentation of patient (i.e. sepsis), and complications
Follow Up of Our Patient J.S.

- Patient J.S. Hospital Course:
  - Anticoagulation: Started on Heparin drip and transitioned to Coumadin
    - Work up by Heme/Onc for coagulopathy was negative
    - Will continue Coumadin for 6 months
  - Antibiotics: Started on broad spectrum antibiotics
    - Vancomycin, Ciprofloxacin, Flagyl
    - Continued on oral Ciprofloxacin and Flagyl for 14 days
  - Bowel Rest
Summary

- Diverticulitis overview
- Mesenteric Venous Thrombophlebitis = Pylephlebitis
- Rare complication of diverticulitis
- Imaging is crucial to diagnosis and prompt treatment
  - Air in mesenteric veins
  - Thrombus in mesenteric/portal veins
  - Hepatic Abscesses
Acknowledgements

- Dr. Jay Pahade, BIDMC Radiology
- Dr. Gillian Lieberman, BIDMC Radiology
- Maria Levantakis, BIDMC Radiology
References