Portal Venous Gas in a patient with mesenteric ischemia

Michelle Ferreira

Yale Diagnostic Radiology Clinical Elective

11/4/19

Case presentation

- PK, 83 y/o M
- PMHx: ESRD **on HD**, bladder CA, Gleason 7 prostate CA s/p radical cystoprostatectomy/ileal neobladder (2012), Afib (on coumadin) with hx of PE/DVT, HTN, HLD, gout
  - PD cath placement 3/17: c/b small bowel perf -> terminal ileal resection with end ileostomy c/b abdominal abscesses and wound dehiscence
  - 2018: ileostomy reversal with lysis of adhesions and abdominal wall reconstruction c/b wound dehiscence

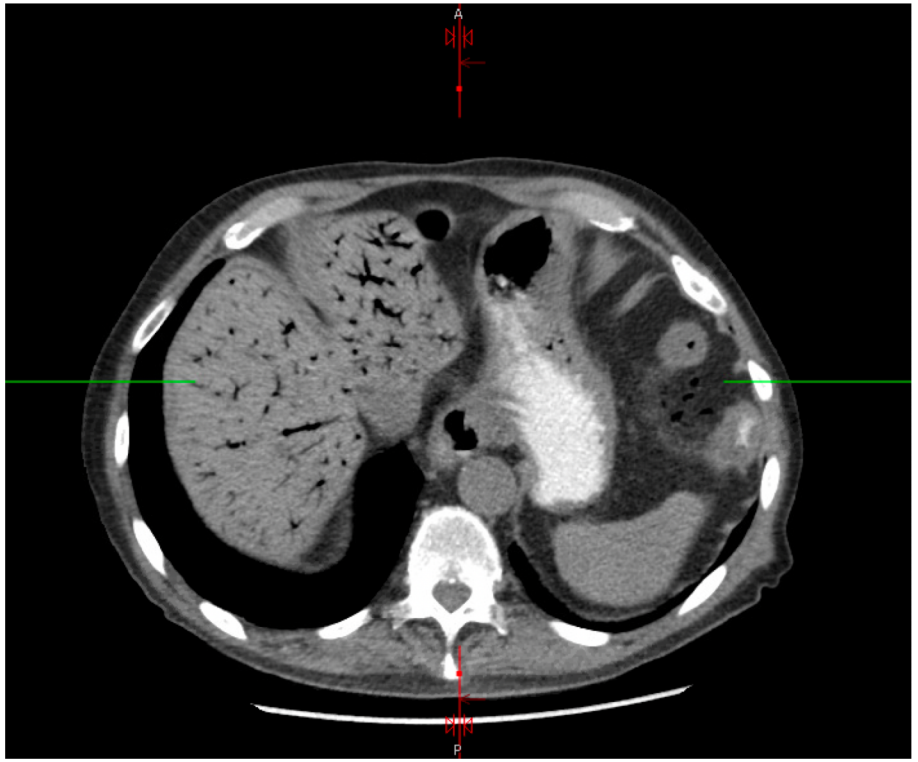
Initial presentation

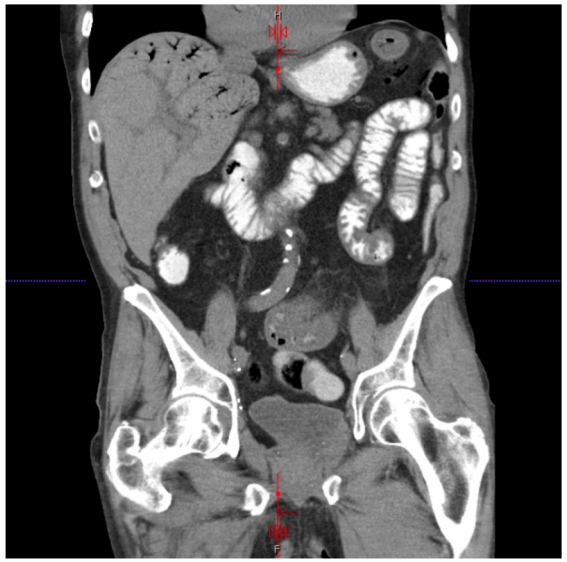
- CC: Abdominal pain, nausea
- HPI:
  - Presented 10/16/19 with ½ day of generalized abdominal pain (10/10) and dry heaves following his AM dialysis session
  - Hard BM in AM without melena or hematochezia, +flatus
  - No vomiting but + dry heaves and nausea
  - Straight caths, no changes in urine
  - ROS otherwise negative

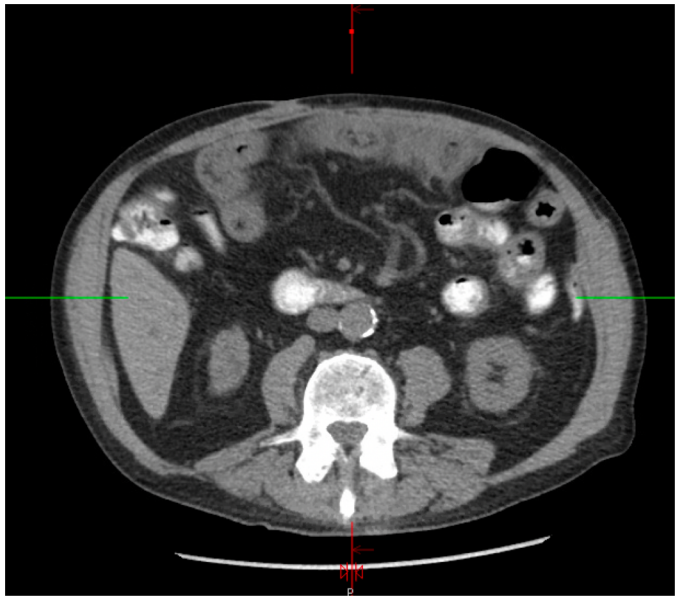
ED course

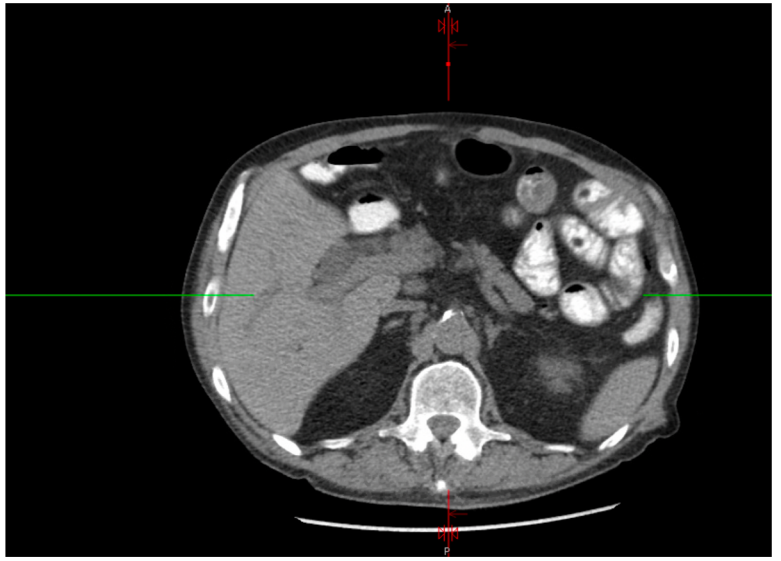
- Vitals: BP 104/50, HR 81, RR 16, T 97.6 F, O2 98%
- PE:
  - Abdomen: +tenderness but – rebound/guarding; R-sided ”fullness” and distension
- Labs:
  - CMP: Na 136, K 3.5, **Cl 95, AG 22,** BUN 21, **Cr 3.41** (Bl 2.5), Glucose 121
  - CBC:
    - WBC 10.4, H/H 13/40.4, Plts 181
  - TSH WNL
  - **ALT/AST 76/67**, **ALP 219**
  - **Lactate 3.3**
  - Trop 0.04
  - INR 3.04
- Bloody BM with contrast ingestion

Abdominal imaging









Abdominal imaging

- Read:
- 1. Long segment of **colonic wall thickening within the splenic flexure** in addition to **several thickened loops of small bowel** with **extensive intrahepatic and extrahepatic portal venous gas**. Findings are compatible with intestinal ischemia though evaluation the mesenteric vasculature is somewhat limited in the absence of intravenous contrast. No definite free air.
-
- 2. There is **progressive intrahepatic and extra hepatic biliary ductal dilatation** with a **1.4 cm hyperdense focus within the mid common bile duct, possibly reflecting a retained stone though underlying neoplasm cannot be excluded**. Further evaluation with ERCP/MRCP could be considered.

Portal venous gas

- Acute onset abdominal pain
- Usually affecting the elderly
- Usually necessitates emergency surgery, although medical management may be considered
- Amount of gas is correlated with severity of pathology, but the prognosis is related to the pathology itself and not related to amount of gas in portal system

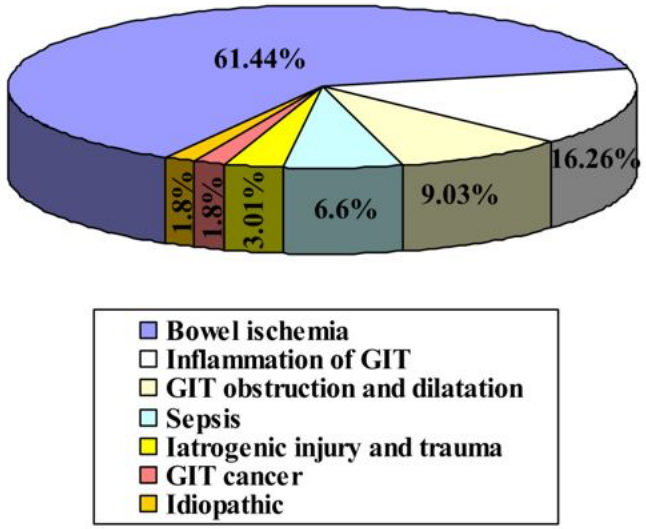
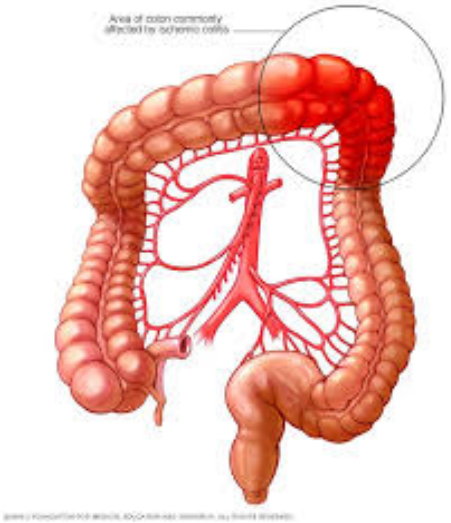


Figure (1) The commonest causes of the hepatic portal vein gas

Hussain et al 2008

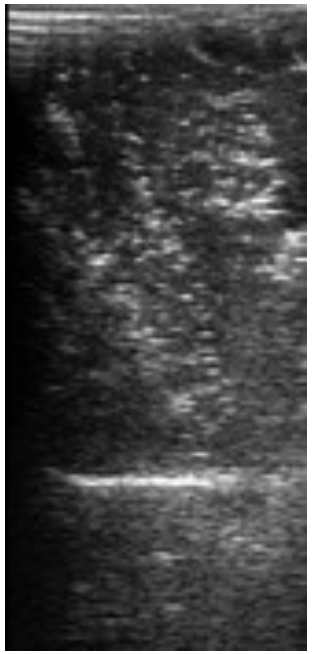
Bowel ischemia

- Clinical:
  - Acute abdominal pain
  - Pain out of proportion to physical exam
- Increased WBC (50%), lactate (90%), and elevated LFTs
  - May be accompanied by polycythemia and thrombocythemia depending on the cause
- Causes:
  - Mesenteric arterial embolism (50%)
  - Mesenteric arterial thrombosis (15-25%)
  - Mesenteric venous thrombosis (5%)
  - Intestinal hypoperfusion, nonocclusive (20-30%)
    - **Watershed areas**



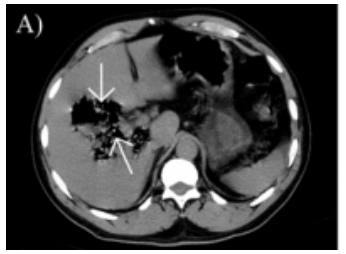
Radiologic appearance of PVG due to bowel ischemia

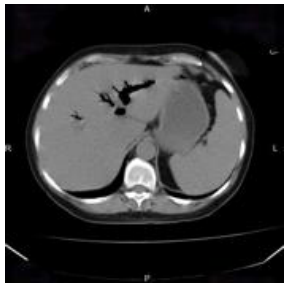
- CT:
  - Tubular areas of decreased attenuation in the liver, especially the left lobe
- US:
  - Dot-like, streak-like, fruit-pulp-like patterns; flowing, echogenic bubbles
  - If positive, f/u with contrast-enhanced CT to assess for intestinal ischemia
    - However, bowel ischemia may not always show up on CT in case of partial thickness infarction/necrosis
- MRI:
  - Delineates the portal system, can assess patency of portal vein and whether there is ischemia (occlusive or non-occlusive)
- XR:
  - Detects PVG in 12.5% of cases
  - May show indirect signs of bowel ischemia (edematous bowel wall, ileus, gasless abdomen, gas in bowel wall/portal vein)

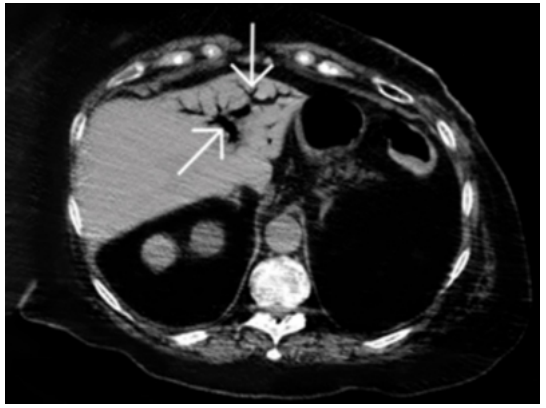


PVG vs pneumobilia

- Pneumobilia:
  - More central
  - Seen in patients following procedures of the biliary tract
  - Can often be managed non-operatively
- PVG:
  - More peripheral
  - Mesenteric ischemia; mortality rate of 75-90% (although decreased in recent decades due to earlier detection)
  - Additional CT manifestations: pneumatosis intestinalis, bowel dilatation, thickening of bowel wall, mesenteric edema







Management

- Surgical management with ex lap and possible bowel resection used to be standard of care
- Endoscopy may be used to locate GI pathology if CT scan is unrevealing
- Obstruction, infarction, or vascular problems – no further endoscopic confirmation necessary, may need emergency surgical exploration

1) + PVG and acute abdominal features -> emergent ex lap

2) + PVG without abdominal signs and stable with no mesenteric ischemia -> good candidates for conservative approach

3) Borderline features of acute abdomen and less dense diagnostic signs of PVG – endoscopic examination

Management of case

- Discussed with colorectal surgery; decided to manage conservatively due to multiple medical comorbidities
- NPO + IVF, IV Zosyn, Coumadin held
- Gradually re-introduced food over the course of several days and discharged on cipro with colorectal surgery f/u