Septic pylephlebitis in acute sigmoid colon diverticulitis

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Clinical History:

Woman with known diverticular disease of the left-sided colon, currently suffering from abdominal pain, fever and diarrhoea, transferred to our hospital with diagnosis of acute diverticulitis with sepsis. Physically found dehydrated with stable vital signs, pelvic tenderness without peritonism. Laboratory abnormalities: anaemia, leukocytosis (20.000/mmc), increased (255 U/l) C-reactive protein.

Imaging Findings:

At another hospital, ultrasound (not shown) diagnosed acute diverticulitis (AD) without perivisceral abscesses. Six days later, initial multidetector CT (Fig. 1) confirmed locally uncomplicated AD by depicting a contracted sigmoid colon with diverticula, moderate mural thickening, mild pericolonic fat inflammation, fluid in the pelvic fasciae and peritoneal cul-de-sac. Signs of perforation and abscesses were excluded. Additionally, CT detected pleural effusions, hypoattenuating thrombus at the portal confluence and distal splenic vein, and multiple "geographic" hyperenhancing liver regions consistent with transient attenuation differences.

After blood cultures grew Enterococcus faecium, antibiotic therapy was corrected and warfarin anticoagulation was started, resulting in progressive clinical improvement and normalization of laboratory changes. Follow-up CT before patient discharge (Fig. 2) showed stable findings concerning AD, persistent non-occlusive thrombosis at the portal confluence, distal splenic and proximal portal vein with gas bubble consistent with infectious pylephlebitis, and regression of the hepatic hyperenhancement regions.

Discussion:

Albeit rare, pylephlebitis (suppurative thrombophlebitis of the portal-mesenteric venous system) is a potentially life-threatening complication of intra-abdominal inflammatory processes such as acute diverticulitis, appendicitis, pancreatitis, cholangitis and early post-surgical conditions. Pylephlebitis results from infectious extension into the involved venous drainage, and has been reported to complicate 0.6% of all abdominal infections and up to 3% of cases of acute diverticulitis [1-3]. Symptoms of pylephlebitis largely overlap with those of the underlying condition, and mostly include abdominal pain, fever, chills and malaise associated with abnormal liver enzymes and laboratory signs of sepsis. Bacteraemia is detected in over 50% of patients, with Streptococcus viridans, Escherichia coli and Bacteroides as the commonest cultured organisms [1-7].

Nowadays multidetector CT is recommended and widely used as the mainstay technique to investigate spontaneous and postoperative intra-abdominal sepsis [8]. Considering the possibility of pylephlebitis, the CT acquisition protocol should include the entire abdomen and pelvis with intravenous contrast enhancement unless contraindicated. Multidetector CT comprehensively allows diagnosing and characterizing pylephlebitis since it detects the primary
source of infection, the portal venous thrombus and presence of intravascular gas, and possible complications such as hepatic abscesses. As this case exemplifies, even in patients with seemingly uncomplicated diverticulitis the portal-mesenteric venous system should be carefully scrutinized for signs of pylephlebitis. The infected portal thrombi appear as a low-attenuation, non-enhancing tubular venous filling defects that may contain gaseous components, may partially or totally occlude the venous lumen, and may sometimes enlarge the involved portal vein or its tributaries. The liver parenchyma commonly shows heterogeneity due to “geographic” hyperperfused regions in the arterial phase (referred to as transient hepatic attenuation differences), or tubular hypodense thrombosed intrahepatic portal branches which may resemble dilated biliary ducts. The differential diagnosis mostly includes bowel ischaemia and other less dangerous causes of portal venous gas [4, 9, 10].

Untreated pylephlebitis may be further complicated by the development of liver abscesses, peritonitis, overwhelming sepsis or bowel ischaemia. With improved diagnosis and management, the mortality rate decreased to 11-23% in recent years. Treatment of pylephlebitis requires intensive broad-spectrum antibiotics and percutaneous or surgical drainage of infectious foci such as liver and pericolonic abscesses. Anticoagulation is used in most patients but remains controversial, and is required if the thrombosis is acute, not limited to the portal vein, associated with signs of bowel ischaemia, or the patient fails to improve with antibiotics [1-3].

Differential Diagnosis List: Pylephlebitis and sepsis in acute sigmoid colon diverticulitis., Uncomplicated acute diverticulitis, Diverticulitis with perforation or abscess formation, Bland portal thrombosis, Liver abscess, Bowel ischaemia, Necrotizing acute pancreatitis, Inflammatory bowel disease

Final Diagnosis: Pylephlebitis and sepsis in acute sigmoid colon diverticulitis.

References:

Description: Axial images showed contracted sigmoid colon with diverticula, mild inflammatory changes of the pericolonic fat (+), fascial fluid (arrowhead) and effusion in the peritoneal cul-de-sac (short arrow) consistent with uncomplicated acute diverticulitis. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: The contracted sigmoid colon showed findings consistent with uncomplicated acute diverticulitis, including mural thickening of some of the diverticula (thin arrow), mild inflammatory changes of the pericolonic fat (+). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Additionally, liver inhomogeneity due to "geographic" hyperenhancing regions (*) was noted.
Note contracted sigmoid colon with minimal perivisceral inflammation (+), peritoneal cul-de-sac effusion (short arrow). Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Pleural effusion was present at both lung bases. Mainly in the right liver lobe, "geographic" regions of parenchymal hyperenhancement (*) consistent with transient attenuation differences were present. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** Multiple "geographic" regions of parenchymal hyperenhancement (*) consistent with transient hepatic attenuation differences were present, particularly vast in the right lobes. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** A hypoattenuating filling defect (arrows) consistent with thrombus was detected in the portal confluence and distal splenic vein. Note geographic\(^*\) regions of hepatic hyperenhancement (\(^*\)) consistent with transient attenuation differences. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: A hypoattenuating filling defect (arrows) consistent with thrombus was detected in the portal confluence and distal splenic vein.

Note patent hepatic portal vein, geographic\" regions of hepatic hyperenhancement (\") consistent with transient attenuation differences. Origin: Tonolini M, Radiology Department, "Luigi Sacco\" University Hospital – Milan (Italy)
Description: In the pelvis, stable findings were observed concerning acute diverticulitis, without signs of free or contained perforation and abscess collections. Note mild inflammatory changes of the pericolonic fat (+). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: In the pelvis, stable findings were observed concerning acute diverticulitis. Note mild inflammatory changes of the pericolonic fat (+), persistent fascial fluid (arrowhead) and effusion in the peritoneal cul-de-sac (short arrow). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: The hypoattenuating filling defect consistent with non-occlusive thrombosis (arrows) persisted at the portal confluence and proximal portal vein, with a gas bubble (thin arrows) suggesting infection (pylephlebitis). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** The hypoattenuating filling defect consistent with non-occlusive thrombosis (arrows) persisted at the portal confluence and proximal portal vein, with a gas bubble (thin arrows) suggesting infection (pylephlebitis). **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Detail unenhanced image confirms gas bubble (arrowhead) in the anatomic site of the proximal portal vein. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Additionally, small thrombotic filling defects (arrows) partially persisted in the distal splenic vein. 

Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** The liver parenchyma now appeared significantly more homogeneous, since the vast majority of transient hepatic hyperenhancement regions were not discernible anymore. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)