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Case Report

Septic Pylephlebitis in a Patient with Crohn's Disease Following the Initial Ingestion of Soil

Azeddine Diffaa[1,2]*, Hind Ait Belcaid[1], Hajar Sebban[1] and Azeddine Sedki[1]

[1]*Water, Biodiversity and Climate Change Laboratory (Eau Biod Cc), Department of Biology, Faculty of Science Samlalia, Cadi Ayad University, Marrakesh, Morocco*

[2]*Gastroenterology Department, Private University Hospital of Marrakech, Morocco*

***Corresponding Author:** Azeddine Diffaa, Gastroenterology Department, Cadi Ayad University, Marrakech, Morocco.

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Abstract

Background: Septic pylephlebitis, also known as septic thrombophlebitis of the portal vein, is an extremely rare and dangerous complication of Crohn's disease (CD). Diagnosis can be difficult in the absence of suggestive clinical context.

Observation: In this report, we present a case of a 43-year-old patient with well-controlled colonic Crohn's disease who was treated with mesalamine. The patient developed fever, chills, and sweats following geophagy. These symptoms are accompanied by acute abdominal pain. Upon clinical examination, the patient was febrile at 39.5°C and had epigastric tenderness. Biological assessments revealed an inflammatory syndrome, including hyperleukocytosis, anemia, and a biological inflammatory syndrome. Abdominal CT scan (CT) revealed massive thrombosis in the portal vein without any signs of intra-abdominal infection. Blood cultures tested positive for *Streptococcus viridians*. The tests for deep vein thrombosis, pulmonary embolism, and thrombophilia yielded negative results. The patient was successfully treated with antibiotics and anticoagulants for septic pylephritis in Crohn's disease.

Conclusion: This case highlights the importance of early comprehensive evaluation for immediate diagnosis and appropriate treatment of septic pylephlebitis in patients with CD presenting with fever and abdominal pain of unknown origin. To our knowledge, this is the first report of an association between pylephlebitis and geophagia.

Keywords: *Septic Thrombophlebitis; Crohn Disease; Pica; Portal Vein*

Introduction

Portal vein thrombophlebitis (pylephlebitis) is a rare and severe extraintestinal complication of inflammatory bowel disease (IBD) that is associated with high mortality [1]. Diagnosis is particularly difficult in clinical practice because of the long list of diagnoses that rules out acute abdominal pain. The portal system is the site of thrombosis in chronic liver diseases such as cirrhosis or coagulopathy [2]. The portal vein and superior mesenteric vein are unusual sites of venous thromboembolism in IBD [2]. Furthermore, in exceptional cases, a combination of portal vein thrombosis and bacterial infection (septic pylephlebitis) may develop [2,3]. Early detection and appropriate treatment of such cases are crucial to avoid complications such as liver abscess, venous ischemia or mesenteric infarction, portal hypertension, and sepsis [3]. We report the first association between pylephlebitis and geophagia in a patient with Crohn's.

Observation

We report a rare case of septic pylephritis in a 43-year-old patient with isolated colonic Crohn's disease (CD) since 3 years. He was neither a smoker nor an alcoholic and had no known personal or familial risk factors for thrombophlebitis. The initial assessment of CD revealed isolated rectosigmoid and right colon localization of Crohn's without extradigestive manifestations. The "BEST score" indicated non-active disease. The patient was treated with 5-amino-salicyclic acid (5ASA) 2 g/day and the follow-up was regular. Symptomatology began 5h after the first intake of soil as a traditional treatment for anorexia. The manifestations include vomiting, abdominal pain, and fever without occlusive syndrome. Examination revealed fever (39.5°C) with chills and sweating, blood pressure of 100/60 mmHg, tachycardia of 115 beats/min, and a respiratory rate of 23 cycles/min. Abdominal examination revealed epigastric and right upper quadrant pain, with tenderness. Biological data showed neutrophil hyperleukocytosis 13,500/mm^3, ferritin anemia 10.9 g/dl, platelets 320,000/mm^3, sedimentation rate 95 mm/h, CRP 45 mg/dl, prothrombin time 75%, total bilirubin 11.10 mg/dl. ALP 95 IU/l, AST 61 IU/l, ALT 87 IU/l, LDH 106 IU/l. The fecal calprotectin level was 55 µg/g (normal, < 50 µg). Chest and abdominal X-rays showed no specific abnormalities, the urine cytobacteriological examination was sterile, several blood cultures were isolated from *Streptococcus viridans* and stool tests were negative. An abdominal scanner revealed a thrombus in the portal vein with periportal edema and perfusion disorders of the liver parenchyma (Figure 1 and 2). However, there was no evidence of intra-abdominal infections such as liver abscesses, diverticulitis, or acute appendicitis. Doppler ultrasonography revealed no evidence of deep venous thrombosis in the lower limbs. Chest scanning and transesophageal echocardiography revealed no evidence of pulmonary thromboembolism, intracardiac thrombus, or septic endocarditis. Laboratory tests excluded underlying coagulopathy (testing for dysfibrinogenemia, systemic lupus, anticardiolipin antibodies, antiphospholipid antibodies, antinuclear antibodies, protein C and S deficiencies, and antithrombin 3 antibodies).

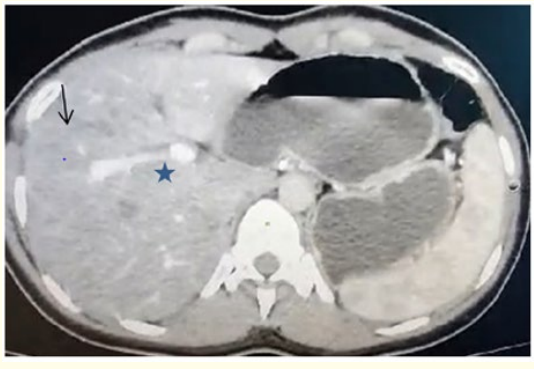

Figure 1: *CT scan show a hepatic perfusion abnormalities (arrow) with partial thrombosis with pylephlebitis (asterisk).*

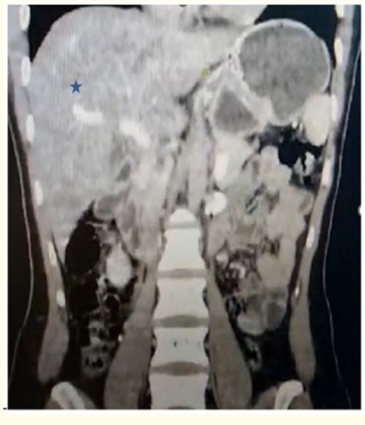

Figure 2: *Abdominal computed tomography (CT) scan reconstruction showing pylephlebitis (asterisk).*

Septic pyelitis complicating Crohn's disease in remission was suspected. The patient was administered intravenous antibiotics (ceftriaxone, 3 g/day; metronidazole, 1200 mg/day) and anticoagulants. Anticoagulation was administered via intravenous heparin perfusion followed by oral anticoagulant therapy. Clinical symptoms improved 72 hours after admission. Hemocultures identified "*Streptococcus viridans*," which is sensitive to third-generation cephalosporins. Antibiotic therapy was prescribed for 15 days with favorable outcomes. After two months of follow-up, the CT scan showed marked improvement in thrombosis, with the disappearance of periportal edema and reduction in hepatic perfusion disorders. Oral anticoagulant therapy was continued for 6 months. Currently, the patient is at a 3-year follow-up without thrombophlebitis recurrence or Crohn's disease relapse on 5ASA.

Discussion

Septic pylephritis or septic portal thrombophlebitis is an infectious suppurative thrombosis of the portal vein. It usually occurs when there is a bacterial infection of the gastrointestinal tract or abdominal suppuration [4]. The incidence of this complication ranges from 0.37 to 2.7 cases per 100,000 person-years [5,6]. Male patients appeared to be affected more frequently [5]. It is an extremely rare complication of abdominal or pelvic infections. In the literature, several cases of septic pyelitis in patients with Crohn's disease were found (Table 1) [7-14]. The mean age of the patients was 30.2 years (range, 14 - 64 years) and eight of the nine patients were male. Most patients present with acute abdominal pain, diarrhea, weight loss, jaundice, fever, or inaugural manifestations suggestive of peritonitis or mesenteric infarction.

Reference	Year	Sex/age	Symptoms	Imaging	Bacterial agent	treatment
Current publication	2023	M/23	Abdominal pain, fever Geophagy	Pylephlebitis Hepatic perfusion abnormalities	*S. viridans*	Antibiotic anticoagulation
Scaringi., *et al*. [7]	2017	M/47	Abdominal pain sepsis	Pylephlebitis portal and mesenteric	-	Ileal Resection parenteral alimentation
Shin., *et al*. [8]	2012	M/16	Abdominal pain, fever	Portale Thrombosis	*S. viridans*	Antibiotic anticoagulation
Aguas., *et al*. [9]	2007	M/25	Abdominal pain, fever	Partial portal Thrombosis multiple hepatic abscess	-	percutaneous drainage Anticoagulation No antibiotic
El-Matary., *et al*. [10]	2006	F/14	Anorexia weight loss icter	portal and mesenteric Thrombosis	-	ileo-cecal Resection
Ng., *et al*. [11]	2006	M/19	Abdominal pain, fever	portal Thrombosis Peritonitis	-	Colectomy
Baddley., *et al*. [12]	1999	M/41	Icter, fever vomiting weight loss	Thrombosis portal et mesenteric	-	Right Colectomy
Tung., *et al*. [13]	1996	F/18	Abdominal pain, fever Diarrhea weight loss	portal Thrombosis abscess hepatic	-	Radiological drainage No antibiotic Ileal resection
Ajzen., *et al*. [14]	1988	M/64	Abdominal pain, weight loss	Thrombophlebitis	-	Ileal resection

Table 1: *Literature data about septic pylephlebitis with Crohn disease.*

The infection site is difficult to identify and is usually suspected on a clinical basis if the patient presents with fever and abdominal pain. The initial sites of infection were colonic diverticulitis (28.2%), appendicitis (19.4%), hepatic abscess (7.8%), pancreatitis (5.8%), and cholangitis 5.8% [5,15]. However, chronic inflammatory bowel disease such as Crohn's disease have also been reported as predisposing factors for septic pyelitis in only 2% of the cases [16]. Pylephlebitis manifests as fever (86.4%), abdominal pain (79%), sepsis/septic shock (58%), diarrhea (26%), vomiting (23%), jaundice (20%), and anorexia (19%).

Portal or mesenteric vein thrombosis was identified on CT-scans in all patients with Crohn's. The median interval between the diagnosis of Crohn's disease and pylephlebitis was 3.5 years (1 - 8 years). pylephlebitis was revelatory of Crohn's disease [2]. Imaging revealed portal thrombosis (7/9), partial portal thrombosis (2/9), mesenteric thrombosis (3/9), hepatic abscess (2/9), peritonitis (1/9), and hepatic perfusion perturbation (1/9). Both abdominal ultrasonography and computed tomography can identify thrombi in the portal vein, as illustrated in figure 1 and 2. Ultrasonography detects echogenic material within the portal vein lumen, which can be confirmed by changes in blood flow observed using Doppler analysis [1]. CT is preferred because of its superior clarity and ability to uncover potential sources of infection in the abdomen and pelvis. According to a recent systematic review of studies from 2010 to 2021, CT scans were used for diagnosis in 89.3% of patients, whereas ultrasound examinations were utilized for only 38.8% [15]. In contrast, an earlier review that included studies conducted before 2010 found that CT scans were employed in only 51% of the patients. Other imaging techniques, such as magnetic resonance imaging [16], angiography, endoscopic ultrasound, or positron emission tomography (PET scan) [17], can also demonstrate portal vein thrombosis; however, their use is limited to specific cases.

No bacterial agent has been identified in publications on pylephlebitis with Crohn's disease, with the exception of one Korean publication that isolated (*Streptococcus viridians*) by hemoculture. In a large literature review, three bacterial strains were identified in patients with pylephlebitis: *Escherichia coli* in 20.4% of cases, *Bacteroides* spp. in 12.6% of cases, and *Streptococcus* spp. in 11.7% of cases [15]. The *Streptococcus* family has been associated with two cases of pylephlebitis in Crohn's disease. This association should be studied in future to elucidate the pathophysiology of this infection.

However, inflammatory bowel disease has also been reported as a predisposing factor for septic pyelitis [2]. The status active of Crohn's disease has been reported in several cases of pylephlebitis; ulceration can intrude the first bacteremia that can lead to the development of a local infection that can send septic microthrombi in the splanchnic circulation. The filtering role of the liver can induce a slowing of flux, which can lead to local portal bacterial colonization and pylephlebitis [1,15].

To the best of our knowledge, this is the first report of an association between geophagia and pylephlebitis. The association between pylephlebitis and geophagia was noteworthy. In a recent study, more prevalent disordered eating behavior traits were present in CD, which may be attributed to lower mood and higher anxiety [18]. Geophagia, the deliberate consumption of soil, although uncommon, has been associated with gastrointestinal complications, owing to the potential ingestion of harmful microorganisms or toxins. Highly toxigenic bacteria such as *Clostridium perfringens, Clostridium tetani*, and *Clostridium botulinum*, the causative agents of gas gangrene, tetanus, botulism, and other human pathogens, may be ingested [19].

This behavior could have contributed to the bacterial infection that caused septic pylephlebitis and highlighted a significant health risk. The combination of colonic Crohn's disease and soil ingestion may have triggered an intensified inflammatory response, resulting in portal vein thrombosis. It is crucial to consider these atypical connections when evaluating and treating patients with IBD for more thorough assessment and appropriate care.

The exact mechanism of pyelitis in Crohn's remains unclear. These complications may be caused by intestinal inflammation or interactions between bacterial infection and the endothelium, which may precipitate activation of the coagulation cascade, leading to pylethrombosis or pylephlebitis [20]. Geophagy could play a role in this case by promoting the introduction of infectious agents by

altering the intestinal microbiota, thereby promoting infection [21]. A case published by Shin., *et al*. [8] was treated with low-dose oral corticosteroid therapy with azathioprine and the patient was in remission. Our patient was treated with mesalazine (3 g/day) alone. Steroid therapy affects platelet aggregation, coagulation proteins, and the vascular system in ways that facilitate thrombosis and infections [2]. Smoking can also promote thrombosis via endothelial cell damage [22]. Other risk factors include hereditary coagulopathy, immobilization, and previous abdominal surgery, particularly in the perioperative period. However, approximately half of patients with chronic inflammatory bowel disease who develop a thromboembolic event have no identifiable risk factor [23]. Therefore, disease activity is an additional factor that needs to be considered. Our patient had a virtually subnormal fecal calprotectin level of 55 µg/g (normal, < 50 µg/g) and no other risk factors associated with thromboembolism. Previous studies have suggested that thromboembolic complications may occur during flare-up episodes or in the presence of complications such as stenosis, fistula, or abscess [1,24,25]. Patients reported in previous studies often have active disease at the onset of pylephritis. Our case and that of Shin., *et al*. [8] suggest that clinicians should consider the risk of pylephlebitis, even in patients with IBD in remission and without other risk factors. The clinical manifestations of pylephritis are generally non-specific. Common symptoms include abdominal pain, fever, nausea and vomiting, which may be the first signs of exacerbation of intestinal disease or acute infectious colitis [7,10]. Its biology is often nonspecific (leukocytosis, anemia, and abnormal liver function test results), which can cause diagnostic delays. Therefore, abdominal ultrasound with Doppler or CT should be considered whenever portal thrombosis or an atypical abdominal or pelvic infection is suspected [7].

There is no consensus on the treatment of CD-associated disease-associated pylephritis [2,8]. Treatment is based on anticoagulation and antibiotherapy [1,2]. The aim of anticoagulation therapy is to stop or prevent thrombosis progression and treat complications such as mesenteric infarction and portal hypertension [3]. The optimal dose of anticoagulants generally varies according to the severity of thrombosis and risk of bleeding [2,15]. In the first episode, six months of anticoagulation treatment was recommended [26]. However, treatment can be extended if the risk factors have not disappeared (surgery or immobilization) and lifelong anticoagulation is indicated in patients with a hereditary hypercoagulation state [26,27]. The optimal duration of antibiotic therapy is also debated, but prolonged treatment has been suggested based on the hypothesis of defective penetration of antibiotics into infected thrombi [2,14]. Current recommendations include thromboembolic prophylaxis in hospitalized patients with severe or non-ambulatory diseases [28,29]. Given that patients with inflammatory bowel disease are at a high risk of recurrent thromboembolism after the first venous thrombosis, it seems logical to prescribe preventive treatment [30,31]. Surgical treatment is indicated in complications, such as mesenteric infarction or peritonitis [31].

Given the association between geophagia and pylephlebitis development in this case, it is paramount to address this behavior to prevent the occurrence of septic pylephlebitis. Counseling and intervention for geophagia, including nutritional supplementation and addressing underlying causes such as iron deficiency anemia, should be integrated into the management plan [2,30].

Additionally, as there is no consensus on the treatment of Crohn's disease-associated pylephlebitis, a multidisciplinary approach involving gastroenterologists, infectious disease specialists, and hematologists should be considered to tailor the treatment plan to specific needs. Given the complexity and rarity of this condition, close monitoring and follow-up are essential to assess the response to treatment and to prevent potential complications.

Meanwhile, it is important to maintain open communication with the healthcare team, adhere to the prescribed treatment regimen, and promptly report any new or worsening symptoms.

Conclusion

Septic pylephritis is a rare and severe complication, with significantly high morbidity and mortality rates. An unknown origin of abdominal pain or fever in a patient with IBD raises the possibility of septic pylephlebitis. The Geophagia in this case may have been

a trigger for digestive infection. Awareness of such complications enables more effective diagnosis and appropriate treatment of these patients. The relationship between "*Streptococcus viridans*" and septic pylephlebitis in Crohn's disease and geophagia requires further investigation. Finally, further studies are required to determine the impact of the intestinal microbiota on the risk of septic thrombosis.

Funding Statement

None.

Ethical Compliance

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration.

Patient Informed Consent

Yes.

Conflict of Interest

No conflict of interest.

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