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Case report

Sigmoid colon perforation with splenic abscess due to ulcerative colitis: A case report and review of the literature

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ABSTRACT

Introduction and importance: The occurrence of abscesses in the spleen, a substantial abdominal organ with hematopoietic function, is relatively rare in clinical cases and mostly occurs in immunodeficient populations. The early symptoms of splenic abscess are not obvious, and the diagnosis is usually confirmed by a combination of patient symptoms, imaging manifestations and blood culture results.

Case presentation: A 36-year-old male patient was treated in the emergency room for severe lower abdominal pain and discomfort. An abdominal CT(Computed Tomography) examination initially suggested an acute bowel perforation and an enlarged and abnormally thick spleen. The patient first underwent a repair of the bowel perforation, which was followed by fever and no reduction in abdominal symptoms, while the patient's splenic abscess was then treated with a repeat splenectomy.

Clinical discussion: Splenic abscesses mostly occur in immunocompromised patients. The treatment of splenic abscesses includes simple antibacterial medication, percutaneous puncture placement for drainage, and splenectomy for drainage. In our case, the treatment of this patient's splenic abscess was divided into several stages, and we finally used splenectomy for drainage because the patient's symptoms were not significantly better than before and combined with coagulation abnormalities.

Conclusion: In patients with severe abdominal infection and relevant ancillary tests suggesting abnormal spleen size and density, it is also important to consider whether a splenic abscess has formed and to provide early diagnosis and treatment of splenic abscess while fighting abdominal infection.

1. Introduction

According to studies, splenic abscesses are more common in men and immunocompromised populations, especially in patients with malignancies, while intestinal perforation and splenic abscesses are extremely rare to occur together [1]. In patients with intestinal tumors there is an incidence of infection spreading to the spleen after intestinal perforation due to tumor infiltration. Diagnosis and treatment of patients with splenic abscesses has proven difficult due to the lack of specific clinical signs. We describe a patient who arrived with intermittent fever and abdominal pain with sigmoid perforation and CT findings suggestive of a heterogeneous enlargement of the spleen in addition to perforated ulcerative colitis and splenic abscess. Although the patient's blood culture results did not show any significant bacterial infection, we made the diagnosis of splenic abscess based on the anterior and posterior changes in the patient's CT imaging presentation. Splenic perforation abscesses are uncommon worldwide. All our work-ups were reported in accordance with SCARE criteria and guidelines [18].

2. Case report

A 36-year-old male who presented to our emergency room with severe lower abdominal pain and discomfort and fever. The patient had a 4-year history of ulcerative colitis and was usually treated with mesalazine (exact dosage unknown).Physical examination findings included an upward shift of the hepatic turbinate, overall abdominal tenderness,

Abbreviations: CT, Computed Tomography; OPSI, overwhelming post-splenectomy infection.

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mainly in the left lower abdomen, mild abdominal muscle tension, and no percussion pain in the hepatic or renal region. Inpatient laboratory data:leukocytes:13.62×109/L, neutrophils:90.10%, c-reactive protein:176.50 mg/L, glucose:10.6 mmol/L, lactate:3.0 mmol/L. Coagulation routine:prothrombin time 16.1S, international normalized ratio 1.43, activated partial thromboplastin time 32.0S. Plasma fibrinogen 2.5 g/L; calcitoninogen 8.967 ng/mL. The patient's initial abdominal CT showed an enlarged and abnormally thick spleen with signs of gastrointestinal perforation (Fig. 1).

After giving rehydration and anti-infective treatment with imipenem cistatin (1.0 g q8h), we performed emergency surgery on the patient. After opening the pelvic abscess cavity, we found dense adhesions between the lower abdomen, pelvic ileum, sigmoid colon, and peritoneum of the pelvic wall, and some omental necrosis and adhesions around the ileum and sigmoid colon, forming a pelvic abscess. The intestinal wall was edematous and thickened, and a large number of gray-white attachments were seen. At the same time, the distal end of the appendix was visibly occluded and swollen with pus moss. After surgery, the patient was transferred to the intensive care unit to continue rehydration and anti-infective treatment. We performed partial sigmoid resection, pelvic-abdominal adhesion release, incidental appendectomy, pelvic abscess incision and drainage, partial resection of the greater omentum, and temporary colostomy to repair the perforation. Postoperatively, the rupture of the sigmoid colon with hemorrhage, necrosis, acute and chronic inflammatory cell infiltration, inflammatory exudate and granulation tissue, glandular hyperplasia and thrombosis, and negative cut margins were suggested as the pathological manifestations (Fig. 3). After surgery, the patient's CT scan showed an enlarged spleen, approximately 8 rib units in size, with heterogeneous density and a large air shadow. The enlarged spleen was thought to be infected and forming an abscess (Fig. 2). When the patient developed fever, blood cultures were performed and imipenemcitabine (1.0 g q8h) was given as an anti-infective drug, but the blood cultures were negative. Although ultrasound-guided puncture and drainage of the splenic abscess was performed, the patient's infection index did not decrease significantly after the procedure, and the platelet count and prothrombin time both decreased significantly. Coagulation routine: prothrombin time 15.4S, international normalized ratio 1.36, activated partial thromboplastin time 48.9S, and prothrombin time 21.6S. The patient also continued to present with intermittent fever and abdominal pain.

Once the patient's hypoproteinemia and coagulation were corrected, we performed splenectomy and abdominal drainage. Intraoperatively, a large splenic gangrene with red-brown purulent effusion, a peripheral yellow-brown effusion, and a yellow-brown pelvic effusion were seen. Postoperative pathology showed partial necrotic hemorrhage of the spleen (Fig. 4). The patient continued symptomatic treatment after surgery, and the patient's fever and abdominal discomfort gradually improved compared with the preoperative symptoms. The patient's imaging and test indexes returned to normal and was discharged after improvement.

3. Discussion

Splenic abscesses are uncommon, with an incidence of 0.14 %–0.7 % [2]. This is because the spleen is not only an organ with hematopoietic function, but also contains a large number of phagocytes and is an immune organ that can resist infection. Blood-borne dissemination, structural and functional alterations of the spleen (infarction, hematoma hemoglobinopathy, etc.), spread of infection to nearby organs, and immunodeficiency are the main mechanisms of splenic abscesses [3]. Among them, blood-borne disseminated infection is the most common cause of splenic abscesses. Over a five-year period, 16 patients with splenic abscesses were collected from tertiary care institutions in Taiwan, seven of whom suffered from sepsis and two from infective endocarditis. Aerobic Gram-positive cocci (Streptococcus and Staphylococcus) and Gram-negative bacilli (Klebsiella, *Escherichia coli*, and Pseudomonas, among others) are the most common pathogens described in the literature for splenic abscesses, while anaerobic bacteria are less

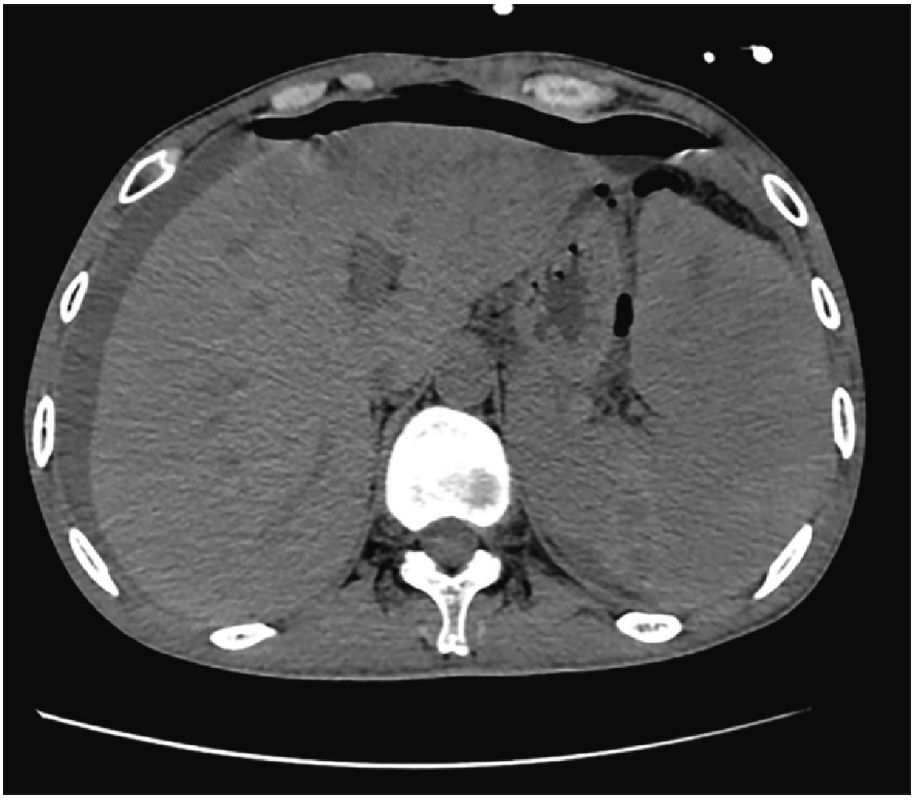

Fig. 1. Enlarged spleen with visible hypodense areas (CT scan).

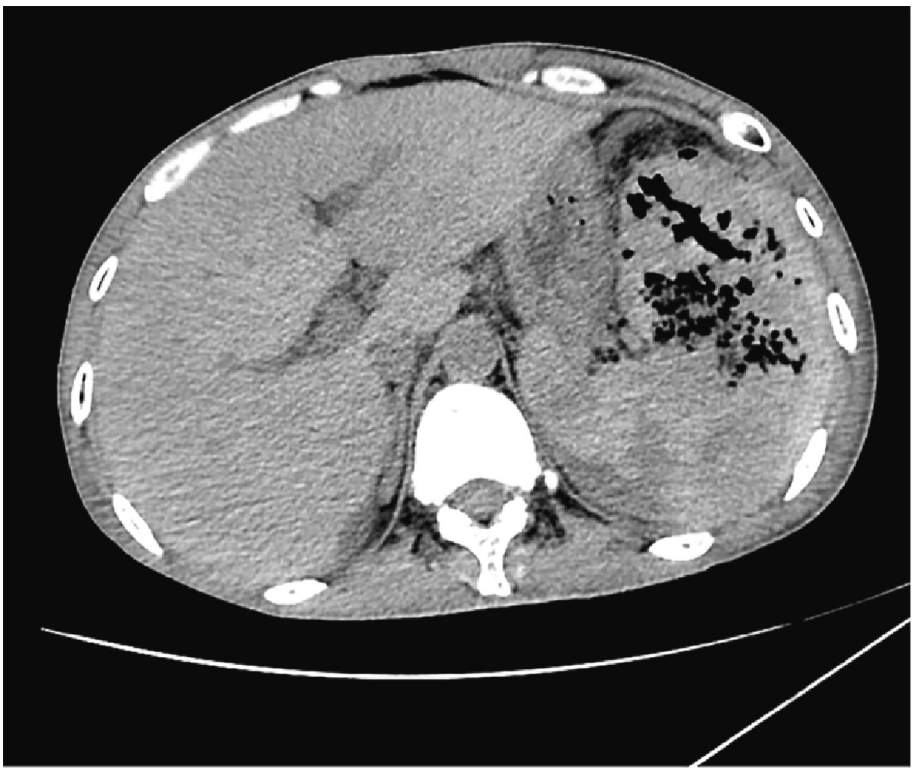

Fig. 2. Uneven density and multiple gas shadows in the spleen.

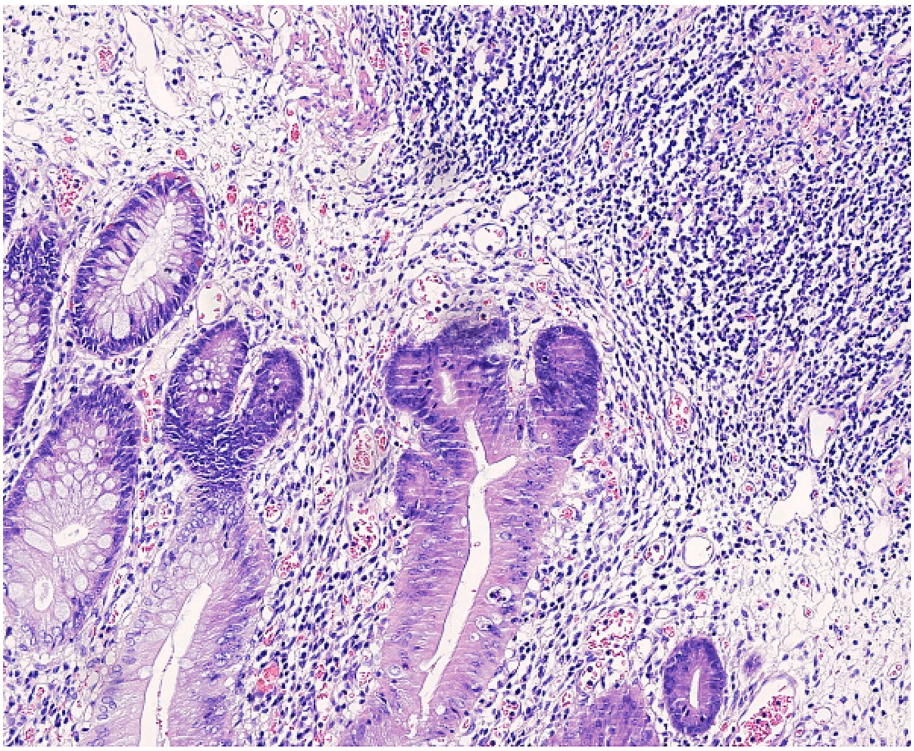

Fig. 3. Hemorrhagic necrosis of the colon and acute and chronic inflammatory cell infiltration and inflammatory exudate and granulation tissue and glandular hyperplasia.

frequently isolated [4,5]. Although blood cultures in this patient did not show any obvious significant abnormalities at the time of fever, considering that this patient had ulcerative colitis, the main pathogenesis of his splenic abscess may be immunosuppression and nearby organ infections due to prolonged ulcerative colitis after sigmoid colon perforation, which is less frequently reported in clinical cases.

Patients with splenic abscess usually have fever, abdominal discomfort and leukocytosis, but none of these symptoms are specific.

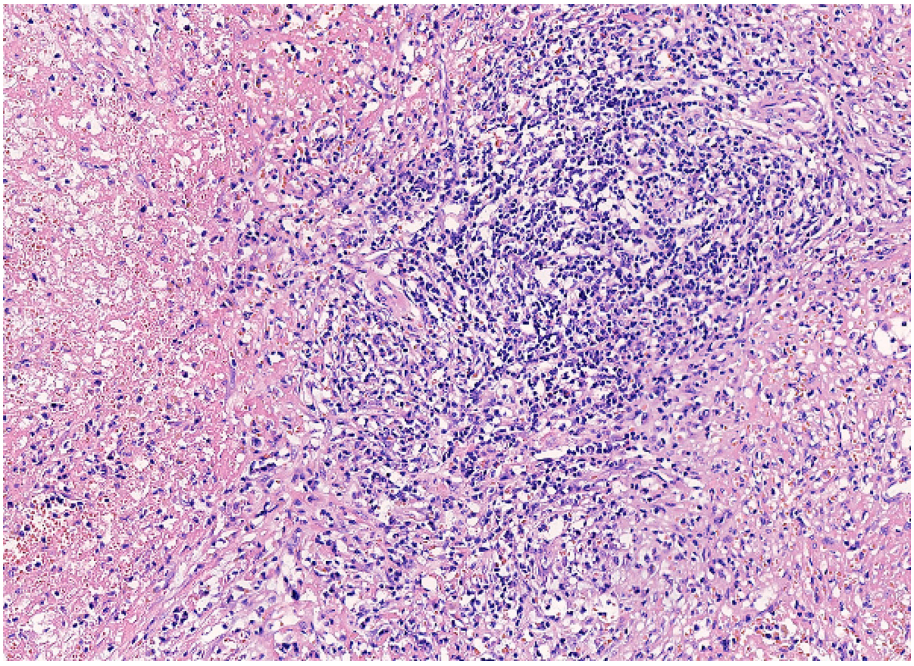

Fig. 4. Splenic tissue with partial hemorrhage and necrosis.

Studies have shown that blood cultures are positive in 24–80 % of patients with splenic abscesses, while post-drainage abscess cultures have better sensitivity, estimated at 50–80 %, but in 28–55 % of punctured patients [6], blood cultures agree with abscess pus cultures in only 38 %. It is suggested that the detection of infectious flora in blood cultures is of some significance in the diagnosis of splenic abscesses. However, it is still difficult to diagnose splenic abscesses from blood cultures and puncture data alone. As this patient had an abdominal infection due to intestinal perforation, we pre-treated him with anti-infective therapy, which is one of the reasons why the flora was not detected in the patient's blood culture. Due to the low sensitivity and specificity of clinical indicators and laboratory markers for the diagnosis of splenic abscess, imaging is crucial. CT scan is the gold standard for diagnosis and can diagnose splenic abscess in more than 90 % of patients, with the spleen typically showing a hypodense lesion on scan [7]. Also CT can help the physician plan treatment by depicting the details of the abscess and the topography of the surrounding structures. Early CT in this patient suggested an enlarged and dense heterogeneous spleen, but the sigmoid perforation abdominal infection was accompanied by fever and abdominal pain, and we did not treat the splenic abscess aggressively, which may have contributed to the patient's intermittent fever and inadequate medication; we also did not treat the patient with perforation drainage because we did not review the abdominal CT in a timely manner. This may also be one of the reasons for the further development of splenic abscess. Therefore, for patients with gastrointestinal perforation combined with splenic abscess, we should make an accurate diagnosis in the patient's imaging examination and symptoms and signs, and consider not only the possibility of splenic abscess formation in combination with the patient's imaging performance, but also early blood culture and timely medication according to its results, so that the patient's splenic abscess can be well controlled at an early stage and further progression of the disease can be avoided.

For the treatment of splenic abscesses, hospital admission is recommended for all patients with splenic abscesses. The choice of antibiotics is guided by the blood culture results upon admission, and when the blood culture results are negative, treatment is mostly with broad-spectrum enteric antibiotics [8]. Three modalities are commonly used, namely, antimicrobial therapy alone, percutaneous puncture drainage, and splenectomy drainage. Currently, treatment of splenic abscesses with antibacterial drugs alone is very rare. The mortality rate of patients treated with antibiotics alone has been reported to be more than 50 %. Therefore, it is difficult to improve the patient's symptoms with antibacterial drug treatment alone. As the patient's symptoms further worsen, the patient may then need to be treated by percutaneous puncture drainage. Currently, ultrasound-guided percutaneous puncture drainage is more likely to reduce abdominal infections in addition to being less costly and easier to administer [9]. Percutaneous puncture drainage also has a significant role in reducing the length of hospital stay and preventing the risk of abdominal rupture in patients, with an efficiency of 70–100 % in the treatment of splenic abscesses [10,11]. Meanwhile, contraindications to percutaneous drainage include: multiple small abscesses, debris-filled cavities, coagulation disorders, poorly defined cavities, diffuse ascites, and difficult access. Recent studies have shown the success of using different treatments depending on the abscess characteristics. Percutaneous drainage is unlikely to be successful in patients with multi-compartment abscesses, poorly defined cavities, necrotic debris, and viscous fluid. Percutaneous aspiration may be a less invasive option in patients at high risk for surgery or a temporary solution used as a bridge to surgery, avoiding the risk of a fulminant and potentially life-threatening infection. Percutaneous aspiration is a successful approach when the abscess collection is unilocular or bilocular, with a complete and thick wall and no internal septations. Aspiration is easier to achieve when the content is liquid enough to be drained. If there are multiple collections or associated coagulopathy, either laparoscopic or open surgical treatment is preferred.

The treatment of splenectomy for splenic abscesses remains highly controversial. The spleen has an important immune role and splenectomy carries the risk of overwhelming post-splenectomy infection (OPSI). Although the rate of OPSI is low, the risk of sepsis and associated mortality is 5-fold and 200-fold higher in patients with splenic malformations, respectively. One strategy to reduce the risk of OPSI is a surgical approach that preserves the parenchyma. Partial or hemisplenectomy can preserve splenic function and prevent the development of OPSI [12]. For necessary total splenectomy, current studies suggest that patients are more likely to develop persistent postoperative infections. Therefore, postoperative anti-infective therapy remains necessary. It is also important to treat patients with early intervention to prevent further infection even if they have the mildest signs of infection

or cold postoperatively [13,14].

For the treatment of this patient, we first chose antimicrobial medication, which was less effective, and then we performed trans-ultrasound-guided puncture drainage because the patient's coagulation function was still acceptable. The patient's symptoms were slightly better for the first few days of drainage, but then the patient developed more pronounced coagulation abnormalities, and the symptoms were more recurrent than before. Although drainage and the use of broad-spectrum antibiotics are currently the treatment of choice for splenic abscesses, splenectomy remains the gold standard for the treatment of splenic abscesses after assessing the patient's risk of bleeding [15–17]. Due to the combination of intestinal perforation and abdominal infection in this patient, conventional antibiotic treatment and puncture drainage did not relieve the symptoms, and we finally chose total splenectomy after integrating the imaging manifestations of the patient, and the patient was actively given anti-infective treatment after surgery, and the patient's symptoms improved significantly. We have insufficient experience in the treatment of this patient with intestinal perforation combined with splenic abscess, and if aggressive intraoperative intervention had been given, the patient might have avoided surgical treatment. Currently, the treatment of splenic abscesses remains a challenge, and the sharing of this case may provide some clinical experience in the treatment of intestinal perforation combined with splenic abscesses.

4. Conclusion

In our case report, we describe a rare case of direct etiologic dissemination in a patient who formed a splenic abscess whose clinical presentation was largely masked by an intestinal perforation with ulcerative colitis. Despite aggressive postoperative treatment of the splenic abscess, we ultimately performed a splenectomy due to splenic necrosis. Therefore, patients with clinically insignificant splenic abscesses should undergo appropriate diagnostic tests and be treated as early as possible to prevent progression of the disease.

Ethics approval

The requirement for ethics approval was waived because this was not a clinical study and consent for publication was provided by the patient.

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CRediT authorship contribution statement

Zheng LK collected the data, imaging and operation reports and wrote the initial draft of the manuscript and subsequent revisions; Wu L, Qiu WL was involved in editing and overseeing the text; Zhang BG, Zhang XB made the operation plan; Liu SQ was the chief surgeons of the patient; Liu SQ was the senior author, and was responsible for oversight of the report and editing the manuscript; and all authors read and approved the final manuscript. All authors declare that they have no conflict of interest.

Guarantor

The doctor Shiqi Liu and Baogui Zhang can accept full responsibility for the work, have access to the data, and control the decision to publish.

Registration of research studies

None.

Consent

The patient has provided informed consent for publication of the case.

Statement of non-duplication

All authors certify that manuscript is a unique submission and is not being considered for publication by any other source in any medium. Further, the manuscript has not been published, in part or in full, in any form.

Conflicts of interest

The authors declare that they have no conflict of interests in this article.

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