Uncommon cause of pneumoperitoneum

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Abstract

Free intraperitoneal air is thought to be pathognomonic for perforation of a hollow viscus. Here, we present a patient with pain in the upper left quadrant, a mild fever and leukocytosis. Free air was suggested under the left diaphragm but during the explorative laparotomy no signs of gastric or diverticular perforation were seen. Further exploration and revision of the computed tomography revealed a perforated splenic abscess. Splenic abscesses are a rare clinical entity. Presenting symptoms are often non-specific and include upper abdominal pain, recurrent or persistent fever, nausea and vomiting, splenomegaly, leukocytosis and left lower chest abnormalities. Predisposing conditions can be very divergent and include depressed immunosuppressed state, metastatic or contiguous infection, splenic infarction and trauma. Splenic abscess should therefore be considered in a patient with fever, left upper abdominal pain and leukocytosis. Moreover, our case shows that splenic abscess can present in an exceptional way without clear underlying aetiology and should even be considered in the presence of free abdominal air.

Core tip: Free intraperitoneal air is thought to be pathognomonic for perforation of a hollow viscus. Here, we present a patient with pain in the upper left quadrant, a mild fever and leukocytosis. Free air was suggested under the left diaphragm but during the explorative laparotomy no signs of gastric or diverticular perforation were seen. Further exploration and revision of the computed tomography revealed a perforated splenic abscess. Splenic abscesses are a rare clinical entity. Our case shows that splenic abscess can present in an exceptional way without clear underlying aetiology and should even be considered in the presence of free abdominal air.

INTRODUCTION

Splenic abscess is a rare condition with a reported frequency in autopsy series between 0.1% to 0.7%[1-3]. Presenting symptoms include upper abdominal pain, recurrent or persistent fever, nausea and vomiting, splenomegaly, leukocytosis and left lower chest abnormalities[4,5]. Diagnosis of a splenic abscess is confirmed on ultrasound or computed tomography (CT)-imaging of the abdomen. Splenectomy has been the gold standard treatment for splenic abscess, however more recent percutaneous drainage is also suggested to be safe and effective[1,6,7]. While gas formation in splenic abscess has been described, few have reported pneumoperitoneum as presenting symptom of a ruptured splenic abscess[8-11].

CASE REPORT

A 78-year-old man presented to our Emergency Room with acute abdominal pain located in the upper left quadrant. The pain had presented in the middle of the...
night, waking the patient. No nausea nor vomiting had occurred, but he was experiencing an urge to move. His clinical record mentioned a mild mitralis valve insufficiency, atypical rheumatic complaints and diverticulosis. He did not use immunosuppressive medication. Clinical examination reported a painful man with a mild fever and raised pulse. The abdomen was bloated, showed little peristaltic sounds, while percussion of the liver was normal and neither liver nor spleen were palpable. Laboratory findings showed leukocytosis and a raised CRP. On the standing X-ray of the thorax a strong suspicion of free air was suggested under the diaphragm, which was confirmed with an X-ray of the abdomen in left lateral position (Figure 1).

Additional CT showed free air in the upper abdomen with some abdominal fluid left paracolic and in the small pelvis, some left pleural effusion, thickening of the gastric wall and a cyst in the spleen (Figure 2). Therefore, a gastric perforation was suggested. There was no sign of diverticular infiltration or perforation.

After intravenous antibiotics were started on the ER, an explorative laparotomy was performed. No signs of gastric or diverticular perforation were seen. Reevaluation of the CT in the operation room was performed and the suggestion of an abscess rather than a cyst in the spleen was introduced (Figure 2). Further exploration of the flexura lienalis was performed and pus was evacuated from the upper left quadrant. A ruptured splenic abscess was found and a splenectomy was performed. Cultures and the suggestion of an abscess rather than a cyst in the spleen (Figure 2). Therefore, a splenectomy was performed. Cultures and the suggestion of an abscess rather than a cyst in the spleen (Figure 2).

Pathology report of the spleen revealed an inflammation with abscess and necrosis without micro-organisms or signs of neoplasia. Post-splenectomy vaccinations were prescribed and the patient was discharged 2 wk after admission. Two months after surgery he was in a good clinical condition.

**DISCUSSION**

Diagnosis of splenic abscess is often not considered due to its rarity and the presence of predisposing conditions which obscure its clinical presentation[4]. Thereby, the aetiology of splenic abscesses is diverse. Three etiological causes of splenic abscesses have been proposed by Kuttner: trauma with secondary infection; per continuitatem; and haematogenous spread[12]. Development by conti-nuitatem has been described in perforated gastric ulcer, perinephric abscess, septic appendix, appendicitis with perforation and in case of concomitant colon carcinoma[4,8,15,16]. Colon carcinoma are also important precursors in the small number of cases in which metastasis of the spleen were secondary infected[13]. Other haematological spread can be caused by retropharyngeal abscess, oitis media, tonsillectomy, infective endocarditis and phlebitis of the cal[4,15,16].

The most common organisms found on bacteriological examination are Gram Negative Bacillus (Klebsiella Pneumoniae, Escherichia Coli) and Gram Positive Coccus (Staphylococcus Aureus), although a great variety of pathogens have been described[4,8,15,16].

All studies on this subject stress the strong correlation between splenic abscess and predisposing factors. Direct trauma, infarction or ischemia of the spleen predispose to secondary infection. Especially immunosuppressive state seems to play a great role in the development and rising incidence of splenic abscesses[19]. Furthermore, intravenous drug abuse, human immunodeficiency virus, diabetes mellitus, tuberculosis and neoplasia seem to be contributing diseases[4,8,15,16].

Review of the literature shows only a few cases in which a splenic abscess presented with a pneumoperitoneum[4,8,15,16]. In some of these cases the aetiology is clear, but all needed an explorative laparotomy to clarify the diagnosis.

In our case, due to the free abdominal air we expected to find a gastric perforation. The splenic abscess was detected during the explorative laparotomy and only in retrospection the CT-images were interpreted accordingly. Postoperative evaluation revealed no aetiological cause of the splenic abscess. The patient did have diverticulosis, but on operative inspection no inflammation was present. Pathology report of the spleen revealed an inflammation with abscess and necrosis without micro-organisms or signs of neoplasia. Post-splenectomy vaccinations were prescribed and the patient was discharged 2 wk after admission. Two months after surgery he was in a good clinical condition.
present in an exceptional way without clear underlying aetiology and should even be considered in the presence of free abdominal air.

**COMMENTS**

**Case characteristics**

The presenting symptoms include acute abdominal pain located in the upper left quadrant with and an urge to move.

**Clinical diagnosis**

The patient had a mild fever and raised pulse, a bloated abdomen which showed little peristaltic sounds.

**Differential diagnosis**

Based on these findings an extensive differential diagnosis of intra-abdominal pathology arose.

**Laboratory diagnosis**

Laboratory findings showed a leukocytosis and raised CRP. On the standing X-ray of the thorax free air was suggested and a strong suspicion of perforation of a hollow viscus arose.

**Imaging diagnosis**

Additional computed tomography showed free air in the upper abdomen with some abdominal fluid left paracolic and in the small pelvis, thickening of the gastric wall and a cyst in the spleen.

**Pathological diagnosis**

Review of the literature shows only a few cases in which a splenic abscess presented with a pneumoperitoneum. In some of these cases the aetiology is clear, but all needed an explorative laparotomy to clarify the diagnosis.

**Treatment**

After intravenous antibiotics were started, an explorative laparotomy was performed and a ruptured splenic abscess was treated by a splenectomy.

**Related reports**

While gas formation in splenic abscesses has been described, few have reported pneumoperitoneum as presenting symptom of a ruptured splenic abscess.

**Experiences and lessons**

Therefore, splenic abscess should be considered in a patient with fever, left upper abdominal pain and leukocytosis, even in the presence of free abdominal air.

**Peer review**

This is a very interesting case report.

**REFERENCES**

1. Sreekar H, Saraf V, Pangi AC, Sreeharsha H, Reddy R, Kamat G. A retrospective study of 75 cases of splenic abscess. Indian J Surg 2011; 73: 398-402 [PMID: 23204694 DOI: 10.1007/s12262-011-0370-y]
2. Carbonell AM, Kercher KW, Matthews BD, Joels CS, Sing RF, Heniford BT. Laparoscopic splenectomy for splenic abscess. Surg Laparosc Endosc Percutan Tech 2004; 14: 289-291 [PMID: 15492661 DOI: 10.1097/0129669-2004100000013]
3. Knauer QF, Abrams JS. Generalized peritonitis due to a ruptured splenic abscess. Am J Surg 1966; 112, 923-926 [PMID: 5928813 DOI: 10.1016/0002-9610(66)90152-8]
4. Chang KC, Chuhai SK, Changchien CS, Tsai TL, Lu SN, Chiu HC, Chen YH. Clinical characteristics and prognostic factors of splenic abscess: a retrospective study of 67 cases in a single medical center of Taiwan. World J Gastroenterol 2006; 12: 460-464 [PMID: 16498960]
5. Lee WS, Choi ST, Kim KK. Splenic abscess: a single institution study and review of the literature. Yonsei Med J 2011; 52: 288-292 [PMID: 21319348 DOI: 10.3349/ymj.2011.52.2.288]
6. Fotiadis C, Lavranos G, Patapis P, Karatzas G. Abscesses of the spleen: report of three cases. World J Gastroenterol 2008; 14: 3088-3091 [PMID: 18494065 DOI: 10.3748/wjg.v14.i30.3088]
7. Conzo G, Docimo G, Palazzo A, Della Pietra C, Stanzione F, Sciacchia V, Santini L. The role of percutaneous US-guided drainage in the treatment of splenic abscess. Case report and review of the literature. Ann Ital Chir 2012; 83: 433-436 [PMID: 22615037]
8. Ishigami K, Decker GT, Bolton-Smith JA, Samuel J, Wilson SR, Brown BP. Ruptured splenic abscess: a cause of pneumoperitoneum in a patient with AIDS. Emerg Radiol 2003; 10: 163-165 [PMID: 15290509 DOI: 10.1007/s10140-003-0302-7]
9. Rege SA, Philip U, Quentin N, Deolekar S, Rohnadia O. Ruptured splenic abscess presenting as pneumoperitoneum. Indian J Gastroenterol 2001; 20: 246-247 [PMID: 11817784]
10. Puhakka KB, Boljanovic S. Ruptured splenic abscesses as cause of pneumoperitoneum. Rofo 1997; 166: 273-274 [PMID: 9134035 DOI: 10.1055/s-2007-1015425]
11. Braat MN, Hueting WE, Hazebroek EJ. Pneumoperitoneum secondary to a ruptured splenic abscess. Intern Emerg Med 2009; 4: 349-351 [PMID: 19415449 DOI: 10.1007/s11739-009-0253-4]
12. van de Wiel W, van Dongen R. Splenic abscess as a complication of salmonella infection. Ned Tijdschr Geneesk 1964; 108: 992-994 [PMID: 14152865]
13. Giacobbe A, Vaccaruso D, Modola G, Catrelli E, Caruso N, Perri F, Tardio B, Biscaglia M, Andriulli A. Splenic abscess secondary to penetrating gastric ulcer. Minerva Gastroenterol Dietol 1998; 44: 111-115 [PMID: 16945891]
14. Stewart IE, Borland C. Case report: perinephric-splenic fistula—a complication of percutaneous perinephric abscess drainage. Br J Radiol 1994; 67: 894-896 [PMID: 7953232 DOI: 10.1259/0007-1285-67-801-894]
15. Pisanu A, Ravarino A, Nieddu R, Uccheddu A. Synchronous isolated splenic metastasis from colon carcinoma and concomitant splenic abscess: a case report and review of the literature. World J Gastroenterol 2007; 13: 5516-5520 [PMID: 17907299]
16. Robinson SL, Saxe JM, Lucas CE, Arbulu A, Ledgerwood AM, Lucas WP. Splenic abscess associated with endocarditis. Am J Surg 1992; 112: 781-786; discussion 786-787 [PMID: 1411951]
17. Brook I, Frazier EH. Microbiology of liver and spleen abscesses. J Med Microbiol 1998; 47: 1075-1080 [PMID: 9856643 DOI: 10.1099/00226517-47-12-1075]
18. Nelken N, Ignatius J, Skinner M, Christensen N. Changing clinical spectrum of splenic abscess. A multicenter study and review of the literature. Am J Surg 1987; 154: 27-34 [PMID: 3300398 DOI: 10.1016/0002-9440(87)90285-6]
19. Ooi LL, Leong SS. Splenic abscesses from 1987 to 1995. Am J Surg 1997; 174: 87-93 [PMID: 9240961]
20. Phillips GS, Radosевич MD, Lipsett PA. Splenic abscess: another look at an old disease. Arch Surg 1997; 132: 1331-1335; discussion 1335-1336 [PMID: 9403539 DOI: 10.1001/archsurg.1997.01430360070714]

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