CASE REPORT

Ruptured splenic abscess causing pneumoperitoneum: a rare cause revisited

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SUMMARY

We present a case report of splenic abscess causing pneumoperitoneum in a case of uncontrolled diabetes. The patient presented with chronic pain abdomen and fever which later evolved to acute abdomen during the course of hospital stay. An X-ray showed pneumoperitoneum and exploratory laparotomy was performed under a strong clinical suspicion of hollow viscus perforation. The patient was treated with antibiotics and had an uneventful recovery.

BACKGROUND

Pneumoperitoneum is considered almost always synonymous with perforated hollow viscus. However, there are certain other entities that cause pneumoperitoneum. One such uncommon cause is a splenic abscess. Although emergency laparotomy is mandatory in a case of hollow viscus perforation, it is not so in case of splenic abscess. Splenectomy is considered the gold standard treatment, although less extensive splenic abscess can be conservatively managed by antibiotics and placement of a drainage tube. Therefore, preoperative differentiation of these entities is necessary for appropriate planning of treatment.

CASE PRESENTATION

A 48-year-old diabetic man presented with a 6-month history of high grade, intermittent fever associated with headache and left hypochondrial pain. During his course of hospital stay, the patient developed acute abdominal pain associated with fever and vomiting. On examination, the patient appeared dehydrated and tachycardia (pulse rate 105 bpm, blood pressure 100/70 mm Hg) was present. Palpation revealed splenomegaly, diffuse tenderness all over the abdomen and guarding over the right iliac fossa.

INVESTIGATIONS

Haematology

- ▶ Laboratory investigations revealed a raised white cell count (WCC) of $19.8 \times 10^9/L$ with neutrophilia. Blood glucose levels were elevated.
- ▶ Liver and renal function tests were within normal limits.
- ▶ Red blood cells: $4.31 \times 10^3/cm^3$
- ▶ Total WCC: $19.8 \times 10^9/L$

Differential count

- ▶ Neutrophils: 85%
- ▶ Lymphocytes: 10%
- ▶ Monocytes: 3%
- ▶ Eosinophils: 1%
- ▶ Basophils: 0%
- ▶ Smear for malarial parasite: negative

Biochemistry

- ▶ Fasting blood glucose: 372 mg%
- ▶ Postprandial blood glucose: 445 mg%
- ▶ Glycated haemoglobin: 12.5%
- ▶ Blood urea: 39 mg%
- ▶ Serum creatinine: 1.3 mg%

Serology

- ▶ Immunochromatography for malaria: negative
- ▶ HIV: non-reactive
- ▶ Hepatitis B virus: non-reactive
- ▶ Hepatitis C virus: non-reactive

Culture and sensitivity

- ▶ Pus culture from the splenic abscess (obtained per-operatively) was *Escherichia coli* positive.
- ▶ Blood culture reports were negative.

Radiology

- ▶ Erect chest X-ray (figure 1) showed a crescent of free air under the right hemidiaphragm.
- ▶ CT scan (figures 2–4) confirmed the presence of pneumoperitoneum with additional findings of heterogeneous density of the spleen with air pockets suggestive of a *gas forming splenic abscess*. A minimal peri-splenic collection was noted. Free fluid was noted in the abdomen and pelvis.

DIFFERENTIAL DIAGNOSIS

Hollow viscus perforation.

Figure 1 Erect chest X-ray showing a crescent of air under the right hemidiaphragm.

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Figure 2 Non-contrast CT of the abdomen axial sections showing free air anterior to the liver. Hypodense areas with gas bubbles noted in the spleen with minimal perisplenic fluid collection.

TREATMENT

Exploratory laparotomy was performed in view of the clinical suspicion of a perforated hollow viscus. There was no evidence of perforation. The surface of the spleen was irregular. Peritoneal lavage was done and the abdomen was closed. The patient was managed postoperatively with broad spectrum antibiotics and insulin.

OUTCOME AND FOLLOW-UP

The patient recovered well in the postoperative period.

DISCUSSION

Splenic abscess is a rare entity with approximately only 600 cases being reported in the literature review so far. Its incidence is about 0.2–0.7% in autopsy series. A splenic abscess causing

Figure 3 Contrast enhanced CT coronal reformatted image showing non-enhancing areas with gas bubbles in the spleen and perisplenic fluid collection. Loss of continuity of the splenic capsule noted (arrow)—suggestive of ruptured splenic abscess.

pneumoperitoneum is even rarer in that only six such cases have been reported to date.^{1–3}

Ooi and Leong⁴ reviewed 287 cases reported in the medical literature between 1987 and 1995 and stated that the most common complication of splenic abscess was rupture in the peritoneal cavity, seen in 7% of the cases, and the most common organisms cultured were *Staphylococcus*, *Salmonella* and *E. coli*. In our case, the organism isolated was *E. coli*.

Three aetiological causes of splenic abscesses have been proposed:⁵ trauma with secondary infection; per continuitatem; and haematogenous spread. Development by continuitatem has been described in perforated gastric ulcer, perinephric abscess, septic abortion, appendicitis with perforation and in the case of concomitant colon carcinoma. Colon carcinoma metastases to the spleen is also an important precursor in a small number of cases where the metastases get secondarily infected. Other haematological spread can be caused by retropharyngeal abscess, otitis media, tonsillectomy, infective endocarditis, urinary tract infections and phlebitis of the calf. The most common organisms found on bacteriological examination are Gram-negative bacilli (*Klebsiella pneumoniae*, *E. coli*) and Gram-positive cocci (*Staphylococcus aureus*), although a great variety of pathogens have been described. All studies on this subject stress the strong correlation between splenic abscess and predisposing factors. Direct trauma, infarction or ischaemia of the spleen predispose to secondary infection. The immunosuppressive state especially seems to play a great role in the development and rising incidence of splenic abscesses. The predisposing conditions include intravenous drug abuse, HIV, diabetes mellitus, tuberculosis and neoplasia. In our case, *E. coli* was the pathological organism and diabetes mellitus the predisposing factor.

The cause of splenic abscess is bacteraemia, particularly in the clinical setting of trauma, embolisation or haemoglobinopathy and immunodeficiency, as in HIV infection. It may also result from extension of a contiguous focus of infection. No known predisposing factor other than uncontrolled diabetes was

Figure 4 Postoperative images showing placement of drains in the subhepatic region and in the pelvis.

present and transient bacteraemia from urinary tract, on a background of uncontrolled diabetes could have led to the development of splenic abscess in our case.

It is observed that there is an increase in the incidence of splenic abscesses in recent years. This may be attributed to the increasing number of individuals with immunocompromised states like diabetes, cancer chemotherapy, HIV, steroid use, etc, and also to the better detection rates due to improved imaging technology.

In our case, although the CT scan was suggestive of splenic abscess as in the cause of pneumoperitoneum, there was a strong clinical suspicion in the mind of the clinician of a perforated hollow viscus, most likely a perforated appendix.

Learning points

- ▶ Splenic abscess should be included in the differential diagnosis of pneumoperitoneum, particularly in the clinical setting of an immunocompromised state.²
- ▶ The most common causative organisms are Gram-negative bacilli (*Klebsiella pneumoniae*, *E. coli*) and Gram-positive cocci (*Staphylococcus aureus*). Although splenectomy is considered the gold standard treatment for splenic abscess, conservative approach can be used for less severe cases.

This was because of the associated right iliac fossa pain, tenderness and guarding of acute onset which was associated with the pneumoperitoneum. An exploratory laparotomy that followed demonstrated no discontinuity in the bowel wall, thereby confirming our diagnosis. Peritoneal lavage was done and two drains were placed, one in the left subhepatic region and one in the pelvis. The patient recovered well in the post-operative period with antibiotics.

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