CASE REPORT

Pneumomediastinum and pneumoretroperitoneum: an extremely rare presentation of acute appendicitis

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Accepted 14 December 2014

SUMMARY

A 22-year-old woman presented with abdominal pain for 12 days. On examination, the abdomen was slightly distended and painful to palpation in the right flank. Subsequent abdominal imaging showed inflammation in the right iliac fossa, retroperitoneal air pockets with inflammation, and signs of pneumomediastinum. Exploratory laparotomy revealed a perforated retrocaecal appendix with abscess extending to the retroperitoneum. Surgical intervention involved a right hemicolectomy followed by end-to-side anastomosis of the ileum to the transverse colon. Histopathological examination of the resected specimen revealed intense inflammation of the caecum and no signs of malignancy. The patient was discharged in good condition 54 days after surgery.

BACKGROUND

Acute appendicitis is the most common cause of acute abdomen requiring surgical intervention, and its diagnosis and treatment in uncomplicated cases is straightforward. However, making the diagnosis of complicated appendicitis (with perforation and abscess formation) can be a challenge even for experienced clinicians, and atypical presentations may lead to delayed or missed diagnoses.[1 2] We report a case of perforated appendicitis presenting with retroperitoneal abscess and pneumomediastinum. This is a rare presentation of the disease, and can lead to life-threatening complications if not managed properly and timely.

CASE PRESENTATION

A 22-year-old woman presented to the emergency department of a tertiary care teaching hospital with abdominal pain for 12 days associated with fever and nausea without vomiting. Pain was felt in the epigastrium and radiated bilaterally to the lumbar region, especially in the right side. On admission, the patient was afebrile, eupnoeic and well hydrated but had tachycardia. She had no significant medical or family history. On examination, the abdomen was slightly distended and painful to palpation in the right flank with a positive Murphy's sign, normal bowel sounds and no signs of peritoneal irritation.

INVESTIGATIONS

Abnormal laboratory findings were a haematocrit of 32%, haemoglobin of 10.9 g/dL, leucocyte count of 36 280/mm^3 (leucocytosis) and band cells of 36%. Results of urinalysis showed turbid urine, 3 erythrocytes and 5 leucocytes per high-power field, bacteria 2+, negative nitrite and uric acid crystals 1+. Abdominal ultrasound performed 5 days earlier showed bilateral nephrolithiasis with pelvicalyceal dilation in the right side. Posteroanterior and lateral chest radiographs showed signs of pneumomediastinum (figure 1A, B), and upright and supine abdominal radiographs showed signs of pneumoretroperitoneum (figure 2A, B). Abdominal CT scan confirmed the radiographic findings and showed inflammation in the pericaecal area (figure 3A), a perforated retrocaecal appendix (figure 3B), retroperitoneal air pockets with inflammation (figure 3C) and pneumomediastinum (figure 3D).

DIFFERENTIAL DIAGNOSIS

An inflamed appendix may rupture and result in intraperitoneal abscesses in the right iliac fossa or pelvis. Patients with perforated retrocaecal appendicitis and abscess formation do not always present with the typical symptoms of acute appendicitis, and, as a result, a delay in diagnosis may occur. Formation of retroperitoneal abscesses involving the thigh, psoas muscle or perirenal space is a rare but serious complication of acute appendicitis associated with retrocaecal appendicular perforation due to delayed diagnosis.[3–5] Abdominal CT scan is the most effective diagnostic tool in these cases, while also allowing the evaluation of possible involvement of other compartments.[6] The condition of patients with retroperitoneal abscess formation is often critical on admission, but the causes of abscess formation usually cannot be determined before surgery.

Pneumomediastinum is an uncommon clinical condition that occurs when air leaks into the mediastinal space from the lungs or any of the luminal organs. Very rarely, gases leak from the colon into the mediastinum. This condition should be included in the differential diagnosis when CT scan shows retroperitoneal air pockets with inflammation, because these spaces communicate, and both air and infection may spread to and from the communicating compartments.[7]

TREATMENT

Subsequent exploratory laparotomy revealed a suppurative retrocaecal appendix perforated at the base with abscess extending to the retroperitoneum and areas of necrosis in the ascending colon. We decided to perform a right hemicolectomy followed by end-to-side anastomosis of the ileum to the transverse colon. Histopathological examination of

To cite: Dalbem CS, Nunes TF, Machado M da SS, *et al*. *BMJ Case Rep* Published online: [*please include* Day Month Year] doi:10.1136/bcr-2014-207255

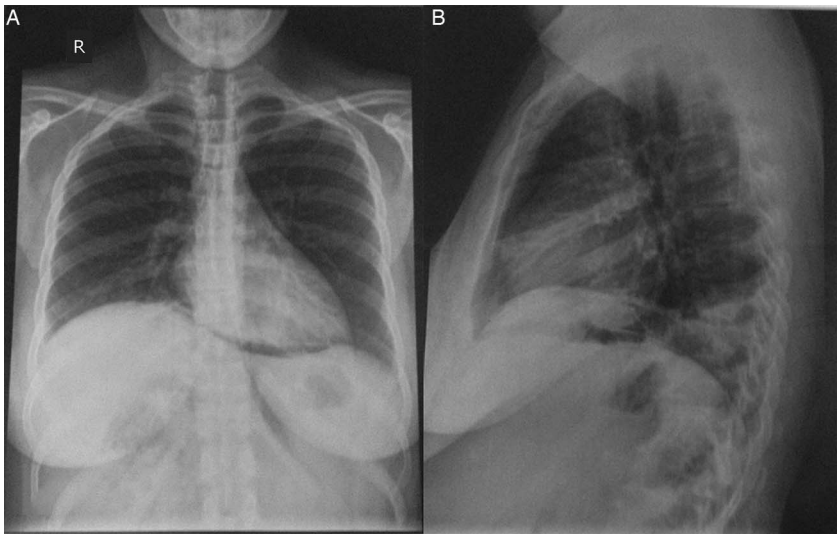

Figure 1 Posteroanterior (A) and lateral (B) chest radiographs showing pneumomediastinum (R, right).

the resected specimen revealed intense inflammation of the caecum and no signs of malignancy.

OUTCOME AND FOLLOW-UP

The patient developed a postoperative intra-abdominal abscess, which was successfully treated with ultrasound-guided percutaneous drainage and antibiotic therapy. She also developed pleural empyema secondary to nosocomial pneumonia requiring chest tube drainage and antibiotics. The patient was discharged in good condition 54 days after surgery.

DISCUSSION

Acute appendicitis is the most common abdominal surgical emergency worldwide, with an overall mortality rate of approximately 1% in the USA, reaching 3% in cases of perforation and up to 15% when perforation occurs in elderly patients.[1 2 8]

The diagnosis of acute non-perforated appendicitis is straightforward in typical cases, and simple appendectomy is believed to be sufficient. However, in doubtful cases, imaging tests such as ultrasound or CT scan can be used to avoid unnecessary surgical intervention.[5 9–11]

In complicated cases, perforation of the appendix may cause intraperitoneal abscess, often located in the right iliac fossa or in the pelvis. More rarely, formation of retroperitoneal abscesses involving the thigh, psoas muscle or perirenal space may occur as a serious complication of acute appendicitis associated with a perforated retrocaecal appendix due to delayed diagnosis and treatment.[5–7 9 12 13] An average time interval of 15 days between the onset of symptoms and diagnosis, and a high mortality rate, have been reported in such cases, with deaths attributed mainly to severe sepsis.[10]

Pneumoretroperitoneum has been reported in association with perforation of the extraperitoneal colon caused by inflammation, trauma or endoscopic manipulation.[12] Retroperitoneal perforations, however, are uncommon. A literature review including studies conducted from 1974 to 2006 found only 24 cases of retroperitoneal perforation associated with several clinical presentations.[14] Pneumomediastinum is also an uncommon but life-threatening condition caused by underlying diseases or detected after injuries, such as trauma, infection and injuries to the respiratory or digestive tract.[15] It rarely occurs in the absence of previous lung disease or precipitating factors.

Isolated retroperitoneal abscess formation has often been reported in patients with perforated retrocaecal appendicitis.[10] However, the combination of pneumoretroperitoneum and pneumomediastinum is a rare complication following acute appendicitis and has been previously described in only two cases related to acute appendicitis.[7 8] A timely diagnosis of this

Figure 2 Upright (A) and supine (B) abdominal radiographs showing pneumoretroperitoneum (R, right).

Figure 3 Non-contrast CT scan showing (A) pericaecal inflammation (axial plane); (B) perforated retrocaecal appendix (arrow; sagittal plane); (C) signs of pneumoretroperitoneum (arrow) in the right perirenal space (sagittal plane) and (D) pneumomediastinum (red arrow) and gas in the right psoas muscle (blue arrow; coronal plane).

unusual presentation of acute appendicitis is therefore of clear benefit to affected patients. In this setting, CT is the most sensitive imaging tool to evaluate intraperitoneal and extraperitoneal structures in cases of acute perforated appendicitis.

Learning points

- Consider pneumoretroperitoneum and pneumomediastinum as rare but possible complications of acute perforated appendicitis.
- Delayed diagnosis can lead to serious complications such as formation of abscesses in the retroperitoneum or in other unexpected sites.
- Morbidity and mortality rates can only be reduced with a high rate of suspicion, early diagnosis and appropriate treatment.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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