Introduction

Appendicitis is a disease frequently encountered in surgical practice. Complications such as perforation, abscess formation and peritonitis are not uncommon. Most of the time, diagnosis and treatment are straightforward. On the other hand, a delayed diagnosis can lead to rare, but sometimes serious, complications. We present a rare but fatal case of retroperitoneal perforated appendicitis with subsequent extensive retroperitoneal abscess formation and subcutaneous emphysema resulting in severe sepsis, multiple organ failure and death.

Case report

A 76-year-old man presented at our emergency department with progressive abdominal pain and loss of appetite that had persisted for five days. The patient’s medical history showed non-insulin dependent diabetes mellitus and hypertension. Physical examination showed a slightly ill-looking man with a temperature of 37.5°C, a blood pressure of 90/45 mmHg and a pulse rate of 117/min. The abdomen was adipose and tender in the lower half and right flank without clinical signs of peritonitis. Abnormal laboratory data included leukocytosis (30.3 × 10^9/L), anaemia (Hb 6.6 mmol/L) and disturbed renal function (creatinine of 289 µmol/L and urea of 23.3 mmol/L). Urinalysis showed 2-5 leucocytes per field, 2-5 erythrocytes per field and no bacteria. Ultrasound examination of the abdomen showed a stone in the right pyelum, without signs of obstruction. On suspicion of suffering from urosepsis, the patient was treated with intravenous antibiotics, followed by a quick recovery with disappearance of leucocytosis. After four days he was discharged with oral antibiotics.

Five days later the patient returned to our hospital because of persistent abdominal pain, mainly on the right side. His blood pressure was 85/45 mmHg; pulse and body temperature were normal. On physical examination a red and tender mass was palpable in the right upper abdominal quadrant. Laboratory tests showed leukocytosis (22 × 10^9/L), anaemia (6.5 mmol/L), thrombocytosis (631 × 10^9/L), progressively disturbed renal function (creatinine of 408 µmol/L and urea of 49 mmol/L) and increased C-reactive protein levels (326 mg/L). Ultrasoundography demonstrated an abscess in the right abdominal wall with culture of a subsequent puncture showing candida glabrata, candida tropicalis, gram-positive flora and anaerobe flora. Subsequently, the patient was treated with intravenous fluconazole, ciprofloxacin, amoxicillin and metronidazole. With abdominal computed tomography (CT) abscesses in the retroperitoneum and subcutaneous emphysema at the right side and in the right abdominal wall were seen, extending into the left abdominal wall down to the pelvis (Fig. 1). Emphysema in the left perirenal space with stones in the left kidney and bladder were also seen. Additional workup with CT-IVP (intravenous pyelogram) and contrast x-ray of the colon (for colonic perforation) showed no abnormalities. At this moment a urologic origin seemed the most likely cause. The patient was clinically stable and repeated laboratory tests did show some improvement (leucocytes of 10.1 × 10^9/L, C-reactive protein levels of 304 mg/L, creatinine of 168 µmol/L and urea of 31.5 mmol/L) during conservative treatment with intravenous antibiotics.

Key words. Perforated appendicitis; retroperitoneal abscess; subcutaneous emphysema.

Abstract. Most of the time, the diagnosis and treatment of appendicitis are straightforward. However, a missed diagnosis can sometimes lead to life-threatening complications. A fatal case of appendicitis in a 76-year-old man who presented with progressive abdominal pain, retroperitoneal abscesses and extensive subcutaneous emphysema, is described. Eventually, laparotomy showed appendicitis perforated into the retroperitoneum without any signs of peritonitis. Despite multiple operations the patient died two months after admission due to multiple organ failure.
However, on day nine, surgical drainage of retro- and preperitoneal abscesses took place. At laparotomy, exploration showed an appendicitis perforated into the retroperitoneum without any signs of peritonitis. Appendectomy was performed and several drains were left in the abscesses. Post-operatively, the patient’s condition deteriorated and despite multiple operations for persistent abscess formation and sepsis, he died due to multiple organ failure two months after admission.

**Discussion**

Worldwide, acute appendicitis is a disease commonly encountered in everyday practice, with a lifetime risk of approximately 7% (1). Proper diagnosis and treatment are essential to prevent morbidity and mortality (2, 3). Occasionally, serious and sometimes life-threatening complications of perforated appendicitis do occur. Four other cases of retroperitoneal perforated appendicitis with formation of retroperitoneal abscesses and subcutaneous emphysema have been described (4-7). Among these, several similarities are described: the patients’ presentation is unusual, a retroperitoneal ruptured appendicitis can cause serious complications and CT is the diagnostic tool of choice.

Although a frequently encountered disease, the diagnosis of appendicitis may be missed. Because of its position, a retroperitoneal perforated appendicitis can cause atypical and confusing physical findings (5). Infection and air can extend to communicating compartments, resulting in emphysema and abscesses in unexpected anatomical sites. Other cases have been described with extension to the abdominal wall, thigh, and perinephric space (4-7).

Since the location of infection in our patient was retroperitoneal, typical peritoneal signs were absent and treatment for a presumed urosepsis was installed. Prompt surgery and source control, especially during the first admission, would most likely have altered the unfortunate outcome of our patient. An early appendectomy could have prevented this extensive spreading of appendicitis.

For a definite diagnosis of acute appendicitis, CT scan of the abdomen is considered to be the imaging study with the highest accuracy and efficiency (8-10). Not only can it be of great help in diagnosis, but also in evaluating the extension of involvement. Furthermore, an approach for drainage of abscesses can be made on CT results. Only on CT scanning, emphysema and abscessing of the right flank were seen. As described by Ishigami et al., the superior and inferior lumbar triangles, two sites of anatomical weakness in the flank abdominal wall, allow spreading to the abdominal wall (7). Nonetheless, in our case, CT findings were not sufficient for the diagnosis and the cause of abscess and emphysema formation was unclear until laparotomy.

In summary, a case of a retroperitoneal perforated acute appendicitis causing formation of retro- and preperitoneal abscesses with extensive subcutaneous emphysema was presented: a rare but life-threatening complication. Physicians should have in mind that occasionally disease extension to unexpected anatomical sites does occur, causing unusual clinical pictures. CT scans of the abdomen should be made freely. However, sometimes an exploratory laparotomy is necessary to reveal the cause. This case re-emphasizes the importance of early management for such a common disease.

**References**


Fig. 1
CT abdomen showing extensive subcutaneous emphysema and abscess formation in the abdominal wall and left perirenal space.


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