

Left-sided chest pain: a case report of intra-abdominal aetiology



Case report

A 44-year-old African-American male presented to the emergency department with progressive left-sided anterior chest pain of 1-month duration, which was rated six out of 10 in intensity. Associated symptoms included nocturnal dry cough and tenderness to touch. The patient's symptoms were relieved with ibuprofen.

When questioned, the patient denied having fever, chills, dyspnoea, weight loss, abdominal pain, nausea, vomiting, change in bowel habits, constipation or a history of trauma. There was no previous history of medical problems or prior surgical procedures, and no known drug allergies.

The patient was unemployed and, hence, did not experience occupational exposures. He denied any previous travel history and animal exposure.

The patient drank 2 pints of beer per day and smoked 2 cigarettes per day, but denied illegal drug use.

Taking a family history revealed that his mother had cirrhosis, although the rest of the family was alive and well.

Investigations

A physical examination revealed the following: temperature 36.8°C; blood pressure 97/73 mmHg; pulse rate 89 beats per minute and regular; respiratory rate of 18 breaths per minute; and pulse oximetry of 100% on room air. The patient appeared well and without discomfort. His oropharynx was remarkable for poor dentition. Examination of the neck showed no jugular venous distention or lymphadenopathy.

Chest examination revealed a tender area 10 cm in diameter, which was raised 1–2 cm at the highest point. There was possible fluctuance but no crepitus. Lung examination revealed normal percussion and breath sounds. No egophony, wheezing, crackles or prolonged expiratory phase were noted. Cardiac examination revealed a normal point of maximal impulse, a regular rate and rhythm without murmurs, rubs or gallops. The patient had a non-distended soft abdomen with normal bowel sounds and no tenderness. No hepatosplenomegaly was noted. The extremities did not show the presence of

clubbing, cyanosis or oedema.

Laboratory data revealed a normal leukocyte count and differential. He had microcytic anaemia with haematocrit of 26% and mean corpuscular volume of 64 fL.

Both chest radiography and computed tomography were performed, and the results can be seen in figures 1 and 2, respectively.



Figure 1
Chest radiograph.

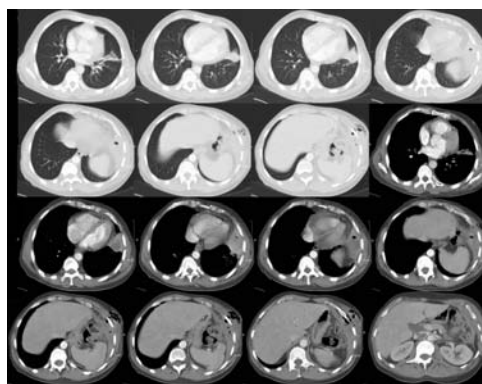


Figure 2
Images from the CT scan.

Task 1

Interpret the chest radiograph.

Task 2

At this point, suggest a diagnosis for this patient.

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Answer 1

The chest radiograph revealed left pleural effusion and consolidation of the left lower lobe.

Answer 2

The patient was diagnosed with **pneumonia** and **empyema necessitatis**, and started on antibiotics to prevent actinomyces, nocardia, streptococcus and anaerobic infections.

The patient was prescribed broad-spectrum antibiotics including penicillin, trimethoprim-sulphamethoxazole, levofloxacin and clindamycin. However, sputum did not reveal acid-fast bacilli on three occasions.

On re-admission to the hospital, thoracentesis was performed, which drained air but no fluid. Postthoracentesis chest radiography was unchanged and showed no pneumothorax. Surgical drainage removed 2 L of pus and revealed tracking down to the abdomen with a large abscess cavity adjacent to the transverse colon. The abdomen was thought to be the source of the infection. Cultures from the chest wall abscess were positive for *Escherichia coli* and *Staphylococcus aureus*.

Subsequently, the patient underwent a barium enema, which revealed two fistulas originating in the transverse colon: one small fistula extended to the chest wall abscess cavity and a second fistula to the small bowel (figure 3). Flexible sigmoidoscopy showed a non-obstructing mass that was 2 cm in size in the left transverse colon at 60 cm. Locally advanced colonic adenocarcinoma was suspected, and the patient underwent surgical resection of a section of the transverse colon and adjacent small bowel. The pathological diagnosis of the mass revealed a tubular adenoma without evidence of inflammatory bowel disease. There was no evidence of malignancy, bowel wall thickening and no necrotic lymph nodes were detected. The patient was in good general health 6 months after discharge.

Discussion

To the current authors' knowledge, this is the first case report of polymicrobial empyema caused by a subdiaphragmatic colonic adenoma. Empyema necessitatis was first described in 1640 by Baillou [1]. Empyema necessitatis is a rare entity in the antibiotic era and is usually caused by actinomycoses or mycobacterial tuberculosis. In the present patient, polymicrobial empyema was

**Figure 3**

The barium enema revealed two fistulas originating in the transverse colon: one extending to the chest wall abscess cavity and the other to the small bowel.

caused by *E. coli* and *S. aureus*. Prior to the antibiotic era, numerous cases were a result of pyogenic infections. In 1940, SINDEL [2] found that ~70% of empyema necessitatis cases were the result of *Mycobacterium tuberculosis* infection, and *Streptococcus pneumoniae* was the second most common pathogen. However, the incidence of pyogenic bacteria, non-tuberculous mycobacterium, tuberculous mycobacterium in association with HIV or actinomyces resulting in empyema necessitatis has been the subject of several case reports [1, 3–11]. The current patient had poor dentition, which increased the risk of infection from actinomyces.

Recently, FREEMAN *et al.* [1] described a 1-year-old male with empyema necessitatis due to *S. pneumoniae*, and, in addition, reviewed 26 cases in the literature dating back to 1966. They found that 50% were the result of *M. tuberculosis* and 24% were due to actinomyces infection. The remaining cases were the result of infections by *S. pneumoniae*, *S. aureus*, *S. milleri*, *Fusobacterium nucleatum* and *M. avium-intracellulare*. In the USA and Canada, the incidence of *M. tuberculosis* and actinomyces was the same [1].

Empyema necessitatis has rarely been reported to extend to the retroperitoneal space, the abdominal cavity or the head/neck [12–14]. The present case involved the reverse pathway: from the abdominal cavity to the pleural space and chest wall. The CT scan showed a collection of air in the abdomen, and careful examination of selected mediastinal views, as well as views from the dedicated abdominal CT, indicated that the infection was conveyed between the pleural and extraperitoneal space. The process began as an infected fluid collection in the extraperitoneal

space that subsequently tracked through the diaphragm into the pleural space. The extension of abdominal processes into the chest has been well described. These include catamenial haemopneumothorax, hepatic hydrothorax and urinorhorrax [15–21]. Once in the pleural space, the infection moved into the major fissure where it was then able to invade into the lung parenchyma of both the lingual and left lower lobe. The infection also penetrated the parietal pleura and chest wall, resulting in an empyema necessitatis. To the current authors' knowledge, this is the first case report involving an extraperitoneal infection that migrated from the

abdomen into the chest and subsequently through the chest wall, resulting in a presentation of empyema necessitatis.

Empyema necessitatis remains a rare entity in the antibiotic era. When presented with this rare entity, common aetiologies must be examined, including mycobacterium, actinomyces and possible pyogenic bacteria that begin as a lung parenchymal or pleural infection. However, in current medical practice, the decline in this entity may make the incidence of atypical aetiologies, such as a polymicrobial infection from an abdominal source, more likely when presented with a case of empyema necessitatis.

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