

Case Report

Anterior abdominal wall abscess caused by *Streptococcus pneumoniae* in a patient with self-inflicted stab injury: An unusual presentation

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Abstract

Streptococcus pneumoniae is a major cause of community-acquired pneumonia, otitis media, paranasal sinusitis, bacteremia and meningitis, as well as osteomyelitis and occasionally peritonitis. We report the case of a 25-year-old female who had stabbed herself with a kitchen knife above the umbilicus 10 days prior to admission. Subsequently, she developed an anterior abdominal wall abscess caused by *S. pneumoniae*. This case is unusual as the focus was distant from the respiratory tract, the usual primary site of infection caused by this organism. Furthermore, the case assumes significance because it occurred in the absence of any typical risk factors for *S. pneumoniae*.

Key words: abdominal wall abscess; *Streptococcus pneumoniae*; stab injury

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Introduction

Streptococcus pneumoniae is a normal inhabitant of the human upper respiratory tract [1]. The bacterium can cause pneumonia, usually of the lobar type, paranasal sinusitis, otitis media, or meningitis, the latter usually being secondary to one of the former infections [1]. It can also cause osteomyelitis, septic arthritis, endocarditis, peritonitis, cellulitis and brain abscesses [1,2]. *S. pneumoniae* is currently the primary cause of invasive bacterial disease in children and the elderly [1]. We report the case of a 25-year-old female who developed an anterior abdominal wall abscess caused by *S. pneumoniae* following a self-inflicted stab injury with a kitchen knife above the umbilicus. This case is unusual as the focus of the infection was distant from the respiratory tract, which is the usual primary site of infection caused by this organism. This case further assumes significance since it occurred in the absence of any of the typical risk factors for *S. pneumoniae*.

Case report

A 25-year-old female presented with a painful swelling in the periumbilical region which she had experienced for 10 days, and four to five episodes of bilious vomiting over three days. She gave a history of a suicide attempt 10 days previously, when she

stabbed herself with a kitchen knife above the umbilicus, following which she was treated conservatively in another health-care centre and advised to undergo ultrasonography of the abdomen and computed tomography (CT), for which she came to our hospital (Mahatma Gandhi Medical College and Research Institute). On initial evaluation, she was afebrile with stable vitals. Abdominal examination revealed tenderness over the site of the injury and a subcutaneous anterior abdominal wall swelling, 5 x 2 x 3 cm which was firm in consistency. There was no discharge or organomegaly. Investigations revealed a significantly elevated white blood cell count of $252 \times 10^3/\mu\text{l}$ with 85% neutrophils, 8% band forms and 7% lymphocytes, platelet count of $95 \times 10^3/\mu\text{l}$, erythrocyte count of $2.7 \times 10^6/\mu\text{l}$, hemoglobin level of 10.4 g/dl, hematocrit of 35%, and a markedly elevated C-reactive protein level of 354 mg/liter. Chest X ray of the patient was normal. Ultrasonography of the abdomen revealed cystic areas with unilateral echoes seen in the periumbilical region. The CT scan clearly showed an anterior abdominal wall abscess communicating with the intraabdominal region. Based on these findings, laparotomy and drainage of pus was planned. During the procedure, a pus-filled cavity (with about 20 ml of pus) was found in the parietal wall. The pus was

seen oozing out through a hole in the posterior rectus sheath and peritoneum into the peritoneal cavity. Intra-operatively, the greater curvature of the stomach was found to be oedematous and thickened; the stab wound was seen tracking down from the skin, tearing the posterior rectus sheath widely and entering the greater curvature of the stomach tangentially without producing any perforation. The supracolic area was filled with numerous flakes, while the infracolic area was free. Approximately 50 ml of pus was drained from the peritoneal cavity and a saline wash was performed. The anterior rectus and skin were closed after the procedure. The sample of abscess fluid revealed Gram-positive cocci in pairs with lanceolate appearance, morphologically resembling *S. pneumoniae*. The organism grew well on 5% sheep blood agar and chocolate plates at 37°C in a CO₂ incubator. There were alpha-hemolytic, pitting colonies on the sheep blood agar and non-mucoid, pitting colonies with greenish discoloration on the chocolate agar. Colonies were catalase negative, susceptible to ethylhydrocuprein (optochin) (zone of inhibition > 14 mm) and bile soluble. The biochemical profiles generated by the API 32 Strep system (bio-Merieux, New Delhi, India) identified the isolate as *S. pneumoniae*. The strain was serotyped by Neufeld's Quellung reaction, using type and factor sera and showed pneumococcal serotype 14. The isolate was sensitive to penicillin (MIC < 0.016 µg/ml), vancomycin (< 0.38 µg/ml), ciprofloxacin (0.75 µg/ml) and clindamycin (< 0.047 µg/ml) according to the Clinical Laboratory Standards Institute guidelines [3]. The patient was treated with intravenous ciprofloxacin, ceftriaxone, and metronidazole for a total duration of ten days. Her condition improved dramatically and she became afebrile. She was advised to take ciprofloxacin and metronidazole orally for another 10 days and to return to the hospital for follow-up.

Discussion

S. pneumoniae may be either a colonizer of the skin and soft tissue or a pathogen. As a pathogen, it causes clinical diseases that vary widely in prognosis and severity. The isolation of *S. pneumoniae* from skin and soft tissue is an unusual finding with difficult clinical interpretation. Shahin and Lerner reported an immunocompetent patient with *S. pneumoniae* pneumonia and concomitant bacteriuria, who presented with abscesses in multiple soft tissue sites [4]. Green and Selinger reported a patient who presented with a urinary tract infection and soft tissue

abscess caused by *S. pneumoniae* without any further focus of infection in the respiratory tract [5]. Most reported cases of *S. pneumoniae* soft tissue infection have involved cellulites that arose by direct inoculation from trauma, as in our case [6-8].

In a study performed by Garcia *et al.*, of the 39 isolates of *S. pneumoniae* obtained from skin and soft tissue infections, the most frequent serotypes were 3, 19, 11 and 23; however, in this case, serotype 14 was isolated [9]. Other predisposing factors for infections due to *S. pneumoniae* include immunosuppression and asplenia, which may also favor renal infections [1]. Michael and Cannon reported an asplenic patient with pneumococcal abscesses in multiple organs [10].

The case reported here assumes significance because it occurred in the absence of any of the typical risk factors for invasive pneumococcal disease, such as splenectomy, steroid use, diabetes mellitus, intravenous drug use, connective disorders or alcoholism [11]. In general, pneumococcal abscesses with or without secondary peritoneal involvement have a good prognosis, if prompt surgical drainage is performed and appropriate antibiotics are administered [12,13]. In our case the patient responded well to surgical drainage and intravenous antibiotic therapy, emphasizing the importance of correct microbiological diagnosis and treatment.

To conclude, although *Streptococcus pneumoniae* is frequently associated with human respiratory illnesses, only rarely it has been implicated in an abdominal wall abscess. Furthermore, our case assumes significance because it occurred in the absence of the characteristic risk factors.

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