

# Fatal Pneumococcal Sepsis from a Tuboovarian Abscess

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Although *Streptococcus pneumoniae* is frequently associated with human respiratory illnesses, only rarely have pneumococcal organisms been implicated in gynecologic infectious syndromes. We report a recent case of fatal *S pneumoniae* infection from a tuboovarian abscess discovered at autopsy and review the literature pertaining to this previously unreported clinical occurrence.

## Case Report

A 35-year-old female nurse noted 5 days of gray vaginal discharge and worsening right hip pain, followed the next day by malaise, chills, fever, lethargy, and weakness. After collapse in an emergency department, she was intubated and transferred to the Medical College of Georgia by helicopter. Her past medical history was unremarkable. She was the mother of 5 children. On initial evaluation, she was hypotensive (60/45 mm Hg), tachycardic (heart rate of 128 beats/min), and hypothermic (33°C), with oozing venipuncture sites. Copious foul vaginal discharge was noted on pelvic examination. Laboratory testing revealed a white blood cell count of 1200/mm<sup>3</sup> with 24 band forms and platelet count of 34,000/mm<sup>3</sup>. Blood gas analysis showed an arterial pH of 7.05 and pO<sub>2</sub> of 71 mm Hg while the patient was receiving 100% oxygen. Serum bicarbonate was 11 mEq/L, lactic acid was 16.3 mmol/L, and creatinine was 5.5 mg/dL. Ionized hypocalcemia of 3.5 mg/dL was documented. Prothrombin time was 26.8 seconds with international normalized ratio of 5.2, and activated partial thromboplastin time was >100 seconds (reference range, 22–35 seconds). Wright staining of a buffy-coat smear revealed numerous encapsulated lancet-

shaped diplococci within polymorphonuclear cells and monocytes. Gram staining of buffy coat and vaginal discharge revealed identical Gram-positive diplococci. Chest radiograph was normal. Serology was negative for HIV. The clinical impression was septic shock with disseminated intravascular coagulation (DIC). Blood culture revealed growth of *S pneumoniae*, sensitive to penicillin, at 12 hours after admission.

Despite aggressive management with intubation, volume expansion, antibiotics, bicarbonate, calcium gluconate, and 3 pressor agents, relentless clinical deterioration ensued followed by death in 6 hours. At autopsy, a 6-cm tuboovarian abscess (TOA) was documented, with pathologic evidence of severe suppurative oophoritis of the right ovary. Gram-positive lancet-shaped diplococci were demonstrated on special stains. The abscess wall was well-organized, consistent with presence of infection for several days. There was no evidence of pneumonia, meningitis, endocarditis, arthritis, or occult abscess elsewhere. Widespread DIC was present.

The final cause of death was overwhelming pneumococcal sepsis with refractory metabolic acidosis, septic shock, and DIC in a patient with previous good health. The surprising finding at autopsy of pneumococcal TOA is, to our knowledge, the first published report implicating *S pneumoniae* in primary pelvic inflammatory disease and fatal bacteremia.

## Discussion

*Neisseria gonorrhoea* and *Chlamydia trachomatis* are the most frequent organisms recovered from cervical cultures in patients with pelvic inflammatory disease. Specimens obtained by laparoscope, however, are often polymicrobial and have yielded single or mixed isolates of *Bacteroides*, *Peptostreptococcus*, *Prevotella*, *Gardnerella*, and *Actinomyces* species, *N gonorrhoea*, *C trachomatis*, *Mycoplasma hominis*, *Streptococcus agalactiae*, *Escherichia coli*, *Haemophilus influ-*

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*enae*, *Streptococcus pyogenes*, *Neisseria meningitidis*, and, as in our case, *S pneumoniae*.<sup>1</sup> Pathogenesis of the last 4 organisms in this list has been attributed to ascending vaginal infection and to the substantial histologic similarity between the epithelium of the respiratory and upper genital tracts. Aggressive *S pneumoniae* infections, such as in our case, may be related to alteration in penicillin binding proteins, limited macrophage surface receptors for capsular antigens, ineffective anticapsular antibody, or resistance to phagocytosis conferred by the polysaccharide capsule, the major determinant of this organism's virulence.<sup>2</sup>

Prior case reports of pneumococcal TOA have involved less severe illness and more favorable outcomes than occurred in our patient. For example, a 23-year-old woman in Sweden with fever and abdominal pain was found to have a large pelvic abscess.<sup>3</sup> At laparotomy, 500 mL of purulence was drained, with culture of pneumococcus. Full recovery followed intravenous penicillin therapy. No primary focus of infection or portal of entry was detected. A 19-year-old woman in North Carolina developed fever and abdominal rebound tenderness, diagnosed as postpartum endometritis, with blood cultures positive for *S pneumoniae*.<sup>4</sup> A chest radiograph was normal. Full recovery followed parenteral ampicillin therapy. Simultaneous infection occurred at age 12 hours in her newborn infant, who had fever, tachypnea, lethargy, and positive cultures for *S pneumoniae* in blood and cerebrospinal fluid. The infant recovered fully with intravenous penicillin therapy. The authors postulate that maternal genital colonization was complicated by systemic spread to mother and infant during normal vaginal delivery.

Westh et al<sup>5</sup> reviewed 24 patients with pneumococcal genital infections reported worldwide since 1963. Predisposing conditions included postpartum states, intrauterine device use, gynecologic surgery, recent abortion, and tampon usage. All patients were successfully treated; no fatalities were reported. A 46-year-old woman in Zaire<sup>6</sup> underwent laparotomy for abdominal pain and was found to have bilateral 10 cm TOAs caused by *S pneumoniae* cultured from purulent drainage. The authors cite the rarity of prior reports of pneumococcal TOA. Rahav et al<sup>7</sup> describe a 52-year-old woman in Israel with abdominal pain, fever, and a pelvic mass 5 years after menopause. At laparotomy, a 9-cm left TOA was detected. *S pneumoniae* was isolated from

purulent aspirate. Rapid recovery accompanied penicillin therapy. The authors stress the unusual instance of postmenopausal TOA caused by pneumococci, in contrast to the common occurrence of TOA from *C trachomatis* or *N gonorrhoea* in premenopausal females as a result of pelvic inflammatory disease.

In a unique report from Delaware,<sup>8</sup> 3 girls aged 8 to 12 were thought to have appendicitis based on fever, abdominal pain, rebound tenderness, and leukocytosis. At laparotomy, however, these children were found to have TOA, and positive cultures of blood, abscess contents, and/or peritoneal fluid for *S pneumoniae*. All recovered with penicillin therapy, although 2 had stormy postoperative courses. None had pathologic findings of appendicitis. The authors were unable to identify a primary focus of pneumococcal infection in these children and cite 2 other cases reported in young girls at age 4.<sup>9,10</sup>

Finally, in a case from Spain reminiscent of our patient,<sup>11</sup> a 35-year-old woman was evaluated for fever, left hip pain, abdominal rebound, and a left pelvic mass. At laparotomy, a left TOA was excised. Cultures revealed *S pneumoniae*. Full recovery accompanied penicillin treatment. The authors emphasize the rarity of pneumococcal TOA, especially in the absence of recurrent PID. In recent comprehensive reviews, both Taylor and Sanders<sup>12</sup> and Capdevila et al<sup>13</sup> reiterate the infrequent occurrence of pneumococcal invasion of the fallopian tubes, ovaries, and peritoneum. They advance several hypotheses as to portals of entry and predisposing conditions leading to these unusual infections.

We postulate that our patient's initial site of infection was pelvic, as manifested by vaginal discharge and right hip pain referred from a developing TOA. Ascending vaginal infection led to tubal abscess formation and subsequent bacteremia accompanied by rapid hematogenous dissemination and septic shock. Fulminant progression to death followed within hours, despite appropriate therapy for an organism proven sensitive to penicillin. We believe that the sudden, severe, culture-positive pneumococcal infection was the cause of death. Unlike most pneumococcal bacteremias, however, this infection originated in the pelvis, not the pulmonary parenchyma. We recognize that earlier recognition and management would have been challenging because of the rapid, relentless pro-

gression of illness but may have held the only hope for a less tragic outcome for this unfortunate wife and mother.

## Conclusion

Our case adds to the body of knowledge describing the rare association of *S pneumoniae* with genital infections such as TOA and constitutes the first reported instance of fatal sepsis from a pneumococcal TOA. The disastrous consequences of bacteremic illness from such an occult source as the ovary are likely to complicate physician detection and early intervention.

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