**Case Report**

**Acute Enteritis Associated with Pneumococcal Bacteremia**

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**Abstract**

We describe an elderly male who had a two day history of fever, abdominal pain and watery loose motions. Clinical examination was positive for abdominal right lower quadrant tenderness and moderate dehydration. Stool examination revealed inflammatory diarrhea. Considering the high prevalence of extended spectrum β-lactamases (ESBL) producing Gram-negative infections, he was treated with Piperacillin/Tazobactam. Surprisingly, his blood culture which was taken on admission returned positive for Streptococcus pneumoniae after two days, which was coincident with resolution of fever and diarrhea. This patient had no other clinically apparent source of Pneumococcal infection and we believe that he had Pneumococcal enteritis with bacteremia. There are very few reported cases of isolated Pneumococcal enteritis in the literature. Therefore, we report this unusual form of Streptococcus pneumoniae infection both because of its rarity and its potentially life-threatening but still curable nature.

**Introduction**

Streptococcus pneumoniae is traditionally regarded as a respiratory pathogen and is indeed the principal cause of community acquired pneumonia. However, less is known about the invasive disorders caused by this agent other than pneumonia and meningitis. We report a case of unusual invasive manifestation of pneumococcal disease in an elderly man who presented with acute enteritis and was found to have pneumococcal bacteremia.

**Case Report**

A 77-year-old male presented to a large tertiary care private hospital in Mumbai with complaints of fever with chills, right lower quadrant abdominal pain and watery loose motions (up to 20-25 times per day) since last one day. He had a history of a transient ischemic attack in the past and no other medical illness. Upon admission, he complained of pain in right lower quadrant of his abdomen. He had already received two doses of oral ciprofloxacin and metronidazole and one dose of IV amikacin from a local private practitioner before coming to our hospital. He also gave a history of recent tour of USA from which he had returned just 4 days ago.

On examination, the patient was febrile (101°F) along with a regular pulse of 98 beats per minute and a blood pressure of 120/70 mm of mercury in his right upper limb in supine position. Systemic examination revealed findings of moderate dehydration and hyper active bowel sounds and tenderness in right iliac fossa. His stool was sent for routine and microscopic examination and blood was sent for culture and other investigations before antibiotics were started in our hospital.

Stool examination revealed greenish semisolid stools with no mucus, parasites, or ova. Occult blood was weakly positive and there were 5 leukocytes per high power field. His hemoglobin was 12 gm per deciliter and WBC count was 8900 cells per cubic mm with 86% polymorphonuclear leucocytes and 7% lymphocytes. Serum creatinine was 1.2 mg per deciliter and blood urea nitrogen was 54 mg per deciliter. Rest of his laboratory investigations including platelet count, hematocrit, and liver function tests were within normal limits. The chest radiograph was also normal.

Over next two days, patient continued to remain febrile and have loose motions, though with a slightly reduced frequency. The stool culture report was returned as no pathogen grown and a stool Clostridium difficile toxin assay was negative.

Considering continuing fever, stool leukocytes which implied an invasive enteritis and a high prevalence of ESBL producing enteric pathogens, we decided to start injection piperacillin/tazobactam empirically in a dose of 4.5 gm 8hourly on day 3 of his admission (day 4 of illness). After initiating treatment, the patient became afebrile the very next day. His loose motions and abdominal pain stopped after defervescence of his fever.

Surprisingly, a penicillin-susceptible strain of Streptococcus pneumoniae was isolated from blood culture of this patient which was collected on the day of admission. Chest radiographs were reevaluated after receiving this report but were found to be completely normal. A pneumococcal urinary antigen test (UAT) was advised in view of his pneumococcal bacteremia; which, however, was returned as negative. Piperacillin/tazobactam
was continued for 7 days. Patient was discharged on oral levofloxacin 750 mg per day for 3 days and was vaccinated with 23-valent polysaccharide pneumococcal vaccine. A follow-up blood and stool culture done after one month of discharge was negative for the pneumococci.

**Discussion**

*Streptococcus pneumoniae*, though a primary respiratory pathogen, is a documented cause of intraabdominal infections. Non-specific GI manifestations like nausea, vomiting and upper abdominal pain are quite common even in non-abdominal Pneumococcal infections such as lower lobe pneumonia. Symptomatic Pneumococcal GI disease includes peritonitis, appendicitis, and endometritis with or without salpingitis. Peritonitis is the most common pneumococcal infection of the abdomen. The risk factors for peritoneal infections with these organisms include liver cirrhosis and young age. We believe our patient had enteritis due to *Streptococcus pneumoniae* for the following reasons:

1. Our patient had documented pneumococcemia with no evident source of infection other than the GI tract.
2. Clinically, he had pain and tenderness in right iliac fossa with fever. His stool report suggested inflammatory diarrhea suggesting an invasive disease. No usual enteric pathogen was grown in the stool culture.
3. There was a prompt resolution of fever as well as diarrhea with piperacillin/tazobactam.

*Streptococcus pneumoniae* not being isolated in the stool could be due to the inhibitory substances in the routine bacterial stool culture medium which inhibit Gram-positive organisms. In addition, it is also possible that the large load of routine gut flora could have easily overgrown the small population of pneumococci in the stool. This patient had previously received ciprofloxacin; which could potentially reduce the chances of isolation of these organisms in the stool. The Pneumococcal UAT could be negative in spite of pneumococcal bacteremia as the patient had received two doses of ciprofloxacin and received at least three days of piperacillin/tazobactam before this test was ordered. UAT has a sensitivity between 70-80% and of those who initially test positive for the urinary antigen, further 20% become negative after the initial 3-4 days of antibiotic therapy. Also the antigen detection is significantly greater in pneumococcal infection presenting as pneumonia than those without pneumonia. This may well result from greater total bacterial load associated with pneumonic infections.

A negative follow-up blood culture helped us to confirm clearance of pneumococcemia after treatment. Possible persistent bowel colonization was ruled out by a second stool culture after recovery on routine media as well as blood agar.

There are very few case reports of *Streptococcus pneumoniae* as a cause of isolated enteritis in the literature. Pneumococcal enteric infections can be bacteremic as well as non-bacteremic. Indeed, Sir William Osler used the term “croupous colitis” to describe the bowel pathology in autopsy findings of those patients who died of pneumococcal bacteremia. Importantly, many of those patients ascribed to the so-called ‘primary pneumococcal bacteremia’ group (pneumococcal bacteremia with no obvious focus of infection found) could actually represent the occult GI infection by these virulent organisms. Unfortunately, there are no clear data available that establish the sporadic presence of pneumococcus in the gut flora and its subsequent ability to become an invader of the bowel wall.

The mechanism by which pneumococci produce GI disease is unknown, although many theories have been proposed. The gut wall can get infected due to hematogenous spread in bacteremic infections or may be directly invaded by the bacteria present in the lumen. An ascending infection via the fallopian tubes has also been postulated to be one of the possible mechanisms of GI tract involvement by the pneumococci, particularly in young girls with peritonitis.

Our case report and brief review of literature indicate that *Streptococcus pneumoniae* is a recognized but rare cause of enteric infections. Clinicians should be able to link any such positive pneumococcal blood culture with the GI syndrome or symptoms, if present and should be aware of the fact that the Pneumococcus may even be the primary cause of such a syndrome. Studies to find its true incidence would require stool cultures designed to detect pneumococci. Although, Pneumococcus as a cause of enteritis must be rare, it should remain in the differential diagnosis of acute enteritis. This becomes particularly important as the incidence of *Penicillin* (β-lactam) resistant pneumococci rises all over the world.

**References**