

LOBAR PNEUMONIA AND PNEUMATOCELE FORMATION DUE TO SALMONELLA PARATYPHI B IN AN INFANT*

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Pulmonary infection due to Salmonella species has rarely been reported. In adults, *S. typhimurium* and *S. choleraesuis* are the chief agents responsible for salmonella lung infections¹. To the best of our knowledge, this is the first publication associated with pneumonia due to *S. paratyphi B* in an infant.

Case Report

A well-nourished six-month-old boy was admitted to Hacettepe Children's Hospital with the chief complaints of high fever, respiratory distress, cough, vomiting and mild diarrhea of five-days duration. Past and family histories were non-contributory. Diagnosis of lobar pneumonia was made following physical examination on admission and chest X-ray. The hemoglobin value was 10.5 g/dl and white blood cell count was 68.000/mm³ with a predominance of segmented neutrophils. The rest of the laboratory studies including urine analysis and serum electrolytes; throat, blood, and cerebrospinal fluid cultures; biochemical studies of cerebrospinal fluid, and PPD were all negative. Penicillin G therapy (300.000 U/kg/day) was intravenously started initially. The clinical condition deteriorated during the next two days. The chest X-ray which was obtained on the second day of admission demonstrated the appearance of multiple pneumatoceles which were suggestive of staphylococcal or gram-negative pneumonia. The growth of *S. paratyphi B*, sensitive only to cephalothin, was reported on stool culture the same day. Cephalothin (200 mg/kg/day) and gentamicin (6 mg/kg/day) were intravenously added to the antibiotic regimen and penicillin G therapy was stopped.

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Repeated chest X-rays revealed the progressive course of the lung infection and abscess formation (Figure 1). The child died on the seventh day of admission. Gram-negative microorganisms were detected on the smears from the abscess of the lung and *S. paratyphi* B was isolated in a postmortem blood culture, and in the lung tissue and abscess formation taken during autopsy.

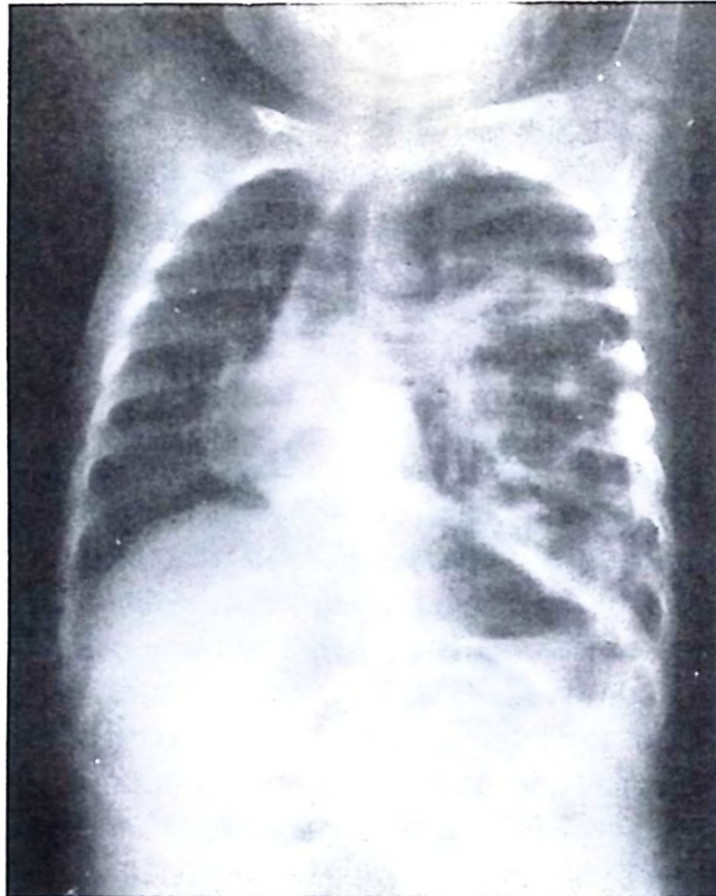


Figure 1

Multiple giant pneumatoceles in both right and left lung fields were observed on the last chest X-ray of the patient.

Discussion

Salmonella gastroenteritis is fairly common in children of less than one year of age and is known to be a self-limited disease. However, Salmonella bacteremia and meningitis have been increasingly reported in infants^{2,3}. Although some children recover without specific therapy, other children develop complications of bacteremia such as osteomyelitis and meningitis. Further, various complications due to salmonella gastroenteritis have been reported in young infants in the absence of bacteremia, proven initially by negative blood cultures⁴.

Salmonellosis may be divided into four main groups. Beside the gastroenteric form and the typhoidal or septic syndrome, focal manifestations take place as a distinct group including endocarditis, pericarditis, appendicitis, cholecystitis, salpingitis, pneumonia, pleurisy, urinary tract infection, osteomyelitis, meningitis, and abscess¹. Respiratory system infections, mostly lobar or bronchopneumonia, have been reported in 85 of 572 patients with focal manifestations among the 7779 patients with salmonella infection¹.

To date, however, *S. paratyphi* B has only been isolated in two elderly patients. The last group consists of carrier conditions.

Pulmonary lesion due to salmonella has been described by various authors⁵⁻¹⁴. It was first reported by Bullowa⁶ in a case of pneumonia, the infecting organism being *S. choleraesuis*. Salmonella from pleural fluid⁷, and from empyema^{5,7,11,12} have also been reported. There is a report from Chicago regarding *S. choleraesuis* pneumonia in children⁸. Most reported cases of pneumonia due to salmonella have been in adults^{4,6,8-10,12}.

Although pneumatoceles have usually been detected as a complication of staphylococcal¹⁵ and Klebsiella pneumonia¹⁶, in a recent report¹⁷ it has been emphasized that among the patients with pneumatoceles, the condition has been ascribed to a variety of etiologic causes, both bacteriologic and chemical. The clinical course of our case indicates that pneumonia caused by *Salmonella paratyphi* B can also progress rapidly and involve pneumatocele formation. Thus, in this clinical setting, a positive stool culture for *Salmonella* may be helpful for diagnosis, as it was in our case.

It has been reported that only three of the nine patients with salmonella empyema had gastrointestinal symptoms¹¹. Despite the low frequency of gastrointestinal symptoms, the probable site of entry of the salmonella organisms is the gastrointestinal tract, as in our case where the *S. paratyphi* B was isolated in a stool culture. Experimental studies in animals show that orally induced salmonella infections subsequently involve the lymphatics and later the lungs¹⁸.

It has been emphasized that subtotal gastrectomy and sickle cell anemia predispose to salmonellosis¹⁹. None of the patients with pulmonary involvement due to salmonella in the literature had such illnesses, but there have been many reports describing the association of salmonella infection with underlying malignancy^{10,20-22}. It has also been stated that most of these elderly patients had a low resistance owing to unrelated diseases, such as hypertension, diabetes, or cancer¹.

The patient presented here has features distinctly comparable with previously published cases, being a young infant with a progressive course of lung infection suggestive of a staphylococcal or gram-negative infection. Therefore, if lobar pneumonia is not improved by appropriate antibiotic therapy in the presence of a positive stool culture, pneumonia due to *Salmonella paratyphi* B should be suspected.

Summary

A six-month-old boy with lobar pneumonia and pneumatocele formation due to *Salmonella paratyphi* B, proven by postmortem blood culture and cultures from lung tissue obtained during autopsy, is presented. The radiological similarity to staphylococcal and gram-negative pneumonia is emphasized. It is suggested that if pneumonia resembling a staphylococcal infection does not improve with appropriate antibiotic therapy, pneumonia due to *S. paratyphi* B should also be considered in the further evaluation of the etiological agent.

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