

PLEURAL EMPYEMA CAUSED BY SALMONELLA TYPHIMURIUM IN A PATIENT WITH ACUTE LYMPHOBLASTIC LEUKEMIA
Akut lenfoblastik lösemili bir hastada Salmonella typhimurium'un neden olduğu plevral ampiyem

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Abstract: Although it has been well known that salmonella infections are relatively common in patients with immunologic disorders, they are very rare in children with acute leukemia. In this report, a child with acute lymphoblastic leukemia and pleural empyema was presented. A 12-year-old boy was admitted to the hospital with the complaints of fever and arthralgia. The diagnosis of acute lymphoblastic leukemia was established and high risk BFM 90 protocol was initiated. During this chemotherapy protocol, pleural empyema developed and Salmonella typhimurium was isolated from pleural fluid. The patient was successfully treated with closed tube drainage and ceftriaxone.

Key Words: Leukemia, Pleural empyema, Salmonella typhimurium

The relation between patients with immunosuppression (malignancy, renal transplant) and bacteremia by salmonella nontyphi, especially S. typhimurium, is widely known (1,2). Infections caused by salmonella organism in children with acute leukemias have been reported. Immunity depression caused by both the main disease and by immunosuppressing drugs lead in such cases to generalized infections by these organisms or local infections which were found in the skeletal system or central nervous system of reported cases (3). Pleuropulmonary involvement of salmonella infection is very rare (4).

Therefore, we presented here a rare case of a patient with acute lymphoblastic leukemia who had a unilateral pleural empyema caused by S. typhimurium.

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Özet: İmmünolojik hastalıklarda salmonella enfeksiyonu sık görülmesine rağmen, akut lösemili çocuklarda çok nadir görüldüğü bilinmektedir. Bu makalede akut lenfoblastik lösemi ve plevral ampiyem vakası sunulmuştur. On iki yaşında erkek hasta ateş ve eklem ağrısı şikayetleriyle hastaneye başvurdu. Akut lenfoblastik lösemi tanısı alan hastaya yüksek risk BFM 90 protokolü başlandı. Kemoterapi tedavisi sırasında plevral ampiyem gelişen hastanın plevral mayisinden Salmonella typhimurium izole edildi. Hasta açık göğüs tüpü drenajı ve seftriakson ile başarıyla tedavi edildi.

Anahtar Kelimeler: Lösemi, Plevral ampiyem, Salmonella typhimurium

CASE REPORT

A 12-year-old boy with a five week history of fever and pain on the region of hip joint was admitted. The pain was aggravated by movement and nonresponsive to analgesic drugs.

On physical examination, his general condition was satisfactory. He was pale with a body temperature of 38°C, regular pulse of 85/min, respiration rate of 20/min and blood pressure of 90/60 mmHg. His height was 143 cm (10th - 25th percentile) and weight 36.5 kg (10th - 25th percentile). The spleen was palpable, 3 cm below the costal margin.

Laboratory investigation showed his hemoglobin level was 9.9 gr/dl, leukocyte count was 31000 / mm³, platelets 186000 / mm³ and sedimentation rate 112 mm / h. His blood chemistry was within normal limits. Lymphoblastic cells were 70% on the peripheral blood smear and on the bone marrow smear. Peripheral blood and bone marrow aspirate slides stained positive with PAS (Periodic-Acetic-Schiff). Flow cytometric analysis revealed

CD45:99.9%, CD2:34%, CD19:82.7%, CD10:0.5%, CD22:66.3%, CD34:60.3%, CD13:54.7%, CD33:17.6%, HLA-DR:39.7%, CD5:32.3%, CD7:38.6% and CD65:0.9%. According to this PAS staining and flow cytometric analysis results the patient was diagnosed as ALL.

The patient was treated for ALL according to BFM-90 protocol. He developed chest pain, fever, and tachypnea on the 15th day of treatment. On physical examination there were dullness to percussion and diminished breath sounds at the right lower field of lung. The chest radiographs revealed a hazy density at the right lower field of lung and blunting right costophrenic angle (Figure 1). The patient developed pleural empyema supported by those findings. Thoracentesis was performed immediately and turbid yellowish fluid was obtained. Pleural fluid cell count revealed 600 white blood cell (WBC)/mm³. A gram stain revealed many polymorphonuclear cells (PMNL) but no organisms. Glucose, protein levels of pleural fluid were 10 mg/dl, 5g/dl, respectively. The pleural effusion was drained by the chest tube. The patient required a chest tube for a period of two weeks. *Salmonella typhimurium* was isolated from pleural fluid. No organism was isolated from blood cultures. The cytologic analysis of pleural fluid revealed no leucemic cells. *S. typhimurium* was sensitive to trimethoprim-sulfamethoxazole, ceftriaxone and ciprofloxacin, and was resistant to ampicillin and chloramphenicol. The patient was treated with ceftriaxone for four weeks and discharged at thirty days and did not develop any complications on follow-up.

DISCUSSION

Salmonella infections occur worldwide. Acute gastroenteritis, the most frequent presentation, is usually self-limited, although bacteremia and focal extraintestinal infections may develop, especially in immunocompromised patients. The latter group has become more important and complex because of the increasing number of children who are

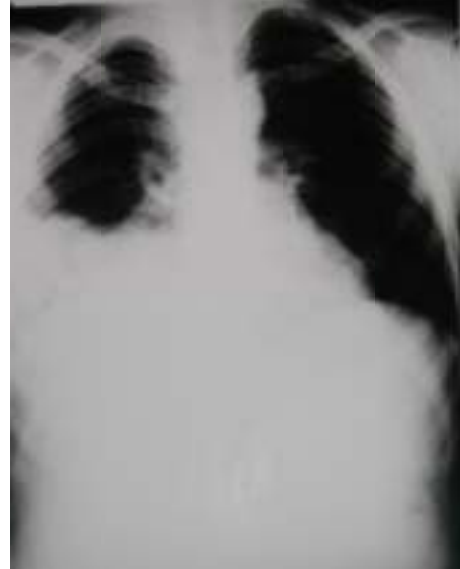


Figure 1. The chest radiography of patient

compromised by AIDS, organ transplant or chemotherapy (1,2).

Salmonella is a genus that belongs to the family of Enterobacteriaceae and contains three species: *S. typhi*, *S. choleraesuis*, and *S. enteritidis*. While the former two species each have one serotype *S. enteritidis* contains more than 1800 distinct serotypes. For convenience, serotypes are sometimes artificially identified as if they were *salmonella* species (e.g., *S. typhimurium*) (2).

The wide range pathologic and clinical manifestations are subdivided into four syndromes, each requiring a distinct diagnostic and therapeutic approach: 1. gastroenteritis, 2. enteric fever, 3. bacteremia with or without metastatic disease, and 4. asymptomatic carriage. Although any serotype can cause any of these syndromes, certain serotypes are associated with specific presentations. *Salmonella* infection is particularly severe in patients who have AIDS, leukemia, lymphoma,

immunodeficiency of other causes, inflammatory bowel disease, schistosomiasis, and macrophage dysfunction. Diagnosis is based on culture of the organism from appropriate sites (3,5-7).

Extraintestinal nontyphoidal *Salmonella* infections are uncommon in developed countries but common in developing ones. The three serotypes most commonly isolated are *S. enteritidis*, *S. paratyphi B* and *S. typhimurium* (8).

Non-typhoid salmonella infections are extremely common, usually taking the form of a benign toxoinfection. Le Chevalier et al. reported 3 cases of pleuro-pulmonary infections due to *Salmonella dublin* with gastrectomy, acute myeloblastic leukemia and obliterative arterial disease (9). Cooper et al reported a case of salmonella septicaemia and pleural effusion as presenting features of hairy cell leukemia (10).

Salmonella typhimurium must be included among the agents which can produce pulmonary cavities such as staphylococcus aureus, mycobacteria, fungus and other gram negative bacilli (1). Empyema is a rare complication of salmonella infections (11)

This patient with ALL produced a unilateral pleural empyema on 15th day after starting chemotherapy. Leukocyte count was 1200 / mm³ and the absolute neutrophil account was 400 / mm³ at the same time. *Salmonella typhimurium* was identified from pleural fluid. No other organism was identified from another cultures of body. Prompt antimicrobial treatment, however, is indicated for patients with bacteremia and focal extra-intestinal infections. Ampicillin, amoxicillin, chloramphenicol, trimethoprim-sulfamethoxazole, and some third-generation cephalosporin and quinolone agents are effective (12). Carel et al proposed intrapleural administration of antibiotics for salmonella empyema in an immunologically compromised patient with malignant pleural effusion (13). But our patient recovered with parenteral administration of ceftriaxone. This organism was sensitive to ceftriaxone. The patient was discharged after 30 days ceftriaxone treatment.

We are reporting this patient with ALL who had pleural empyema, since pleural empyema is a rare complication of nontyphoid salmonella infection in immunocompromised patients, especially by *Salmonella Typhimurium*.

REFERENCES

1. Saballs P, Aregall S, Pallares E, Tremoleda J, Gimeno JL, Drobnic L. *Salmonella typhimurium* as the causal agent of pulmonary cavitations. *Enferm Infecc Microbiol Clin* 1993; 11:93-96.
2. Cleary TG. *Salmonella*. In: Behrman RE, Kliegman RM, Jenson HB (EDS). *Nelson Textbook of Pediatrics*. 16th ed. WB Saunders. Philadelphia 2000, pp729-734.
3. Ciepielewska D, Zelenay E. *Salmonellosis in children with proliferative haematological diseases*. *Mater Med Pol* 1991;23:223-225.
4. Rim MS, Park CM, Ko KH, Lim SC, Park KO. *Pleural empyema due to Salmonella: a case report*. *Korean J Intern Med* 2000;15:138-141.
5. Goldberg MB, Rubin RH. *The spectrum of Salmonella infection*. *Infect Dis Clin North Am* 1988;2:571-598.
6. Moriuchi Y, Yamada Y, Tomonaga M. *Infectious complications in patients with adult T-cell leukemia*. *Kansenshogaku Zasshi* 1992;66:1444-1448.
7. Hung IJ, Yang CP. *Early-onset sepsis in children with acute lymphoblastic leukemia*. *J Formos Med Assoc* 1996;95:746-753.
8. Lee WS, Puthucheary SD, Parasakthi N. *Extra-intestinal non-typhoidal Salmonella infections in children*. *Ann Trop Paediatr* 2000;20:125-129.
9. Le Chevalier B, Jehan A, Brun J, Vergnaud M. *Pleuropulmonary localizations of non-typhoid Salmonella infections*. *Rev Pneumol Clin* 1985;41:320-324.
10. Cooper C, Watts EJ, Smith AG. *Salmonella septicaemia and pleural effusion as presenting features of hairy cell leukemia*. *Br J Clin Pract* 1987;41:670-671.
11. Yang CH, Chen KJ, Tseng HH, Yang CJ, Liu JD. *Salmonella pericarditis and empyema: a*

- case report. *Zhonghua Yi Xue Za Zhi (taipei)* 1995; 56:199-204.
12. Lee LA, Puhr ND, Maloney EK, Bean NH, Tauxe RV. Increase in Antimicrobial- Resistant *Salmonella* Infections in the United States, 1989-1990. *J Infect Dis* 1994;170:128-134.
13. Carel RS, Schey G, Ma'ayan M, Bruderman I. *Salmonella* empyema as a complication in malignant pleural effusion. *Respiration* 1977; 34:232-235.