



Cervical Spinal Epidural Abscess in an Infant: A Possible Complication of Untreated *Streptococcus pneumoniae* Bacteremia

Bir Bebekte Servikal Spinal Epidural Apse: Tedavi Edilmemiş *Streptococcus pneumoniae* Bakteriyemisinin Olası Bir Komplikasyonu

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Abstract

Fever is one of the major diagnostic challenges for the pediatrician. The accurate diagnosis and treatment of febrile infants is the major concern because of the immaturity of immune system in the first three months of life. The outcome of untreated occult bacteremia depends on causative organism as well as host factors. *Streptococcus pneumoniae* bacteremia can resolve spontaneously without treatment, especially in children that appear well, can persist, and can lead to localized infections. *S. pneumoniae* as the causative agent of spinal epidural abscess is rare. In this report we present a young infant admitted to hospital with a diagnosis of cervical abscess due to untreated *S. pneumoniae* bacteremia.

Keywords: Spinal epidural abscess, *Streptococcus pneumoniae*, bacteremia

Öz

Ateş, çocuk doktorları için en önemli tanısal sorunlardan biridir. Ateşli bebeklerin doğru teşhis ve tedavisi, yaşamın ilk üç ayında bağışıklık sisteminin olgunlaşmamış olması nedeniyle büyük bir endişedir. Tedavi edilmeyen gizli baktereminin sonucu, nedensel organizmanın yanı sıra konakçı faktörlere bağlıdır. *Streptococcus pneumoniae* bakteriyemisi, özellikle iyi görünen çocuklarda tedavi olmaksızın kendiliğinden düzelebilir, persiste edebilir veya lokal enfeksiyonlara yol açabilir. *S. pneumoniae* spinal epidural apsenin etkeni olarak nadirdir. Bu yazıda tedavi edilmemiş *S. pneumoniae* bakteriyemisine bağlı servikal apse tanısıyla hastaneye yatırılan bir infanıtı sunduk.

Anahtar Kelimeler: Spinal epidural apse, *Streptococcus pneumoniae*, bakteriyemi

Introduction

The primary concern associated with fever without a focus in a child younger than three months is accurate diagnosis of a severe bacterial infection requiring immediate antibiotic

therapy. There are no physical findings other than fever in approximately 20% of children that present with fever (1). Herein, it was aimed to describe an infant with cervical abscess that was a complication of *Streptococcus pneumoniae* bacteremia.

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Case Report

A 54-day-old male presented with restlessness and swelling on the posterior neck that was first observed one day earlier. His medical records showed his admission to the emergency department with fever and restlessness 18 days ago. Physical examination showed a temperature of 38°C and irritability. Poor sucking reflex was also observed. According to his records, C-reactive protein (CRP) was 34.2 mg/L (normal range: 0-8 mg/L) and white blood cell count (WBC) was 15.770/mm³. Blood and urine samples for culture were obtained, and lumbar puncture was offered, but his parents did not consent. The patient was taken home without having received any treatment or follow-up recommendations. Consequently, the patient was considered as untreated fever without a focus.

Blood culture subsequently yielded *S. pneumoniae*, with minimal inhibitory concentration (MIC) levels for penicillin and cefotaxime of 0.032 µg/ml and 0.012 µg/ml, respectively. Eighteen days after the first visit, when he was readmitted to the hospital, he was afebrile and irritable. Physical examination showed a 2x2-cm well-defined mobile mass lesion without hyperemia on his neck. Findings for meningismus, a bulging fontanelle, and neurological deficit were negative. Laboratory findings were as follows; hemoglobin: 8.8 g/dL, WBC count: 27.190/mm³ (absolute neutrophil count: 8920/mm³ absolute lymphocyte count: 4390/mm³) platelet count: 688.000/mm³, erythrocyte sedimentation rate (ESR): 115 mm/h (normal range: 0-10 mm/h), CRP: 112 mg/dL. Liver and kidney function tests were all normal. Serum immunoglobulin (Ig) levels were in normal range for age. Serum IgG level was 692 mg/dL, IgA level was 47 mg/dL, IgM level was 66.5 mg/dL, IgE level was <17.9 mg/dL. Anti-Human Immunodeficiency Virus serology was negative.

Ultrasonographic examination showed a 38x13 mm thick-walled cystic lesion extending to the cervical medulla spinalis channel through the cervical vertebra transverse processes. Cerebrospinal fluid (CSF) examination performed on recent admission showed that it was xanthochromic, and had a WBC count of 20/µL, protein level of 374 mg/dL (normal range: 15-45 mg/dL), and glucose level of 44 mg/dL (normal range: 40-70 mg/dL). Simultaneous blood glucose was 89 mg/dL. A Gram-stained CSF smear showed no evidence of microorganism. Blood, urine, and CSF cultures were all negative. Based on the above findings, the patient was diagnosed as pneumococcal meningitis and cervical abscess as a complication of untreated pneumococcal bacteremia; intravenous cefotaxime was commenced. Magnetic resonance imaging (MRI) of the mass lesion showed a lobulated cystic mass measuring 6.1x6.1x4.8 cm in the right paraspinal region between C7 and T3. T2 weighted sagittal image reveals the indentation of the spinal cord by the mass lesion. The mass invaded the spinal canal through the left neural foramina of C7-T1 and T2, and indented the spinal cord.

The mass displaced the trachea and right upper lobe bronchus to the anterior, and extended through the paraspinal muscles to the dermis posteriorly. The mass was enhanced with contrast material peripherally, without a solid component. Fat planes were heterogenous. There was restricted diffusion in diffusion-weighted images (Figures 1, 2). Complete paraspinal

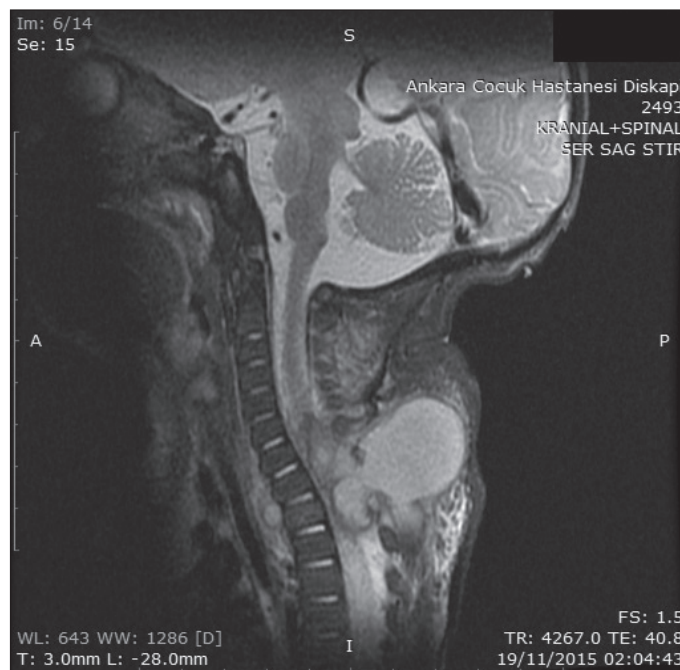


Figure 1. T2 weighted sagittal image reveals the indentation of the spinal cord by the mass lesion.

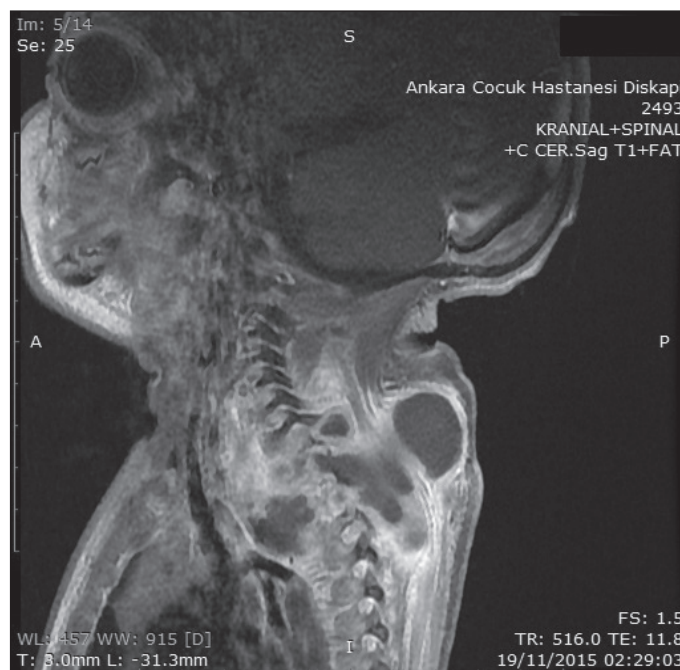


Figure 2. Postcontrast T1 weighted sagittal image depicts the peripherally enhanced necrotic lesion that extends from trachea to the posterior chest wall, invading the spinal canal.

abscess drainage was performed by a neurosurgeon after ten days of antibiotic treatment. Paraspinal abscess material culture was negative. The patient was discharged from hospital seven days post-surgery. He was afebrile at the subsequent outpatient follow-up visit after two months and his neurological development was normal one year post-surgery. Informed consent for using medical records was received from the patient's family.

Discussion

Management of febrile infants aged <3 months is challenging because of the increased risk of serious bacterial infection as compared to older children. Prompt hospitalization and immediate parenteral antimicrobial therapy are recommended after blood, urine, and CSF cultures are obtained (1). However, this approach can lead to unnecessary hospitalization, nosocomial infections, injudicious use of antibiotics, emergence of antibiotic-resistant bacteria, and adverse effects of antibiotics (2). Currently, hospitalization and antibiotics are not mandatory for febrile infants aged <3 months that meet low risk criteria. One study that analyzed seven years of data showed that, among 1472 infants aged <90 days that had fever without a focus, 676 met low risk criteria for serious bacterial infection, of which 586 (86.6%) were successfully managed as outpatients without antibiotics or undergoing a lumbar puncture. The researchers reported that only two patients were diagnosed with severe bacterial infection (2). The presented patient did not fully meet all the low-risk criteria, as he exhibited irritability and poor sucking reflex, and had an elevated CRP level.

The outcome of untreated occult bacteremia depends on host factors and causative organism. *S. pneumoniae* bacteremia can resolve spontaneously without treatment, especially in children that appear well, can persist, and can lead to such localized infections as meningitis, pneumonia, cellulitis, pericarditis, osteomyelitis, and suppurative arthritis (1). *S. pneumoniae*, as the causative agent of spinal epidural abscess, is rare. In an adult retrospective case-control study on the effect of diagnostic delay on outcome and use of risk factor screening for early identification of spinal epidural abscess, only 74 patients with spinal epidural abscess were identified during the 10-year study period. Among the causative agents, *Staphylococcus aureus* was the most common, whereas *S. pneumoniae* was causative in <3% of the cases (3).

Spinal epidural abscess can occur with hematogenous spread of infection from another part of the body or via contamination during surgery, lumbar drainage, mucocutaneous trauma, and spinal anesthesia in most patients. Furthermore, with spinal epidural abscess, there is a predisposing factor, including immunosuppressive disease, diabetes mellitus,

chronic renal failure, intravenous drug abuse, and cancer (4). Younger age had been defined as another risk factor for hematogenous dissemination. A 9-year single-center retrospective study that included 9 pediatric patients with spinal epidural abscess reported that 6 of the 9 immunocompetent cases had an identifiable risk factor for spinal epidural abscess (recent skin/soft tissue infection or trauma). *S. aureus* was the only identified pathogen, which was isolated via blood culture in 6 of the 9 patients (5). In the presented case of spinal epidural abscess, no organism was yielded in perioperative abscess material culture, because of the preceding intravenous broad-spectrum antibiotic treatment. It was considered that spinal epidural abscess might have developed as a result of untreated primary *S. pneumoniae* bacteremia in the absence of a predisposing factor other than the patient's age.

It is known that CSF findings with parameningeal collections, such as spinal epidural abscess, subdural empyema, and vertebral osteomyelitis, are mild to moderate neutrophil dominant pleocytosis and normal to moderately elevated protein values. The positive CSF culture rate is low (<10%) (6, 7). It was reported that partial or complete obstruction of CSF flow around the spinal cord could be the cause of an elevated CSF protein concentration (7). In the presented case, it was reasoned that CSF culture negativity might have been due to the absence of coexisting meningitis and no draining abscess into the subarachnoid space. The elevated CSF protein concentration in the presented patient might have been due to obstruction of CSF flow caused by the exertion of pressure by abscess lesion.

Spinal epidural abscess can be a complication of untreated *S. pneumoniae* bacteremia in infants aged <3 months; therefore, occult bacteremia in patients aged ≤ 3 months that do not fully meet the low-risk criteria for serious bacterial infection should undergo careful evaluation, including lumbar puncture. Furthermore, such patients should be admitted to hospital for intravenous antibiotic treatment while waiting for blood culture results.

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