

Salmonella-Infected Chronic Subdural Hematoma

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Abstract: We present herein a case in which salmonella infected a pre-existing chronic subdural hematoma. A one-year-old male infant was admitted to our hospital with complaints of loss of consciousness, seizure, and left hemiparesis. Irrigation and drainage through two burr-holes were performed to the left frontoparietal region with the diagnosis of chronic subdural hematoma according to CT findings. Operative findings revealed an infected subdural hematoma. *Salmonella typhi* grew in cultures of the subdural hematoma. According to the result of the culture antibiogram, ciprofloxacin therapy was initiated. Because of continued lethargy six days after the operation, a contrasted MRI was performed. The patient was reoperated with drainage and irrigation according to the MRI result. The antibiotic therapy was changed to a combination of vancomycin and meropenem. The following physical and neurological examinations of the patient were uneventful and the patient was discharged after six weeks of antibiotic therapy. The follow-up CT and neurological examination were normal after six months.

Key Words: Chronic subdural hematoma, infected subdural hematoma, *Salmonella typhi*

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Salmonella ile Enfekte Olmuş Kronik Subdural Hematom: Olgu Sunumu

Özet: Salmonella ile enfekte olmuş kronik subdural hematom olgusu sunuldu. Olgumuz 1 yaşında erkek, bilinç kaybı, nöbet geçirme ve sol tarafında güçsüzlük şikayetiyle başvurdu. CT'de görülen sol frontoparietal bölge yerleşimli kronik subdural hematom ile uyumlu lezyona, iki adet burr-hole açılarak irrigasyon ve drenaj uygulandı. Hematom sıvısından yapılan kültürde *Salmonella typhi* üredi. Kültür sonuçlarına göre Ciprofloksasin başlandı. Postoperatif 6. günde hastanın bilincinin letarjik olması sebebiyle çekilen Kranial MRI' da sol frontoparietal bölgede çevresel kontrast tutan içi hipointens, orta hat yapıları karşı tarafa itmiş, subdural ampiyem ile uyumlu görünüm tespit edildi. Hasta tekrar operasyona alınarak subdural ampiyem boşaltıldı, irrigasyon ve drenaj uygulandı. Nörolojik muayenesi normale döndü. Ciprofloksasin kesilerek Vankomisin + Meronem başlandı. 6 haftalık antibiyotik tedavisi sonrası sorunsuz olarak taburcu edildi. Postoperatif 6. ayda nörolojik muayene ve CT normal olarak değerlendirildi.

Anahtar Sözcükler: Kronik subdural hematom, enfekte subdural hematom, *Salmonella typhi*

Introduction

Chronic subdural hematoma is a well-known disease that can be treated surgically (1). It frequently occurs in the left frontoparietal region. Salmonella-infected chronic subdural hematoma is seen rarely in the literature (2).

In this report, we present a salmonella-infected chronic subdural hematoma case that was diagnosed by a culture of the subdural hematoma. We treated the chronic subdural hematoma surgically but encountered problems such as salmonella sepsis and salmonella enteritis.

Case Report

A one-year-old male infant was admitted to our emergency room with complaints of loss of consciousness, seizure and left hemiparesis. In addition, a neurological

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examination of the patient revealed pupillary anisocoria (dilatation of the left eye), and a Babinski sign in the lower left extremity. There was no history of trauma.

Non-contrast computerized tomography (CT) demonstrated a low density area with membranous structures mimicking subdural hematoma in the left subdural spaces of the frontoparietal region and a marked shift of the midline structures to the right hemisphere (Figure 1).

The patient was operated and two burr-holes were made on the left frontal and parietal regions. Dark green-yellow colored hematoma was drained and irrigation was performed to the subdural space. A subdural drainage kit was placed in the operation area. The neurological examination after operation was normal. The subdural drainage kit was removed after 48 hours. During this period, *Salmonella typhi* was grown in the chronic subdural hematoma liquid.

The patient developed abdominal distension and gastroenteritis, and *Salmonella typhi* grew in the blood

and stool cultures. Ciprofloxacin therapy was started according to the culture antibiogram results. On the sixth day, the drainage kit was removed, and a cranial magnetic resonance imaging (MRI) was performed because of the patient's continued lethargy. A T1W1 contrasted cranial MRI revealed a lesion that was hyperintense in the peripheral region and hypointense in the inner space in the left frontoparietal subdural area with a marked shift of the midline structures to the right. The patient was reoperated, subdural empyema was evacuated, and drainage and irrigation were performed (Figure 2).

The neurological examination was normal after the operation. Ciprofloxacin treatment was stopped and a vancomycin and meropenem combination of antibiotic therapy was initiated according to the second culture antibiogram results. The patient was discharged uneventfully after an antibiotic therapy of six weeks. The follow-up CT and neurological examination were normal after six months (Figure 3).

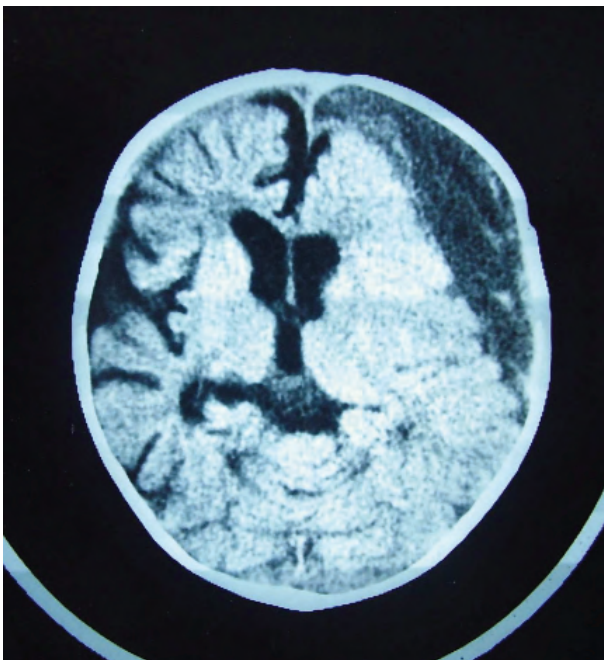


Figure 1. Axial CT scan showing a low density area with membranous structures in the left subdural space of frontoparietal regions with a marked shift of the midline.

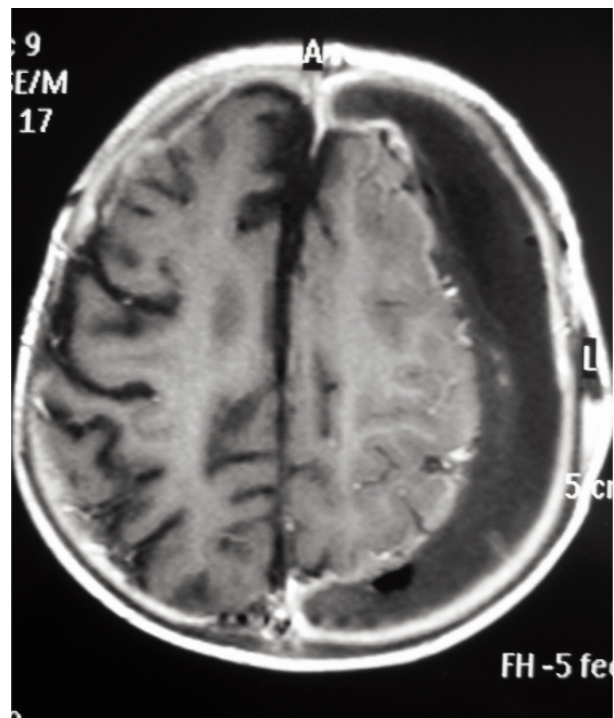


Figure 2. Axial T1W1 contrast-enhanced MRI showing enhanced contrast around the left subdural frontoparietal region.

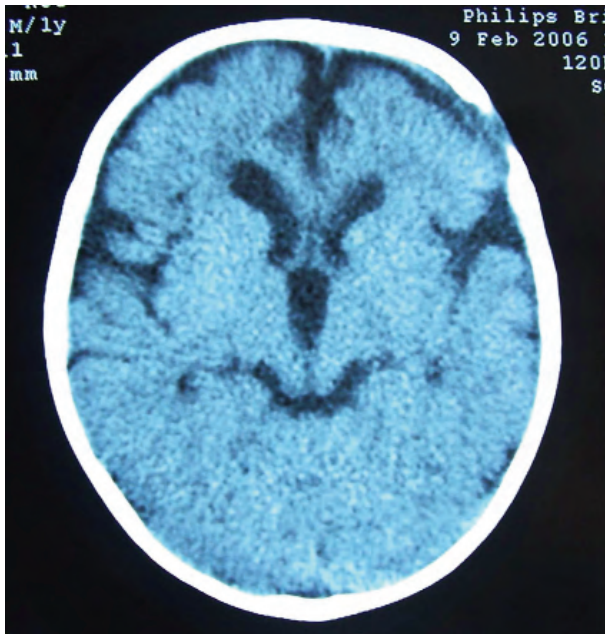


Figure 3. Follow-up axial CT scan after six months.

Discussion

Infection of a subdural hematoma is a rare cause of subdural empyema (3). Salmonellosis is usually a self-limited disease, generally restricted to the gastrointestinal tract (2,4). Salmonella bacteremia is known to occur in 5 to 45% of all cases of salmonellosis during the first year of life (2,5).

Meningitis is the most important predisposing factor to focal intracranial infection by salmonella (2,4). About 10% of described cases in the literature are related to acquired immunodeficiency syndrome (AIDS), all of them in the advanced stages of the disease (1). Other associated factors include immunosuppression, central nervous system (CNS) tumors, intracranial hematoma, trauma, otitis, previous meningitis, hydrocephalus, and vein of Galen malformation (2,4,6,7). We believe that the subdural hematoma of our case developed secondary to salmonella meningitis and sepsis.

Bacterial translocation is defined as the passage of bacteria from the lumen of the gastrointestinal tract through the epithelial mucosa into the lamina propria and then to the mesenteric lymph nodes. The causes of bacterial translocation include disruption of the ecologic balance of the normal indigenous microflora, resulting in bacterial overgrowth with gram-negative enteric bacilli,

impaired host immune defenses, and physical or functional loss of the mucosal barrier. Under certain circumstances, including trauma and burns, intestinal bacteria can escape from the gut and cause systemic infections (3).

When intracranial infection occurs, the prognosis of salmonellosis is poor, with mortality rates as high as 37%. However, Kinsella et al. (6) described bacteriological and clinical cures in 79% of patients with salmonella meningitis using new generation cephalosporins.

Visudhipan et al. (8) described the use of third-generation cephalosporins associated with ampicillin and/or trimethoprim-sulfamethoxazole, adding ciprofloxacin to the previously used antibiotics for cases of severe meningitis. Wessalowski et al. (9) related success treating one patient with ciprofloxacin only. Ciprofloxacin, vancomycin and meropenem antibiotic therapy were initiated in our case.

Clinically, an infected subdural hematoma manifests with non-specific signs of infection, focal neurologic signs, and signs of increased intracranial pressure (3,10,11). The neurological examination in our case revealed loss of consciousness, pupillary anisocoria (dilatation in the left eye), left hemiparesis, and a positive Babinski sign in the left lower extremity. In most patients, fever and headache are present, preceding a fulminant loss of consciousness (3).

Preoperatively, the diagnosis of chronic subdural hematoma is usually made based on the CT findings. In our case, a definitive preoperative diagnosis was not made. Contrast CT may help to establish the diagnosis if the membrane of the infected subdural hematoma is formed. Practically, it is difficult to make the diagnosis of an infected subdural hematoma preoperatively. However, fever and fulminant loss of consciousness may be suggestive (3).

Infected subdural hematoma is rare. Appropriate therapies, consisting of drainage and intravenous antibiotics, usually result in recovery. The possibility of hematogenous seeding from a distant focus of infection to the subdural space should be considered when CT findings suggestive of chronic subdural hematoma exist in a patient with signs of infection (3). Rare cases of salmonella-infected chronic subdural hematoma may be diagnosed by the culture of liquid removed from the hematoma during an operation.

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