RESEARCH PAPER

Salmonella Meningitis Complicated by Subdural Empyema in a 6-Month-Old Infant: A Case Report

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ABSTRACT

Background

Salmonella meningitis remains a critical cause of infant morbidity and mortality in developing countries despite its rarity. We describe a 6-month-old infant who developed culture proven Salmonella meningitis, complicated by subdural empyema who underwent timely burr hole drainage combined with prolonged high dose ceftriaxone and oral ciprofloxacin resulting in full neurological recovery.

Case Presentation

A 6-month-old infant presented with fever, seizures, and altered sensorium. Cerebrospinal fluid analysis and culture confirmed Salmonella meningitis. Neuroimaging revealed subdural empyema requiring neurosurgical intervention.

Management and Outcome

The infant underwent burr hole drainage along with prolonged high-dose ceftriaxone and oral ciprofloxacin therapy. The patient demonstrated full neurological recovery without any residual deficits.

Conclusion

Early recognition and treatment with prolonged course of intravenous antibiotics, vigilant neuroimaging and prompt neurosurgical drainage are pivotal for favorable outcome.

Keywords: Salmonella meningitis; subdural empyema; infant; neuroimaging.

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Introduction

Salmonella meningitis is accounting for less than 1% of cases in developed countries. This rate may occur in up to 13% of developing countries [1]. We present an infant with Salmonella meningitis complicated by subdural empyema and outline practical management lessons for paediatric practice. The report emphasises the importance of prolonged course of antibiotics, vigilant neuroimaging and timely neurosurgical drainage

Clinical Presentation

6 months old infant initially admitted with persistent fever and signs of central nervous system involvement, irritability and seizures. The child was well thriving and had received breastfeeds and top feeds with formula. The child had bulging fontanelle, hypertonia and poor activity. MRI performed at admission revealed leptomeningeal enhancement and CSF analysis showed pleocytosis, elevated protein, and low glucose suggestive of bacterial meningitis. The child was started on high

dose intravenous Ceftriaxone and Vancomycin along with Dexamethasone and anti-convulsants.. Blood and CSF cultures grew Salmonella typhimurium. Hence Vancomycin was stopped. Despite appropriate high-dose IV ceftriaxone therapy, child continued to remain irritable with persistent fever after 5 days. Repeat MRI revealed subdural empyema – left fronto-parietal (12 mm) in the infant (figure 1) . Neurosurgical drainage via burr-hole procedure was performed in leading to clinical improvement. Need for immunodeficiency workup has been counselled and parents wanted to get it done later. CSF culture and pus were sterile. At 6 months follow up the child was developmentally normal. Summary of clinical findings, investigations and management is summarised in table 1. Antibiotic therapy was continued postoperatively with full neurological recovery at follow up.

Figure 1: Repeat MRI showing left frontoparietal subdural empyema (12mm)

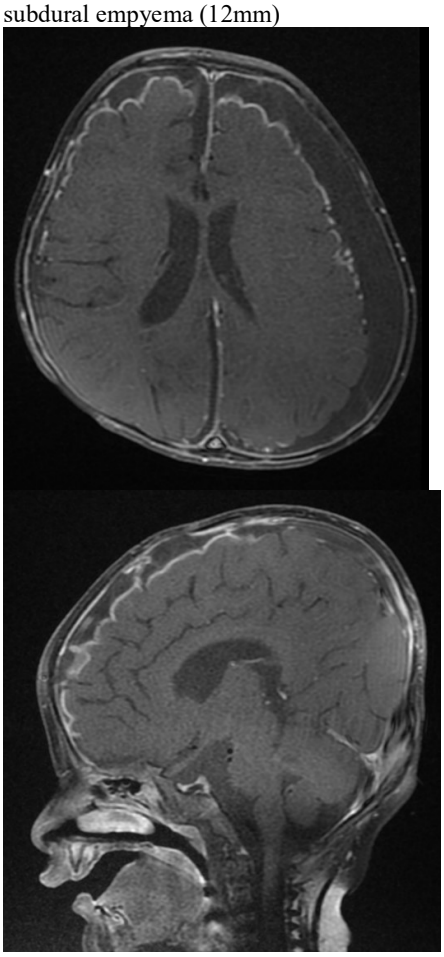

Table 1. **Summary of Clinical Findings, specific investigations and Management**

Case	**Age / Gender**	**Clinical Presentation**	**CSF Culture**	**CSF Findings**	**Antibiotics & Duration**
1	6 months/ Male	Fever, irritability followed by seizures	**(Serovar)** Salmonella Typhimurium	256 cells /µL, Protein 220 mg/dL, Glucose 5 mg/dL	Ceftriaxone 6 weeks and Ciprofloxacin 4 weeks

Discussion

Salmonella meningitis is most frequently diagnosed in infants under one year of age [1].Immunosuppression, whether congenital or acquired underdeveloped blood brain barrier in children, significantly those are risk factors for developing invasive non typhoidal salmonella infections .[2]. Non-typhoidal strains commonly cause meningitis, while S. Typhi is more associated with subdural empyema[3] .Treatment for salmonella meningitis is challenging as there is no consensus on the best approach.[1] Adjunctive ciprofloxacin may enhance bacteremic clearance and reduce relapse risk. [2].Salmonella meningitis, though rare, can have excellent neurological outcomes with early diagnosis, prolonged ceftriaxone therapy, and timely burr-hole drainage[3]. Our case report reinforces that prompt surgical and antibiotic intervention can ensure full recovery.

Conclusion

Salmonella meningitis warrants high suspicion in infants on top feeds, repeat neuroimaging needs to be considered when clinical recovery is delayed. Prolonged antibiotics, vigilant neuroimaging and prompt drainage of subdural empyema ensures excellent neurological recovery.

Points to remember

• Maintain high suspicion for Salmonella in infants on top feeding presenting with meningitis with or without diarrhea [3].

• Persistent fever and irritability after 5-7 days of appropriate antibiotics for meningitis, consider doing MRI to look for complications like subdural effusion [4].

• Subdural collections ≥10 mm or causing mass effect requires prompt early surgical intervention[5].

References:

1. Elouali A, Ouerradi N, Ayad G, Babakhouya A, Rkain M. Salmonella Meningitis in a Young Infant: A Case Report. Cureus. 2023 Aug

26;15(8):e44147. Doi: 10.7759/cureus.44147. PMID: 37753016; PMCID: PMC10518735.

2. Owusu-Ofori A, Scheld WM. Treatment of Salmonella meningitis: two case reports and a review of the literature. Int J Infect Dis. 2003 Mar;7(1):53-60. Doi: 10.1016/s1201-9712(03)90043-9. PMID: 12718811.

3. Williams V, Lakshmikantha KM, Nallasamy K, Sudeep KC, Baranwal AK, Jayashree M. Subdural empyema due to Salmonella paratyphi B in an infant: a case report and review of literature. Childs Nerv Syst. 2018 Nov;34(11):2317-2320. Doi: 10.1007/s00381-018-3825-7. Epub 2018 May 10. PMID: 29748704.
4. UpToDate's topic on "Neurologic complications of bacterial meningitis in children" (literature review current through ~February 2025, last updated using pediatric neurology/imaging guidelines)

5. The UpToDate topic on "Subdural hematoma in adults: Management and prognosis" (based on evidence summarization and neurosurgery consensus, literature summarized through at least 2021)