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STREPTOCOCCUS PNEUMONIAE MENINGITIS COMPLICATED BY HYGROMA AND VASCULITIS

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ABSTRACT

Hygroma and vasculitis are rare complications of meningitis, that are serious and potentially fatal. In this case report, we present a 71-year-old male diagnosed with *Streptococcus pneumoniae* meningitis who developed bilateral subdural hygroma and vasculitis despite appropriate treatment in the intensive care unit. The patient experienced seizures and persistent febrile episodes, leading to the diagnosis of these complications. Despite surgical and medical management, the patient's neurological status did not improve, and he remained comatose and was eventually transitioned to palliative care.

KEYWORDS

Meningitis, hygroma, vasculitis

LEARNING POINTS

- Bacterial meningitis can be complicated by rare events such as subdural hygroma and vasculitis.
- While surgical and medical interventions are essential, the outcomes often depend on the severity of initial infection and timely recognition of complications in order to adjust therapy as soon as possible.

INTRODUCTION

Meningitis is an acute inflammation of the leptomeninges, the protective membranes covering the brain and spinal cord. The condition can result from infectious causes, including bacteria, viruses, and fungi, as well as non-infectious aetiology such as autoimmune disorders, drugs, and malignant tumours. The clinical presentation varies depending on the underlying cause, but it often includes fever, altered mental status, neck stiffness, and headache[1]. Bacterial meningitis, especially due to *Streptococcus pneumoniae*, is associated with significant morbidity and mortality[2]. It is associated with systemic and neurological complications, including septic shock, increased intracranial pressure, seizures, and cerebrovascular abnormalities. Subdural hygroma and vasculitis, though rare, are particularly severe complications[3,4].

This report highlights a case of bacterial meningitis complicated by subdural hygroma and vasculitis and discusses the pathophysiology, diagnostic approach, and management strategies.

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CASE PRESENTATION

A 71-year-old male with a medical history of hypertension, benign prostatic hyperplasia, and type 2 diabetes mellitus presented to the emergency department with fever, chills, and decreased level of consciousness. His family reported purulent discharge from his left ear 1 week prior to presentation.

On examination, the patient appeared agitated and disoriented with a Glasgow Coma Scale (GCS) score of 9 out of 15. Neck rigidity was noted (positive Brudzinski sign), but the cranial nerves were intact, and Babinski reflex was negative bilaterally. Pertinent initial laboratory workup revealed a white blood cell (WBC) count of 8600/µl (differential including neutrophils: 88.6%), and a C-reactive protein (CRP) level of 110 mg/l. A non-contrast computed tomography (CT) scan of the brain was normal.

The patient was admitted to the intensive care unit (ICU), an urgent lumbar puncture (LP) was done, cerebrospinal fluid analysis showed: WBC count 2198/µl, red blood cell (RBC) count 1000/µl, protein 555 mg/dl, glucose: 30 mg/dl. A provisional diagnosis of bacterial meningitis was made, and the patient was started on ceftriaxone, vancomycin, and dexamethasone. On day 2 of admission, the patient developed tonic-clonic seizures and required intubation. Repeat CT imaging of brain revealed bilateral subdural collections that could be hygroma or empyema as seen in *Fig. 1*. After neurosurgery consultation burr hole drainage was performed and showed clear fluid on inspection thus indicating the presence of hygroma.

Postoperatively the patient had recurrent fevers despite intravenous (IV) treatment, so follow-up LP was done and showed improved cerebral spinal fluid (CSF) parameters. After discussion with the neurosurgery team, intrathecal vancomycin (3 doses) was administered, and repeat imaging was planned.

Magnetic resonance imaging (MRI) of the brain was performed, and findings were consistent with vasculitis, including bilateral high T2/FLAIR signal changes involving the cerebral cortex, basal ganglia, and midbrain as seen in *Fig. 2*.

The patient was started on methylprednisolone 1 g IV daily for 3 days. Yet almost 7 days post admission, the patient still had fever, and his neurologic status had not improved. Extubating was not possible. After discussion with the family, of the patient was transferred to palliative care. He died on day 9 post admission.



Figure 1. Computed tomography scan of the brain, showing bilateral frontal hygroma.

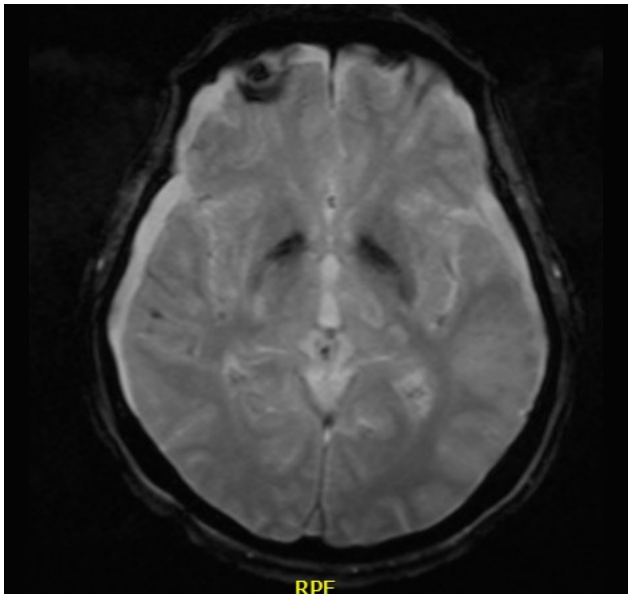


Figure 2. Magnetic resonance imaging of the brain showing diffuse bilateral areas of high T2/FLAIR areas with iso/low T1 signal involving the cerebral cortex. Basal ganglia, midbrain and cerebellum diffusion restriction and no enhancement, predominant in the frontal and parietal lobes.

DISCUSSION

Subdural hygroma, the accumulation of CSF in the subdural space, is a rare complication of bacterial meningitis[5]. Most cases resolve spontaneously; however, symptomatic cases with mass effect, such as seizures or altered consciousness, require surgical intervention. In this patient, the development of seizures prompted immediate imaging and surgical drainage. The pathogenesis of hygroma in meningitis is likely related to disrupted CSF absorption due to inflammation. Although uncommon, this complication highlights the importance of prompt neuroimaging in deteriorating patients with meningitis[5].

In addition, cerebral vasculitis, an inflammatory response of the vascular wall, has been reported as a severe complication of pneumococcal meningitis[6,7]. It can lead to ischemic or haemorrhagic strokes, as well as diffuse brain injury. Imaging findings typically include T2/FLAIR hyperintensities, as seen in this patient[8]. A 18-year retrospective study from France reported a 30% incidence of vasculitis in adult pneumococcal meningitis cases, correlating with high CSF protein levels and CRP[9]. Early corticosteroid therapy is the cornerstone of treatment, aiming to reduce inflammation and prevent further vascular damage[10].

The coexistence of subdural hygroma and vasculitis complicates the clinical course and worsens prognosis. Persistent fever despite targeted antibiotic therapy and a lack of neurological improvement are poor prognostic indicators[4]. Advanced imaging modalities such as MRI are critical in identifying these complications early, to prevent mortality, although therapeutic options remain limited in severe cases[7,8].

CONCLUSION

This case illustrates the challenges of managing bacterial meningitis complicated by subdural hygroma and vasculitis. While surgical and medical interventions are essential, the outcomes often depend on the severity of initial infection and timely recognition of complications. Further research into the prevention and management of such complications is crucial to improving patient outcomes.

REFERENCES

1. Hersi K, Gonzalez FJ, Kondamudi NP. Meningitis. [Updated 2023 Aug 12]. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459360/
2. Kim KS. Pathogenesis of bacterial meningitis: from bacteraemia to neuronal injury. *Nat Rev Neurosci* 2003;**4**:376-385.
3. Weisfelt M, van de Beek D, Spanjaard L, Reitsma JB, de Gans J. Clinical features, complications, and outcome in adults with pneumococcal meningitis: a prospective case series. *Lancet Neurol* 2006;**5**(2):123-9. doi: 10.1016/S1474-4422(05)70288-X. PMID: 16426988.
4. Steinberg SH, Murphy JP. Subdural hygroma complicating meningococcic meningitis. *J Neurosurg* 1951;**8**:671-674.3
5. Khedher A, Sma N, Slama D, Fraj N Hachfi W, Boussarsas M. Cerebral vasculitis complicationg pneumococcal meningitis. *EJCRIM* 2018;**5**:10.12890/2018_000819.
6. Schut ES, Lucas MJ, Brouwer MC, Vergouwen MD, van der Ende A, van de Beek D. Cerebral infarction in adults with bacterial meningitis. *Neurocrit Care* 2012;**16**:421-427.
7. Pfister HW, Borasio GD, Dirnagl U, Bauer M, Einhäupl KM. Cerebrovascular complications of bacterial meningitis in adults. *Neurology* 1992;**42**:1497-1504.
8. Mukherjee D, Saha A. Cerebral Vasculitis in a Case of Meningitis. *Iran J Child Neurol* 2017;**11**:81-84.
9. Artiaga A, Herman F, Arquizan C, Thouvenot E, Loubet P, Le Moing V, et al. Cerebral vasculitis as a complication of pneumococcal meningitis: A cohort study. *Infect Dis Now* 2023;**53**:104772.
10. Hummel BA, Blackburn J, Pham-Huy A, Muir K. High-dose steroid and heparin: a novel therapy for cerebral vasculitis associated with presumed group A Streptococcus meningitis. *BMJ Case Rep* 2021;**14**:e239618.