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Otogenic Pneumococcal Meningitis and Ventriculitis Mimicking Subarachnoid Hemorrhage

Khandaker Abdul Sadib

abdulsadib14@gmail.com

Marks Medical College & Hospital https://orcid.org/0009-0006-5836-6947

Yeaomoon Fabiha

Continental Hospital

Case Report

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Abstract

A 28-year-old man with chronic suppurative otitis media presented with acute headache, vomiting, and reduced consciousness (Glasgow Coma Scale 7). Non-contrast CT brain demonstrated basal cisternal hyperdensity suggestive of subarachnoid hemorrhage. However, CT angiography showed no aneurysm or vascular abnormality. Cerebrospinal fluid analysis revealed neutrophilic pleocytosis with elevated protein, and polymerase chain reaction confirmed Streptococcus pneumoniae. The clinical course was complicated by generalized tonic–clonic seizure, severe electrolyte derangements, and MRI-confirmed ventriculitis. The patient improved with intravenous antibiotics, corticosteroids, electrolyte correction, and supportive care, achieving full neurological recovery. This case highlights bacterial meningitis as an important mimic of subarachnoid hemorrhage on CT.

Key Clinical Message

Bacterial meningitis can mimic subarachnoid hemorrhage on CT due to proteinaceous inflammatory exudates. When vascular imaging is negative, prompt cerebrospinal fluid analysis and further neuroimaging are essential to avoid diagnostic delay and inappropriate management.

Introduction

Bacterial meningitis can occasionally present with radiological findings that mimic subarachnoid hemorrhage, particularly when severe basal exudates or cerebral edema are present. This overlap may lead to diagnostic uncertainty in emergency settings where non-contrast CT is the initial imaging modality. We report a case of pneumococcal meningitis originating from chronic suppurative otitis media that presented with features suggestive of subarachnoid hemorrhage and was further complicated by ventriculitis.

Case Report

Initial Presentation

A 28-year-old man with a one-month history of chronic suppurative otitis media presented with acute headache and vomiting followed by progressive restlessness and decreased consciousness. On admission, his Glasgow Coma Scale score was 7 (E2V2M3).

Non-contrast CT brain demonstrated increased attenuation within the basal cisterns, raising suspicion for subarachnoid hemorrhage (Fig. 1).

Diagnostic Workup

Given the history of ear infection, an intracranial infectious etiology was considered. CT angiography demonstrated normal intracranial vasculature with no evidence of aneurysm or vascular malformation (Fig. 2).

Lumbar puncture revealed turbid cerebrospinal fluid under elevated pressure with neutrophilic pleocytosis and markedly elevated protein. Glucose was relatively preserved. Gram stain and culture were negative, likely due to prior antibiotic exposure, but polymerase chain reaction detected *Streptococcus pneumoniae*.

Peripheral leukocytosis peaked at 33,830/mm³.

On the night of admission, the patient developed a generalized tonic–clonic seizure. Laboratory evaluation revealed severe electrolyte derangements, including hypokalemia, hypomagnesemia (0.6 mg/dL), and hypophosphatemia.

Management and Hospital Course

Empiric therapy with intravenous ceftriaxone and vancomycin was initiated along with adjunctive dexamethasone. Electrolyte abnormalities were aggressively corrected.

MRI brain demonstrated findings consistent with ventriculitis (Fig. 3).

The hospital course was further complicated by a mixed-pattern liver injury, with peak bilirubin exceeding 10 mg/dL and alanine aminotransferase exceeding 700 U/L, likely multifactorial in the setting of severe infection and exposure to multiple potentially hepatotoxic medications, including antibiotics and phenytoin. This improved with supportive management.

During steroid tapering, the patient developed worsening headache suggestive of rebound cerebral edema, which improved following temporary escalation of corticosteroids and osmotherapy.

Follow-up and Outcome

Follow-up and Outcome
Repeat cerebrospinal fluid analysis showed marked improvement with near normalization of parameters. The patient achieved full neurological recovery and was discharged with a Glasgow Coma Scale score of 15.

Discussion

This case highlights an important diagnostic pitfall in neuroimaging. Increased attenuation within basal cisterns on CT, typically associated with subarachnoid hemorrhage, may also occur in severe meningitis due to protein-rich inflammatory exudates, producing a pseudo-subarachnoid appearance.[1,2]

The absence of vascular abnormalities on CT angiography was critical in excluding true hemorrhage. This overlap between inflammatory exudates and true hemorrhage on CT can contribute to diagnostic anchoring, particularly in acute settings. Integration of imaging, clinical features, and cerebrospinal fluid findings established the diagnosis of pneumococcal meningitis.[4]

The development of ventriculitis indicated severe central nervous system infection. Severe electrolyte derangements likely contributed to seizure activity, emphasizing the importance of metabolic monitoring in critically ill patients.[5]

This case underscores the need to interpret imaging findings in clinical context, particularly in patients with predisposing conditions such as chronic ear infection.

Conclusion

This case highlights the importance of considering infectious etiologies in patients presenting with apparent subarachnoid hemorrhage on CT, particularly when vascular imaging is negative and clinical features suggest infection.

Declarations

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing Interests

The authors declare no competing interests.

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No funding was received for this study.

Author Contributions

Khandaker Abdul Sadib contributed to conceptualization, neuroimaging interpretation, manuscript drafting, and supervision.

Yeaomoon Fabiha contributed to patient management, data collection, and manuscript revision.

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Figures

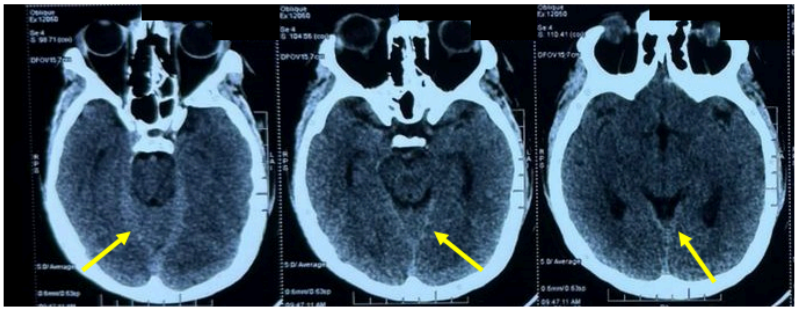


Figure 1

Non-contrast axial CT brain demonstrating increased attenuation within the basal cisterns and cortical sulci, representing a pseudo-subarachnoid hemorrhage pattern secondary to proteinaceous inflammatory exudate.

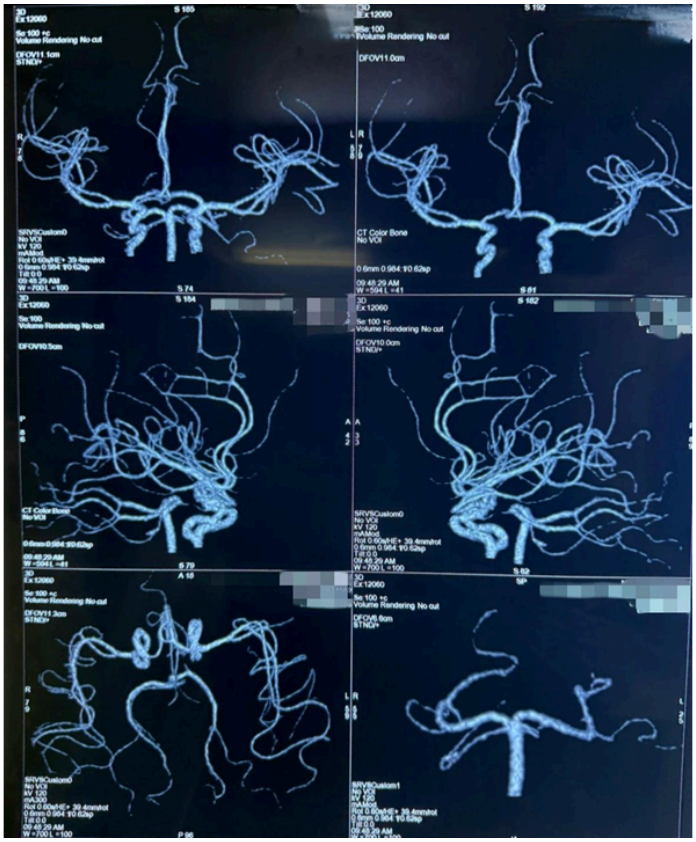


Figure 2

Three-dimensional reconstructed CT angiogram demonstrating patent intracranial vasculature with no evidence of aneurysm or vascular malformation.

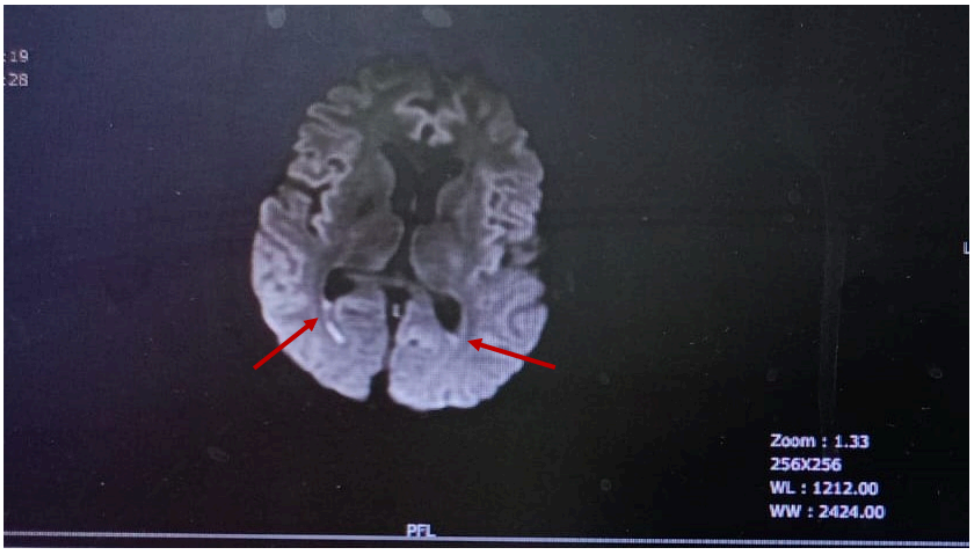


Figure 3

Axial diffusion-weighted MRI demonstrating hyperintense restricted diffusion within the dependent occipital horns of both lateral ventricles, consistent with ventriculitis.