

# Infratentorial subdural empyemas mimicking pyogenic meningitis

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### ABSTRACT

Infratentorial subdural empyema is an extremely rare condition which unfortunately mimics pyogenic meningitis in 75% of cases. While an ill-planned lumbar puncture in these cases may be fatal, an inadvertent delay in treatment may be detrimental to the outcome for the patient. We present a case of a young boy with long standing history of chronic suppurative otitis media (CSOM) presenting with an infratentorial empyema with features suggestive of pyogenic meningitis. We also review the available literature to further define the condition in terms of clinical features, treatment options, and outcome. A misdiagnosis of this condition with failure to institute appropriate surgical intervention and antibiotic therapy is potentially life threatening. We highlight this rare condition which requires a high degree of suspicion especially in the presence of associated risk factors.

**Key words:** Masquerading, meningitis, pyogenic, subdural empyemas

### Introduction

Subdural empyemas are a well-known complication of cranial sepsis. Infratentorial empyemas are however rare with only few such cases being reported in the literature. In its most common presentation, the condition mimics pyogenic meningitis and is more likely to be misdiagnosed as the same.

### Case Report

A 17-year-old boy presented to our hospital with high spiking fever, chills rigors associated with vomiting and headache for the past 3 days. He also had a history of intermittent purulent right ear discharge since 6 years of age. There were no focal neurological signs or papilledema to suggest raised intracranial tension. A CT scan of the head done by the referring doctor was normal. Lumbar

puncture showed increased proteins (210 mg/dL) with normal sugars. Cerebrospinal spinal fluid analysis (CSF) showed 3000 cells, 84% of them being neutrophils. Gram staining was negative for bacteria and CSF cultures were sterile. He was treated as pyogenic meningitis and was started on a combination of Ceftriaxone, Amikacin, and Tinidazole. His fever promptly responded to the antibiotics, but he repeatedly complained of a persistent headache. He was also diagnosed with bilateral atticofrontal CSOM with a right-sided cholesteatoma. In view of the persistent headache, a contrast MRI study of the brain was obtained and it revealed a right-sided enhancing subtentorial subdural collection suggestive of a subdural empyema [Figure 1].

Neurosurgical consult was sought and the patient was transferred under our care for further management. As the boy was afebrile with no evidence of raised intracranial tension, he was initially managed conservatively with antibiotics. Over the next few days his headache and vomiting subsided, but he kept complaining of repeated episodes of severe neck pain every night at around 3 am.

A repeat contrast-enhanced computed tomography scan (CECT) done 10 days later using a 64 slice scanner revealed that the collection had greatly increased in size

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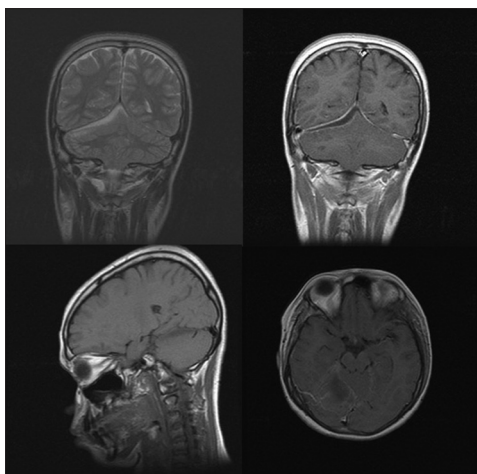


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**Figure 1:** Plain and contrast MRI of the posterior fossa showing a well defined loculated collection in the right subtentorial plain. The collection appears hypointense on T1-weighted images and hyperintense on T2-weighted images, with peripheral contrast enhancement. There is no associated hydrocephalus. Supratentorial compartment was normal

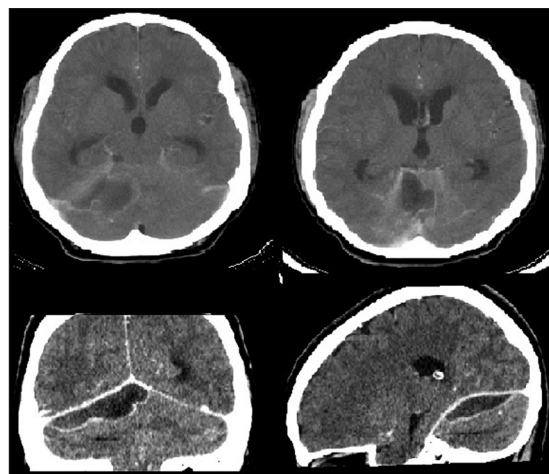
and now measured  $4.5 \times 2.5$  cm and was associated with secondary hydrocephalus [Figure 2]. The boy was taken up for a right retromastoid suboccipital craniectomy and about 15 ml of frank subdural pus was aspirated, and the subdural space gently washed out with antibiotic solution. Pus was sent for culture but later failed to show any bacterial growth.

Post-operative period, he did well with no recurrence of fever or neck pain. Intravenous antibiotics were continued for the next 10 days. At the time of discharge he was afebrile and neurologically intact with no focal deficits. He was advised to attend the ENT outpatient department period for further management of his middle ear infection.

## Discussion

Subdural empyemas are a well-known complication of cranial sepsis which are more common in the pediatric age group with the mean age of presentation being 12-16 years of age.<sup>[1,2]</sup> However, in its most common presentation, the condition mimics a simple pyogenic meningitis<sup>[1-5]</sup> and is more likely to present to a general practitioner or pediatrician than a neuro-specialist.

Infratentorial empyemas are predominantly otogenic in origin, with most patients having a history of a chronic discharging ear. The spread of infection from the middle ear to the infratentorial space can be direct, through osteomyelitic involvement of the bone, or through retrograde thrombosis of the mastoid emissary veins and the dural sinuses.<sup>[6]</sup>



**Figure 2:** Plain and contrast CT head images showing hypodense collection with peripheral contrast enhancement which has increased in size compared to the MRI and is causing compression and distortion of the 4<sup>th</sup> ventricle with obstructive hydrocephalus

The condition commonly presents with features of meningitis, in a patient with history of chronic ear discharge.<sup>[1-5]</sup> Only about 25% of all cases have focal neurological signs,<sup>[4]</sup> or features of raised intracranial tension. Deaths have been reported following lumbar punctures.<sup>[1]</sup> CSF studies are very nonspecific and usually suggestive of a frank or partially treated pyogenic infection.<sup>[1-3]</sup>

Most authors have used CT imaging as the sole diagnostic modality. However some reports have questioned its ability to diagnose infratentorial collections.<sup>[4,5]</sup> As it was seen in our case, imaging done outside had failed to show any collection which a MRI 3 days later demonstrated clearly.

Aggressive early management is the key to success. Unlike supratentorial collection where there is still a debate regarding craniotomy or burr hole,<sup>[7-9]</sup> wide posterior fossa craniectomy and evacuation of the pus is advocated for infratentorial collections.<sup>[1-3]</sup> Antibiotics should be empirical initially and should be further modified based on the culture reports from the drained pus or ear discharge.<sup>[1-3]</sup> A few cases of successful treatment with antibiotics have also been reported but they are the exception than the rule.<sup>[4,10]</sup>

## Conclusions

Infratentorial empyema is an extremely rare form or intracranial suppuration which mimics common pyogenic meningitis. It is commonly a sequel of long standing otitis media and it should be suspected in all such patients presenting with features of meningitis. An ill-planned lumbar puncture may be lethal and a good quality CT scan

study should be performed in all such cases. Treatment has to be early and aggressive with surgery and antibiotics.

## References

1. Nathoo N, Nadvi SS, van Dellen JR. Infratentorial empyema: Analysis of 22 cases. *Neurosurgery* 1997;41:1263-8.
2. Venkatesh MS, Pandey P, Devi BI, Khanapure K, Satish S, Sampath S, *et al.* Pediatric infratentorial subdural empyema: Analysis of 14 cases. *J Neurosurg* 2006;105 (5 Suppl):370-7.
3. Borovich B, Johnson E, Spagnuolo E. Infratentorial subdural empyema: Clinical and computerized tomography findings. Report of three cases. *J Neurosurg* 1990;72:299-301.
4. Van de Beek D, Patel R, Daly RC, McGregor CG, Wijdicks EF. The clinical challenge of recognizing infratentorial empyema. *Neurology* 2007;69:477-81.
5. Taha MM, Hassanam S. Subtentorial subdural empyema: Report of two cases and review of the literatures. *Turk Neurosurg* 2011;21:669-73.
6. Courville CB. Subdural empyema secondary to purulent frontal sinusitis. A clinicopathologic study of 42 cases verified at autopsy. *Arch Otolaryngol* 1944;39:211-30.
7. Pathak A, Sharma BS, Mathuriya SN, Khosla VK, Khandelwal N, Kak VK. Controversies in the management of subdural empyemas: A study of 11 cases with review of the literature. *Acta Neurochir (Wien)* 1990;102:25-32.
8. Bok AP, Peter JC. Subdural empyema: Burr holes or craniotomy?: A retrospective computerized tomography-era analysis of treatment in 90 cases. *J Neurosurg* 1993;78:574-8.
9. Nathoo N, Nadvi SS, Gouws E, van Dellen JR. Craniotomy improves outcomes for cranial subdural empyemas: Computed tomography-era experience with 699 patients. *Neurosurgery* 2001;49:872-7.
10. Jhamb R, Kumar A, Ranga G, Binecta K. Infratentorial subdural empyema following pyogenic meningitis in an adult: A case report. *J Clin Pathol Forensic Med* 2011;2:21-4.

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