ECRONICON OPEN ACCESS

EC PAEDIATRICS
Case Report

Sinusitis-Related Brain Infection a Case Report

Kawtar El Jebbouri*, Manal Oufroukhi, Majda Ankri, Nazik Allali, Siham El Haddad and Latifa Chat

Pediatric and Gynecology Radiology Department, Children's Hospital, Mohamed V University, Rabat, Morocco

***Corresponding Author:** Kawtar El Jebbouri, Pediatric and Gynecology Radiology Department, Children's Hospital, Mohamed V University, Rabat, Morocco.

Received: August 19, 2025; **Published:** September 10, 2025

Abstract

A 14-year-old boy with a history of fronto-ethmoidal sinusitis treated with antibiotics was admitted due to clinical deterioration. His symptoms began one week prior with frontal headache and meal-independent vomiting. Progression was marked by localized swelling in the right frontal region and fever. On admission, the patient had a temperature of 39.2°C and neck stiffness, indicating febrile meningeal syndrome. The remainder of the physical examination was unremarkable. Laboratory tests revealed leukocytosis and elevated C-reactive protein. A brain CT scan, performed one week after symptom onset, confirmed the diagnosis.

The final diagnosis was subdural empyema, a rare but serious complication of sinusitis. This condition accounts for 15 - 22% of focal intracranial infections. Historically almost always fatal before the advent of antibiotics, its prognosis has significantly improved with modern therapies. Clinically, it typically presents with fever, vomiting, and altered mental status. Rapid neurological decline usually reflects extensive hemispheric involvement.

Frontal sinusitis is the most common cause, sometimes in combination with ethmoidal or maxillary sinusitis. The infection spreads either retrogradely through septic thrombophlebitis or directly from osteomyelitis. Less frequently, it follows neurosurgical procedures. Subdural empyema is often associated with epidural empyema, cortical thrombophlebitis, brain abscess, or cortical venous infarction.

Neuroimaging is essential for diagnosis. On CT scans, the empyema appears as a hypodense collection over one cerebral hemisphere or along the falx cerebri, with sharper margins after intravenous contrast injection. CT also helps assess mass effect and midline shift. MRI with contrast, particularly diffusion-weighted imaging, provides superior sensitivity for detecting small collections, especially within the interhemispheric fissure. On T1-weighted sequences, the empyema typically appears as a crescentic or elliptical hypointense lesion adjacent to the skull or falx.

Keywords: *Subdural Empyema; CT; Brain Infection*

Introduction and Case Report

A 14-year-old boy, who had been diagnosed with fronto-ethmoidal sinusitis three days earlier and was on antibiotic treatment, was admitted to our department due to worsening of his condition. His symptoms began one week before admission with the onset of a frontal headache associated with episodes of vomiting unrelated to meals. The progression was marked by the appearance of a localized swelling in the right frontal region, accompanied by an unmeasured fever, which led the patient to seek care at the pediatric emergency department.

Initially, the patient was stable, with a fever measured at 39.2 degrees Celsius and neck stiffness. These two signs characterize febrile meningeal syndrome. The rest of the clinical examination was unremarkable.

Laboratory tests revealed leukocytosis and elevated C-reactive protein.

A CT scan was performed in our department one week after the onset of symptoms.

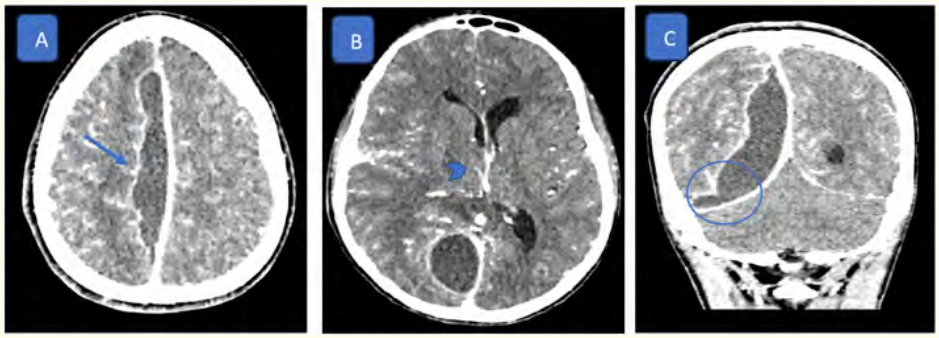

Figure 1: *Post-contrast brain CT in axial (A), coronal (B), and sagittal (C) slices showing a large hemispheric subdural empyema (arrow), with extension to the tentorium cerebelli (circle). Note the collapse of the right lateral ventricle and the midline shift caused by the mass effect (arrowhead).*

Discussion

Subdural empyema is a serious intracranial infection, accounting for 15 to 22% of focal brain infections. Before the advent of penicillin, it was almost always fatal, but modern antibiotic treatments have significantly improved the prognosis [1].

Early diagnosis and treatment are crucial for favorable outcomes and preventing lasting neurological damage [1].

Subdural empyema typically presents with fever, vomiting, and altered mental status. Rapid onset of neurological signs often indicates extensive involvement of one cerebral hemisphere [2].

Subdural empyema is most commonly caused by frontal sinusitis, sometimes combined with ethmoidal and maxillary sinusitis. It typically arises from retrograde infection spread via septic thrombophlebitis or direct extension from osteomyelitis. Less often, it occurs after neurosurgery and is frequently linked with epidural empyema, cortical thrombophlebitis, or intracranial abscesses, with possible cortical venous infarction [3].

Cranial imaging is essential for all patients suspected of having a subdural empyema. On CT scans, the lesion typically appears as a hypodense area over one cerebral hemisphere or along the falx cerebri. The boundaries of the collection become more distinct following intravenous contrast administration. CT imaging is also valuable for evaluating any associated mass effect or midline shift [4].

MRI with contrast provides more detailed visualization of smaller collections, particularly those located in the interhemispheric fissure. On T1-weighted sequences, the empyema typically appears as a crescent- or elliptical-shaped hypointense area adjacent to the skull or near the falx. Diffusion-weighted imaging (DWI) has demonstrated superior sensitivity compared to conventional MRI sequences and should be included as part of the diagnostic workup [4].

Conclusion

Subdural empyema remains a life-threatening complication of frontal sinusitis in children and adolescents. Prognosis depends on early recognition and prompt management, combining neuroimaging, targeted antibiotics, and surgical drainage when indicated. Brain imaging should be systematically performed in any complicated sinusitis presenting with neurological or meningeal signs to prevent irreversible sequelae.

We believe this case illustrates the importance of early diagnosis and management of intracranial complications of sinusitis, and we hope it will be of interest to your readers.

Bibliography

1. Segun Toyin Dawodu., *et al*. "Médecin physiatre interventionnel traitant, Wellspan Health, Subdural Empyema". Medscape Reference, Updated: October 28, 2022.
2. Robyn S Klein. "Abcès épidural et empyème sous-dural intracrâniens". University of Western Ontario, Le manuel MSD (2024).
3. Johann Sellner., *et al*. "Chapter 1 - Pathogenesis and pathophysiology of bacterial CNS infections" (2010).
4. Walter A Hall and Orlando De Jesus. "Subdural Empyema". Statpearls, National Library of Medicine (2024).

Volume 14 Issue 10 October 2025