



# A Case of Two Different Complications of Sinusitis: Orbital Abscess and Subdural Empyema

## Bir Olguda İki Farklı Sinüzit Komplikasyonu: Orbital Apse ve Subdural Ampiyem

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### Summary

Today, in spite of improved diagnostic tools and appropriate antibiotic usage, life-threatening complications of sinusitis such as orbital abscess and subdural empyema can still be observed. These complications may cause serious, disabling sequelae. Presently described is case of 12-year-old girl with frontoethmoidal sinusitis as well as orbital abscess and subdural empyema. Prompt diagnosis and treatment resulted in uncomplicated outcome. For patients with subdural empyema, early diagnosis is possible with cranial magnetic resonance imaging (MRI) and surgery is not necessarily required for clinical improvement. Otolaryngologists should pay attention to additional symptoms such as confusion or loss of consciousness in patients with orbital abscess in order to diagnose a secondary complication such as subdural empyema promptly.

**Keywords:** Orbital abscess; sinusitis complications; subdural empyema.

### Özet

Günümüzde gelişen tanı araçları ve uygun antibiyotik kullanımı ile sinüzit komplikasyonları tedavi edilebilmesine rağmen orbital apse ve subdural ampiyem hala hayatı tehdit edebilen tedavi sonrasında sekel bırakabilen ciddi sinüzit komplikasyonlarıdır. Bu yazıda, fronto-etmoid sinüzit nedeni ile orbital apse ve subdural ampiyem gibi aynı anda iki ciddi sinüzit komplikasyonu olan, hızlı tanı ve tedavi ile komplikasyonsuz iyileşen 12 yaşında kız hasta sunuldu. Tanısı kraniyal manyetik rezonans görüntüleme (MRG) ve klinik ile konulabilen ve tedavisi cerrahi yapılmadan da mümkün olan subdural ampiyemde acil tanı ve tedavi hastalarda kalıcı sekel bırakmadan da iyileşmeyi mümkün kılmaktadır. Sinüzit komplikasyonu olarak oluşabilecek subdural ampiyemin erken tespit ve tedavisi için biz KBB hekimlerinin hasta takibinde bilinç bulanıklığı ve bilinç kaybı gibi nörolojik bulgulara dikkat etmesi gerekmektedir.

**Anahtar sözcükler:** Orbital apse; sinüzit komplikasyonları; subdural ampiyem.

### Introduction

Complications of sinusitis can be classified as orbital or intracranial complications. Orbital complications consist of orbital inflammatory edema, orbital cellulitis, subperiosteal abscess, orbital abscess, and throm-

bosis of the cavernous sinus.<sup>[1]</sup> Spread of infection occurs through direct contact with bone, or in the more frequently encountered indirect spread, there is retrograde progression of septic thrombophlebitis through venous system connecting intra- and extracranial ar-

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eas.<sup>[2]</sup> Currently, sophisticated diagnostic tools and appropriate use of antibiotics can treat complications of sinusitis; however, orbital abscess and subdural empyema are still serious complications that can threaten life, and leave postoperative sequelae.<sup>[3]</sup>

Presently described is case of a 12-year-old girl who was diagnosed with orbital abscess and subdural empyema as result of frontoethmoidal sinusitis but who recovered without complication thanks to rapid diagnosis and treatment.

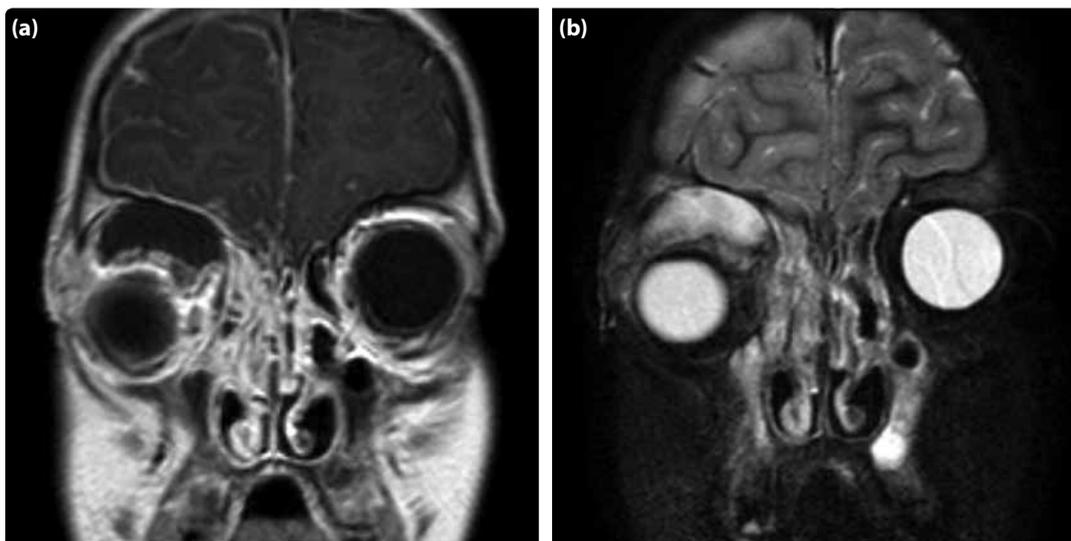
### Case Report

Examination of 12-year-old patient who presented at clinic indicated swelling of upper lid of right eye, inferolateral protrusion of eye, redness and pain in right eye, high fever, inferolateral repression of right eye, hyperemia, edema, and increased local temperature of painful right eye. Endoscopic rhinological examination revealed diffuse mucopurulent secretion in both middle and lower meatus, and edema of inferior conchae. Laboratory results were unremarkable with exception of leucocytosis ( $15000/\text{mm}^3$ ). Evaluation of paranasal sinus computed tomography (CT) disclosed frontoethmoidal sinusitis and orbital abscess. Orbital magnetic resonance imaging (MRI) was performed to precisely delineate contours of abscess (Figure 1a, b). Based on these findings, patient received initial diagnosis of sinusitis associated with orbital abscess. Initial treatment with intravenous (IV) ceftriaxone sodium (3 g/d) + vancomycin (40 mg/kg/d) + metranidazole (40

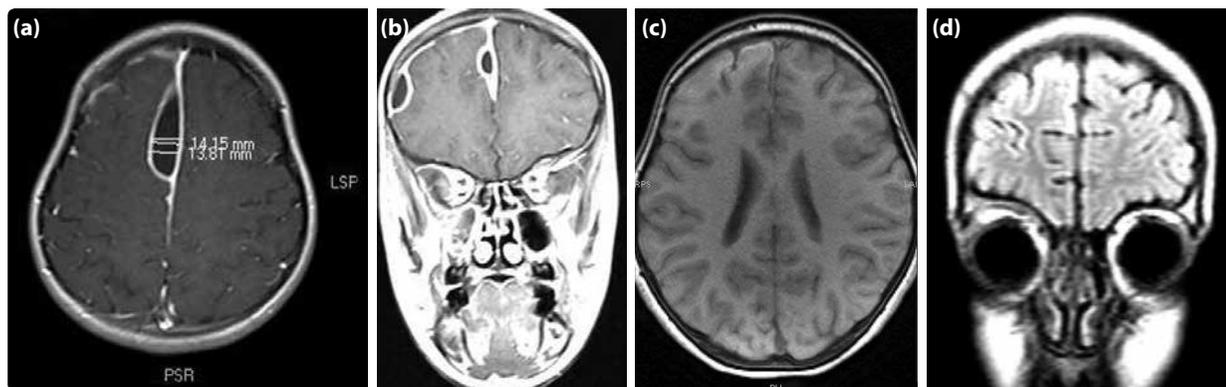
mg/kg/d) was implemented, and an urgent operation was planned. Under general anesthesia, through an incision performed on laterosuperior part of right upper eyelid, abscess was drained and a Penrose drain was placed in situ. In addition, right uncinectomy, right anterior and posterior ethmoidectomy, and ostial dilatation of frontal sinus were performed endoscopically. Surgical intervention was terminated without anterior packing in order to avoid blocking drainage. Despite surgical intervention and intensive antibiotherapy, on third postoperative day, high fever and severe headache persisted, and confusion, loss of consciousness, and temporary epileptiform attacks each lasting 2 to 3 minutes were added to symptoms, which necessitated requesting urgent consultation from neurosurgery and neurology departments. Based on cranial MRI findings, diagnosis of subdural empyema was made by department of neurosurgery, and patient was kept under observation (Figure 2a, b). During observation period, antibiotherapy was maintained, and course of disease was followed-up with frequent cranial MRIs. At the end of 6 weeks, patient recovered completely with drug therapy and maintenance therapy without the need for additional surgical intervention (Figure 2c, d). No recurrent infection or neurological sequelae were observed in follow-up over ensuing 4 months.

### Discussion

Empyema is accumulation of pus in intracranial spaces. However, subdural empyema is local accumulation of pus between inner layer of dura mater and outer



**Figure 1.** (a) MRI of the orbital abscess (coronal plane). (b) Contrast-enhanced image of the orbital abscess (coronal plane).



**Figure 2.** (a) Pretreatment subdural empyema axial MRI image. (b) Pretreatment subdural empyema coronal MRI image. (c) Posttreatment axial MRI image. (d) Posttreatment coronal MRI image.

layer of arachnoid membrane.<sup>[4,5]</sup> Subdural empyema constitutes 15–25% of all intracranial infections, and it is frequently unilateral. In newborns, subdural empyema is frequently seen as complication of meningitis or otitis media, and occurs as complication of sinusitis in school age children.<sup>[6]</sup> Nearly 80% of subdural empyemas are seen in men, and 60% of patients are between 10 and 40 years of age.<sup>[7]</sup> In developing countries, the most common intracranial complication of sinusitis is epidural abscess, which has a more favorable prognosis. Then in decreasing frequency, subdural empyema, meningitis, encephalitis, and brain abscess are seen.<sup>[8]</sup>

Rarely, as complication of sinusitis, subdural empyema can have fatal outcome. It can develop as a result of erosion of tegmen tympani caused by mastoid or middle ear infection, or these infections may directly induce formation of defects on adjacent posterior wall of frontal sinus. Indirect spread occurs through retrograde progression of septic thromboembolism of venous system.<sup>[9]</sup> Development of ipsilateral orbital abscess and subdural empyema in present patient suggested local spread. No bone defects caused by direct spread from adjacent empyema were detected with cerebral MRI or CT examinations, so conclusion was that infection was disseminated through venous route.

As reported in the literature, as a complication of sinusitis, orbital abscess is rare; however, it can cause blindness or lead to fatal outcome.<sup>[10]</sup> Orbital abscess emerging as complication of sinusitis can be localized on affected site or it can manifest secondary to the sinusitis on contralateral side. Subdural empyema is seen less frequently than orbital abscess. Concomitancy of preseptal cellulitis and subdural empyema is

more frequently seen; concurrent presence of orbital abscess and subdural empyema in same patient is very rarely encountered.<sup>[11]</sup>

During clinical progression of subdural empyema, epileptiform seizures coursing with headache, fever, confusion, and loss of consciousness are seen. It is difficult to discriminate clinical course from meningitis. In present patient, temporary loss of consciousness lasting for 1 or 2 minutes, and severe headache clinically suggested presence of intracranial pathology. Initial diagnosis was based on cerebral MRI findings. Diagnosis of subdural empyema was made based on cranial MRI findings of increased convexity, thickening, and contrast-enhancement of dural and arachnoidal membranes.

On T1 axial sections of present patient, convexity along entire length of frontal lobe falx, consolidation, and contrast-enhancement of dural and arachnoidal membranes were observed. Restriction of diffusion, a characteristic feature of bacterial empyema, was also noted. Subdural empyema should be urgently treated. Surgery may be preferred as a first-line treatment; however, intensive use of appropriate antibiotics with surveillance and frequent cranial MRIs is a more updated, conservative approach. In addition to obtaining frequent cranial MRIs and pursuing rigorous antibiotherapy, specialists in neurosurgery, infectious disease, and pediatrics also collaborated on follow-up of present patient, who was fully recovered at end of sixth week without sequelae.

### Conclusion

Previously, cases of subdural empyema typically ran a fatal course; however, development of current diagnostic tools such as MRI and CT have provided advan-

tages of making faster diagnosis, allowing patients recover without sequelae following use of appropriate antibiotherapy.<sup>[11]</sup> In otolaryngology clinics, it should not be forgotten that in addition to frequently seen complications of sinusitis, rarely observed concurrent presence of orbital abscess and subdural empyema can leave permanent sequelae and result in fatal outcome. When subdural hematoma accompanies orbital abscess emerging as complication of sinusitis, in addition to existing symptoms, confusion or loss of consciousness is observed. Urgent diagnosis and treatment of patients with subdural empyema, which can be accomplished based on cranial MRI and clinical findings and does not require surgery, allows for patient recovery without permanent sequelae.

### Conflict of interest

None declared.

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