

# Acute Sinusitis Complicated with Orbital Abscess, Osteomyelitis and Staphylococcus Aureus Bacteremia: A Case Report

## Orbital Apse, Osteomiyelit ve Staphylococcus Aureus Bakteremisi ile Komplike Akut Sinüzit Olgusu Sunumu

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### ÖZET

Orbital selülit gözü çevreleyen yumuşak dokunun enfeksiyonu olarak tanımlanır. Orbital komplikasyonlar akut sinüzitten etkilenen çocuklarda görülebilmektedir. 12 yaş kız hasta akut sinüzit sonrası sağ üst göz kapağında şişlik, kızarıklık, ağrı, yanma şikayetleriyle kliniğimize başvurdu. Uygun antibiyoterapi uygulanmasına rağmen kliniğinde düzelme olmayan hastaya çekilen orbital manyetik rezonans görüntülemesinde frontal, maksiller ve etmoidal sinüzit, frontal kemikte destrüksiyon, osteomiyelit ve subperiosteal apse izlendi. Sağ gözde yukarı ve laterale bakış kısıtlılığı başlayan hastada cerrahi olarak abse temizlendi. Hastanın kan ve apse drenaj kültüründe Staphylococcus Aureus üremesi oldu. Cerrahi ve medikal tedavi sonrası hasta sekelsiz iyileşti. Sinüzite sekonder göz kapağında şişlik, proptosis, ağrı, gözde hareket kısıtlılığı ile gelen bir hastada komplikasyon düşünülmesi, uygun medikal tedavi ve erken cerrahi müdahale açısından değerlendirilmesi kalıcı hasarların önüne geçilmesi açısından önemlidir.

**Anahtar Kelimeler:** Orbital abse, Sinüzit, S. Aureus; Osteomyelit

### ABSTRACT

Orbital cellulitis is defined as infection of the soft tissue surrounding the eye. Orbital complications can be seen in children affected by acute sinusitis. Herein we report a twelve year old child admitted to our clinic with complaints of redness, swelling, pain and burning of the right upper eyelid after acute sinusitis. Frontal, maxillary and ethmoidal sinusitis, frontal bone destruction, osteomyelitis and subperiosteal abscess were observed in the orbital magnetic resonance imaging of the patient, whose clinical condition did not improve despite appropriate antibiotic therapy. In the follow up; limitation of upward and lateral gaze began in the right eye then surgical abscess drainage was performed. Staphylococcus aureus growth was observed in the patient's blood and abscess drainage culture. The patient recovered without sequelae after surgical and medical treatment. It is important to consider a sinusitis complication in a patient who presents with eyelid swelling, proptosis, pain and limitation of movement and evaluate it in terms of appropriate medical treatment and early surgical intervention in order to prevent permanent damage.

**Key words:** Orbital abscess, Sinusitis, S. Aureus; Osteomyelitis

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### INTRODUCTION

Common clinical findings of childhood acute sinusitis are runny nose, cough, fever, unpleasant breath odor, hyponasal speech, irritability, loss of appetite, headache and postnasal drip. Although it is mostly cured with appropriate treatment, complications may sometimes develop. Orbital complications are the most common seen among all complications. These are orbital cellulitis, preseptal/periorbital cellulitis, subperiosteal abscess and optic neuritis (1,2). Chandler's classification sorts orbital complications according to the degree of infection



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of the orbital contents and surrounding structures (3).

Orbital complications account for 74-85% of all complications. Blindness and intracranial involvement may develop in patients with orbital complications secondary to acute sinusitis. Therefore, rapid diagnosis and appropriate treatment of the complications are important (4).

*S. aureus*, *Streptococcus pyogenes*, *Haemophilus influenzae*, *Streptococcus pneumoniae* are common bacterial causes of orbital and periorbital cellulitis (5-7).

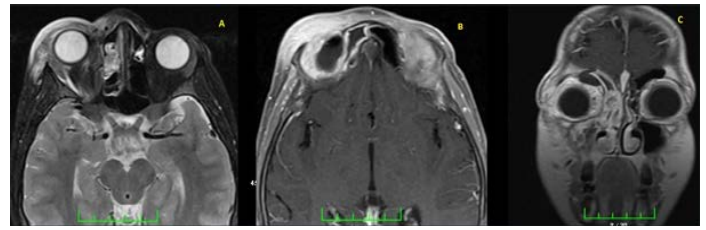
We report a case with acute sinusitis and developed orbital cellulitis, subperiosteal abscess and *S. aureus*-associated bacteremia and recovered without sequelae with appropriate medical and early surgical treatment.

### CASE REPORT

A 12-year-old girl patient with no known disease was admitted with complaints of swelling, redness, burning and pain in the right eye for a day. Amoxicillin clavulanate treatment at a dose of 40 mg/kg/day had been started to the patient at an another health center with the diagnosis of sinusitis. Two days after the onset of symptoms, the patient presented with fever, swelling, pain, and a burning sensation localized to the right eye. On physical examination, body temperature was 36.9 °C, heart rate was 114/min and blood pressure was 100/60 mmHg. There was edema as much as to close the eyelid opening, hyperemia and temperature increase in the right eyelid (Figure 1). Eye movements were free in all directions. Visual acuity was found %100 bilaterally by ophthalmologic examination. There was purulent postnasal



**Figure 1.** Edema and hyperemia in the right eye



**Figure 2.** Orbita magnetic resonance imaging; Orbital cellulitis and extraconal abscess A- Axial T2 weighted image: Preorbital cellulitis and ethmoid sinusitis. B- Axial contrast enhanced T1 weighted image: Preorbital cellulitis and extraconal abscess. C- Coronal contrast enhanced T1 weighted image: Preorbital cellulitis, frontal, ethmoid and maxillary sinusitis and extraconal abscess.

discharge in the oral cavity. Other system examinations were normal. Laboratory investigations revealed a leukocyte count of 15,220/mm<sup>3</sup> (90% polymorphonuclear leukocytes, 6% lymphocytes), hemoglobin level of 12.2 g/dL, platelet count of 238,000/mm<sup>3</sup>, C-reactive protein (CRP) level of 72.9 mg/L (reference range: 0–5 mg/L), and an erythrocyte sedimentation rate of 38 mm/h (reference range: 0–20 mm/h). Other biochemical parameters were within normal limits. The patient was evaluated as having preseptal cellulitis. Ceftriaxone and clindamycin treatments were given to the patient.

Magnetic resonance imaging (MRI) was planned as there was no clinical improvement and limited lateral and superior eye movements developed on the second day of the patient's hospitalization. Orbital MRI of the patient revealed mucosal thickening associated with widespread inflammation in the right frontal sinus, ethmoid sinus, and right maxillary sinus. Loss of bone integrity at the floor of the right frontal sinus (osteomyelitis) and at this plane abscess loculation extending from the frontal sinus to the extraconal tissue in the orbital area was observed. In a location corresponding to the roof of the right maxillary sinus and orbital floor an abscess loculation with more intense contrast in the periphery was observed as well. Methicillin-sensitive *S. aureus* grew in the blood culture taken at the patient's admission. Performing Functional Endoscopic Sinus Surgery (FESS) by the Ear, Nose and Throat (ENT) Department, the sinuses were cleaned, but the patient's clinical findings didn't improve and eye movements were limited in the postoperative period, the performed control MRI showed that contrast enhancement in the extraconal area on the right and compression was observed in the superior rectus due to the described lesion. The findings were consistent with cellulitis and abscess on the right side in

the extraconal area secondary to cellulitis (Figure 2). On the seventh day of the patient's hospitalization, abscess drainage was performed through an incision through the right eyelid. After the operation, edema and hyperemia gradually started to regress and eye movements became free in all directions. Methicillin-sensitive *S. aureus* was grown in the culture taken from the abscess drainage at the patient's second operation. On the 21st day of the patient's hospitalization, the edema and redness of the right eyelid decreased significantly. The patient was given ceftriaxone and clindamycin treatments at maximum dose for a total of 21 days and teicoplanin treatments for 17 days and then discharged with amoxicillin and clavulanic acid treatment.

At the patient's follow-up visit one week later, the edema and hyperemia in the eyelid had completely disappeared. The eye could move freely in all directions. In the patient's control orbital MRI performed one month after discharge, a significant decrease in inflammation in the right preseptal space and upper eyelid area was observed.

## DISCUSSION

Paranasal sinus (ethmoidal, maxillary and frontal) infections may cause orbital infection. In a study conducted on patients diagnosed with orbital cellulitis, 22.2% maxillary and ethmoidal, 11.1% ethmoidal and 5.5% frontal sinusitis were detected radiologically and clinically (8). Mostly, rhinosinusitis is a diagnosis based on clinical symptoms and while complications are clinically suspected CT and/or MRI of the paranasal sinuses should be obtained. A significant disadvantage of CT is the use of ionizing radiation. Especially in children, exposure to radiation should be kept at a minimum. And also some reports showed that abnormalities responsible for the clinical symptoms are better seen on MRI. This seems true especially for intracranial complications (3). In our case, MRI was planned due to eye movement restriction and lack of clinical improvement thereby orbital cellulitis and subperiosteal abscess were observed owing to ethmoidal, maxillary and frontal sinusitis.

Even if appropriate antibiotic treatment is carried out, infections of the paranasal sinuses might cause serious complications (orbital cellulitis, subperiosteal orbital abscess, intraorbital abscess, subdural empyema, brain abscess and cavernous sinus thrombophlebitis) and surgical treatment is mostly required (9). In this case, we found that orbital abscess and bacteremia developed as a complication of sinusitis despite appropriate treatment and surgical interventions were required two times. Osteomyelitis secondary to sinusitis is mostly seen in children and *S. aureus* is the most common causative agent. After osteomyelitis, an abscess may develop in the relevant area (10). In our case, osteomyelitis, bacteremia and abscess developed secondary to sinusitis. The incidence

of bacteremia secondary to orbital cellulitis has been reported to be low in the literature (11).

Restriction in eye movements, chemosis, proptosis, diplopia, decreased visual acuity, decreased pupillary reflex; are the most important clinical findings in orbital abscess (12). In this case, there were edema and hyperemia in the right eyelid and limitation of superior and lateral vision in the right eye.

In orbital cellulitis, MRI may indicate smearing of normal fatty shadows on T2 weighted images. The preferred imaging method for diagnosing cavernous sinus thrombosis and demonstrating local fluid collection such as abscess is MRI (13). Based on patient's MRI findings and Chandler's classification, we diagnosed orbital abscess that caused frontal bone destruction.

Intravenous antibiotics are supposed to be administered for at least 3 days or until orbital symptoms resolve and these medications should be continued for 7-10 days for bacteremia. Initial antibiotics are chosen based on the most likely sinusitis pathogens (*S. pneumoniae*, other streptococci, *S. aureus*, nontypeable *H. influenzae* and nonspore-forming anaerobes). Ceftriaxone can be used alone in patients younger than nine years of age or combined with clindamycin in patients older than nine years of age (13). In our case, ceftriaxone and clindamycin treatments were started empirically, but teicoplanin was added to the treatment due to insufficient response to the treatment.

In patients diagnosed with orbital cellulitis, in case there is no improvement, but progresses with antibiotic therapy within 24-48 hours, surgical intervention is planned (9). In one study, surgical treatment was recommended, firstly starting with intravenous antibiotic treatment and in case periorbital edema did not improve, proptosis worsened and gaze limitation in eye movements persisted or worsened within 24-48 hours. Findings that suggest urgent surgical treatment at the time of initial presentation are stated as decreased visual acuity, systemic involvement and immunosuppression in the patient (14). During our follow-up, our patient had no clinical improvement for two days, so FESS was performed by the ENT. Later, abscess drainage was performed to the patient whose clinical condition did not improve by the ENT. More serious complications were prevented by close monitoring and if necessary, rapid surgical intervention.

As a result, cases presenting with eyelid swelling and redness should be carefully evaluated in terms of complications of acute sinusitis and should be carefully examined in terms of eye movements, edema, hyperemia and visual acuity during the examination. After starting appropriate treatment for possible pathogens, the clinical response should be monitored daily and in cases with no clinical improvement, it should be evaluated with advanced imaging studies and surgical

intervention should be planned for preventing permanent damage from complications.

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