

Preseptal Cellulitis Not Recover with Medical Treatment: When Should We Consider Orbital Abscess?

Medikal Tedaviyle İyileşmeyen Preseptal Selülit: Orbital Abseyi Ne Zaman Düşünmeliyiz?

 Memduha Sari¹,  Zeynep Celiktaş¹,  Ahmet Osman Kilic¹,  Fatih Akin¹,  Abdullah Yazar¹,
 Mehmet Akif Dunder²

¹Necmettin Erbakan University, Faculty of Medicine, Child Health and Diseases, Konya, Türkiye

²Necmettin Erbakan University, Faculty of Medicine, Ear Nose and Throat Diseases, Konya, Türkiye

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Sorumlu Yazar/Corresponding Author:

Memduha Sari,
Necmettin Erbakan University, Faculty of Medicine, Child Health and Diseases, Konya, Türkiye

e mail: menduhaakcay@gmail.com

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ÖZET

Orbital selülit göz küresi dışındaki yağ ve kas dokularını içeren ciddi bir enfeksiyondur. Preseptal selülit ise göz kapağının ön kısmındaki dokuların genellikle hafif seyreden enfeksiyonudur. Her iki klinik durumda göz ağrısı, göz kapağında şişme ve eriteme neden olabileceğinden birbirleriyle karıştırılabilir de klinik etkileri çok farklıdır. Preseptal selülit nadiren ciddi komplikasyonlara yol açan hafif bir rahatsızlıktır, oysa orbital selülit görme kaybına ve hatta yaşam kaybına neden olabilir. İki hastalıkta da altta yatan en sık neden yakın dokulardaki enfeksiyonların (akut sinüzit vb.) komşuluk yoluyla orbitaya yayılmasıdır. Orbital selülitin en önemli ve ciddi komplikasyonlarından birisi de orbital apsedir. Klinik bulgular ve radyolojik tetkikler ile orbital apse tespit edildiğinde vakit kaybetmeden intravenöz geniş spektrumlu antibiyotik tedavisi ve acil cerrahi müdahale gerekmektedir. Bu yazımızda, preseptal selülitte orbital selülit ve orbital apseye ilerleyen ve cerrahi tedavi gerektiren bir olguyu sunacağız. Sonuç olarak, orbital enfeksiyonlarda tedaviye yanıt alınamıyorsa ciddi komplikasyonlar (orbital apse vb.) akla gelmelidir. Hızlıca radyolojik görüntülemelerle ayırıcı tanı yapılmalıdır. Gerekiyorsa cerrahi müdahale yapılmalıdır. Hastalık tedavisi, pediatri, göz hastalıkları ve kulak burun boğaz branşlarının ortak görüşleriyle multidisipliner olarak planlanmalı ve takip edilmelidir.

Anahtar Kelimeler: Orbital abse, preseptal selülit, orbital selülit

ABSTRACT

Orbital cellulitis is a serious infection of the fat and muscle tissue outside the eyeball. Preseptal cellulitis is a generally mild infection of the tissues in the front of the eyelid. Although both conditions can cause eye pain, eyelid swelling and erythema, they can be confused with each other, but their clinical effects are very different. Preseptal cellulitis is a mild condition that rarely leads to serious complications, whereas orbital cellulitis can cause vision loss and even death. The most common underlying cause of both conditions is the spread of infection from nearby tissues (acute sinusitis, etc.) to the orbit through the surrounding tissues. One of the most important and serious complications of orbital cellulitis is orbital abscess. When orbital abscess is detected by clinical findings and radiologic examinations, intravenous broad-spectrum antibiotic treatment and emergency surgical intervention are required immediately. In this article, we will present a case that progressed from preseptal cellulitis to orbital cellulitis and orbital abscess and required surgical treatment. In conclusion, if there is no response to treatment in orbital infections, serious complications (orbital abscess, etc.) should be considered. Differential diagnosis should be made quickly with radiologic imaging. If necessary, surgery should be performed. Management of the disease should be planned and followed in a multidisciplinary manner with joint opinions from pediatrics, ophthalmology and otolaryngology branches.

Key words: Preseptal cellulitis, orbital abscess, orbital cellulitis

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INTRODUCTION

Preseptal cellulitis (periorbital cellulitis) can occur at any age, but is particularly common in the pediatric population (1). Some studies show a mortality rate of 5% to 25% for preseptal or orbital cellulitis with intracranial complications (2). Although it is most commonly considered a complication of sinus infection, clinical conditions such as local trauma, sepsis, spread of local infection, and insect bites may also be involved in the etiology (3).

Preseptal cellulitis is an infection of the anterior part of the palpebrae. Orbital cellulitis is an infection of the tissues surrounding the orbit (4). Preseptal and orbital cellulitis are two clinical entities that require differential diagnosis in terms of ocular pain, hyperemia, and swelling. Preseptal cellulitis is a condition that usually does not cause serious complications and responds well to medical treatment. However, orbital cellulitis can lead to loss of vision and mortality. Orbital cellulitis can be differentiated from preseptal cellulitis by clinical features (ophthalmoplegia, eye movements, pain and proptosis) and imaging methods.

Staphylococcus aureus, S. pneumoniae, other streptococci and anaerobes are commonly implicated in the etiology of preseptal cellulitis. Evaluation of the orbit and paranasal sinuses with computed tomography (CT) or magnetic resonance imaging (MRI) is useful to differentiating preseptal and orbital cellulitis. Imaging is also indicated in patients with suspected preseptal cellulitis who have significant eyelid swelling, fever and leukocytosis or whose infection does not improve after 24 to 48 hours of appropriate antibiotics. If the diagnosis of orbital cellulitis/abscess is confirmed, surgical drainage may be required (5).

Here, the treatment process of a patient who was diagnosed with preseptal cellulitis in another center and failed to improve despite intravenous antibiotic treatment will be discussed.

CASE REPORT

A 14-month-old girl, previously completely healthy, was admitted to our clinic with erythema and swelling of the right eye of 20 days duration. The patient's history revealed that she had been hospitalized for 15 days in another center one month ago with the diagnosis of preseptal cellulitis, but she applied to our center because she did not benefit from the treatment. The patient's medical history and family history were unremarkable. Vital signs were stable. Ocular examination revealed normal pupillary reflexes in both eyes and proptosis in the right eye. Conjunctival examination of the right eye was normal, but there was chemosis, lid edema, hyperemia, and exophthalmos. Examination of the left eye was normal. Bilateral optic nerve head and macula were normal. Erythrocyte sedimentation rate was 85 mm/h (0-20 mm/h), C-reactive protein level was 163 mg/dl (0-5 mg/



Figure 1. Paranasal sinus tomography was performed on the patient and showed no sinus aeration on the right side.

dl), white blood cell count was 12300/uL, (4000-10000/uL) neutrophil count was 9100/uL, and other laboratory tests were within normal limits. Paranasal sinus tomography was performed on the patient and showed no sinus aeration on the right side (Figure 1). Orbital MRI was performed for differential diagnosis.

Contrast-enhanced orbital MRI; thickening was observed in the periorbital area on the right side due to diffuse soft tissue edema in the subcutaneous soft tissues anteriorly. On contrast-

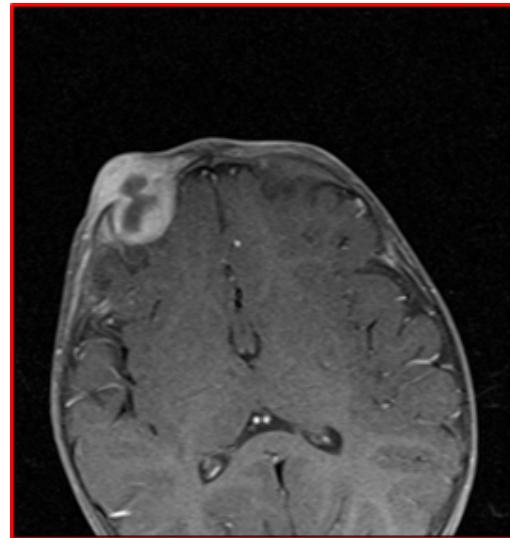


Figure 2. Magnetic resonance with contrast T2 sequence, an abscess lesion of soft tissue formation with cystic nature in the center with contrast enhancement in the periphery.

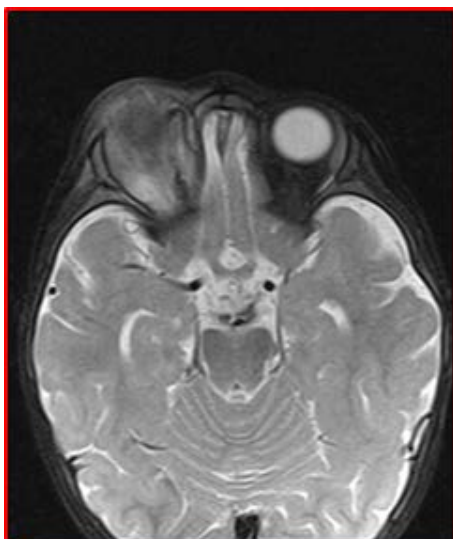


Figure 3. Magnetic resonance with contrast T2 sequence, thickening and enhancement due to significant inflammation in the postseptal area and preseptal area in the extraconal fat tissues around the globe tissues anteriorly.

enhanced examination in the superior part of the globe, an abscess lesion of soft tissue formation with cystic nature in the center with contrast enhancement in the periphery (Figure 2), thickening and enhancement due to significant inflammation in the postseptal area and preseptal area in the extraconal fat tissues around the globe, and thickening of soft tissue in the right frontal region at the level of inflammation were detected (Figure 3). No significant parenchymal lesion was observed in the cerebral area.

Abscess drainage was performed by the otolaryngology department on the 7th day of the patient's hospitalization. The patient was treated with meropenem seven days before the procedure and seven days after the procedure. Acute phase reactant levels decreased. The patient's ocular examination returned to normal. The patient was discharged with recovery.

DISCUSSION

The most important factor in determining the clinic for orbital infections is the anatomic region of infection. Preseptal cellulitis is an infection of the eyelid and surrounding tissues, and orbital abscess/cellulitis is an infection of the tissues surrounding the orbit.

Orbital cellulitis is more common in children than in adults, and it occurs more frequently between the ages of 10 months and 18 years (6,7). Our case was a completely healthy 14-month-old child.

Clinical manifestations such as decreased visual acuity,

orbital pain, proptosis, chemosis, and limitation of eye movements are seen in orbital cellulitis. Fever and leukocytosis are often associated. In severe infections, subperiosteal abscess and orbital abscess may occur (6). In our case, there was redness, swelling of the eye, and acute phase elevation, which increased despite antibiotic treatment.

Thrombosis in the cavernous sinus due to the anastomosis of the orbital venous system with the cranial venous system through valveless vessels; cerebral abscess and meningitis development due to anatomical proximity are feared complications of orbital cellulitis, which increase morbidity and may cause mortality. In our case, intracranial complications were not considered because of the absence of nuchal rigidity and meningeal irritation findings in the physical examination, and the neurological examination was normal. In addition, there were no imaging findings suggestive of intracranial spread.

Orbital infections usually occur as a complication of rhinosinusitis (8,9). In ethmoidal sinusitis in children, infectious material can easily spread from the lamina papyracea and ethmoidal air spaces to the subperiosteal space. Orbital cellulitis may also develop as a result of local spread of infection to tissues around the orbit, hematogenous spread, direct inoculation from trauma or surgery, and dental infections. In our case, the computed tomography performed did not show any ventilation of the right maxillary sinus. This situation was interpreted in favor of antecedent rhinosinusitis.

Streptococcus species, *S. aureus*, *H. influenzae* type b, *Pseudomonas* spp, *Klebsiella* spp, *E. Corrodens* and *Enterococcus* spp play a role in the etiology of orbital cellulitis (10). *Mucor* and *Aspergillus* species from fungal pathogens should be considered as pathogens in immunosuppressed patients (11). However, it is not always possible to identify the pathogen in patient cultures. In our case, there was no growth in the abscess drainage culture.

Contrast-enhanced CT is the most commonly used imaging modality for the follow-up of periorbital infections in terms of complication development (3,12). CT has superiority in showing bone details. CT imaging is recommended prior to treatment planning in patients whose visual acuity cannot be assessed (citation). MRI is superior in evaluating soft tissues. It is very useful in the differential diagnosis of cavernous sinus thrombosis and cerebral abscess. In addition, MRI may be preferred over CT to avoid cumulative radiation damage in pediatric patients who undergo frequent follow-up (12). In our case, imaging modalities were used in addition to clinical differential diagnosis. First, the patient underwent computed tomography and then magnetic resonance imaging. The diagnosis of orbital abscess/cellulitis was made based on the data obtained from the imaging techniques. In the case of subperiosteal or orbital abscess development,

surgical drainage is the treatment of choice. Garcia et al (13,14) reported that medical treatment was more effective than drainage for medially located, small, and nonsecondary abscesses in cases under nine years of age. Studies have suggested that in children younger than nine years of age, the proliferation of anaerobic flora is prevented and spontaneous drainage is facilitated due to wider sinus ostia and better sinus aeration. In addition, Siedek et al (15) performed surgical drainage in 90% of patients diagnosed with abscess. In our case, the presumptive diagnosis of orbital abscess/cellulitis was considered due to the lack of clinical response despite long-term medical treatment. After this diagnosis was confirmed by imaging studies, the decision for surgical treatment of the patient was made jointly with the otolaryngology department. After surgical treatment, medical treatment was continued and the patient was discharged with full recovery (12).

CONCLUSION

Orbital cellulitis is an urgent condition that requires prompt treatment and close follow-up for the development of complications. Treatment should be planned with the consensus of ophthalmology, otolaryngology, and pediatrics. The diagnosis of orbital cellulitis/abscess should be considered and differential diagnosis should be made with imaging in cases that do not respond to medical treatment, fail to achieve clinical improvement, and have persistent elevation of acute phase reactants despite treatment.

A review of the literature shows that the need for surgical treatment in patients with orbital cellulitis reaches 30%. Therefore, it is critical to be careful in the follow-up of orbital infections against the occurrence of complications and to prevent the progression of the disease by early diagnosis and treatment. Our aim in presenting this case is to raise awareness.

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Sorumlu Yazar: Memduha Sari, Necmettin Erbakan University, Faculty of Medicine, Child Health and Diseases, Konya, Türkiye
e-mail: menduhaakcay@gmail.com

REFERENCES

1. Donahue SP, Schwartz G. Preseptal and orbital cellulitis in childhood. *Ophthalmology*. 1998 Oct;105(10):1902–6.
2. Bae C, Bourget D. Periorbital Cellulitis, <https://www.ncbi.nlm.nih.gov/books/NBK470408/>. 21.06.2021.
3. Olitsky SE, Marsh JD, Jackson MA. Orbital Infections. 21st ed. Kliegman RM, St Geme JW, Behrman RE, Blum NJ, Tasker RC, Shah SS, editors. Vol. 2. Philadelphia: Elsevier; 2020. 3391–93 p.
4. Anlaçık SÖ, Güney F. Akut Sinüziti Olan Bir Hastada Periorbital

- Selülit, Menenjit ve Sinüs Ven Trombozu, *Selçuk Tıp Dergisi*, 2016;32(3): 65-6.
5. Gappy C, Archer SM. Preseptal cellulitis. https://www.uptodate.com/contents/preseptal-cellulitis?search=Preseptal%20cellulitis&source=search_result&selectedTitle=1~24&usage_type=default&display_rank=1. 01.04.2023
6. Özcan AA, Esen E, Erdem E, et al. Orbital selülit olgularında klinik yaklaşım: Olgu serisi. *Türk J Ophtalmol*. 2012; 42:284–7.
7. Doğru Ü. Preseptal ve Orbital Sellülit. *Journal of Pediatric Infection/ Çocuk Enfeksiyon Dergisi*. 2009;3.
8. Oxford LE, McClay J. Complications of Acute Sinusitis in Children. *Otolaryngology–Head and Neck Surgery*. 2005 Jul 17;133(1):32–7.
9. Berk AT, Ayhan Z, Yaman A, et al. Çocukluk Yaş Grubunda Preseptal Sellülit Tanı ve Tedavisi. *Turkish Journal of Ophthalmology/Türk Oftalmoloji Dergisi*. 2010;40(4).
10. Baring DEC, Hilmi OJ. An evidence based review of periorbital cellulitis. *Clin Otolaryngol*. 2011 Feb;36(1):57–64.
11. Cruz AA, Mussi-Pinhata MM, Akaishi PM, et al. Neonatal orbital abscess. *Ophthalmology*. 2001 Dec;108(12):2316–20.
12. Cannon PS, Mc Keag D, Radford R, et al. Our experience using primary oral antibiotics in the management of orbital cellulitis in a tertiary referral centre. *Eye (Lond)*. 2009 Mar;23(3):612–5.
13. Yang M, Quah BL, Seah LL, et al. Orbital cellulitis in children-medical treatment versus surgical management. *Orbit*. 2009;28(2–3):124–36.
14. Garcia GH, Harris GJ. Criteria for nonsurgical management of subperiosteal abscess of the orbit: analysis of outcomes 1988-1998. *Ophthalmology*. 2000 Aug;107(8):1454–6; discussion 1457-8.
15. Siedek V, Kremer A, Betz CS, et al. Management of orbital complications due to rhinosinusitis. *Eur Arch Otorhinolaryngol*. 2010 Dec;267(12):1881–6.