Folliculitis Extending into Preseptal Cellulitis and Abscess in Children

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Abstract:

Objectives: To report a rare and complicated case of folliculitis extending into preseptal and orbital abscess in a young boy. *Case Report:* An 11 month-old boy presented with frontal mass since 7 days and swelling, redness and pain of left eye since 3 days. A multidisciplinary approach was undertaken to find the etiology of infection, rule out malignancy, and confirm the diagnosis. Orbital MRI with contrast revealed cellulitis with multifocal abscess at the left eyelid, fronto-nasal region, and intra-orbitally. The patient underwent incisional biopsy and drainage of the abscess after 10 days of intravenous antibiotic and steroid resulting in only mild improvement. Histopathologic examination confirmed of abscess and culture revealed *Staphylococcus aureus*. Two months later, eyelid swelling completely resolved and visual acuity were 6/12 OU. *Conclusion:* Multidisciplinary assessment is required to differentiate preseptal or orbital cellulitis and malignancy, especially in children. Aggressive intravenous antibiotics with steroid therapy are required to control infection. Surgical intervention must be promptly undertaken when there is no significant clinical improvement with conservative management or if there is evidence of abscess.

Key words: Folliculitis, Orbital Cellulitis, Orbital cellulitis, Abscess, Staphylococcus aureus, Antibiotics, Drainage, Humans.

Introduction

Preseptal cellulitis is an inflammatory disease limited to anterior of the orbital septum characterized by edema, warmth and tenderness of the eyelid [1]. It can cause orbital cellulitis, in which the inflammatory process extends to the soft tissues posterior to the orbital septum with signs of fever, lid edema, proptosis, ophthalmoplegia, decreased vision and a positive relative afferent pupillary defect (RAPD) [2,3]. Both are most commonly caused by bacterial infection, which can originate from sinuses, skin infection on eyelids or face, local trauma, or hematogenous spread from distant sources such as pneumonia [2-9]. In children, the most common cause of orbital cellulitis is direct spread of sinusitis [6,9]. Abscess formation can be a complication of preseptal or orbital cellulitis [9]. It is an ocular emergency, as it is sight-threatening and life-threatening as a result of serious intracranial complications [9-12]. Children are at greater risk of these complications [13].

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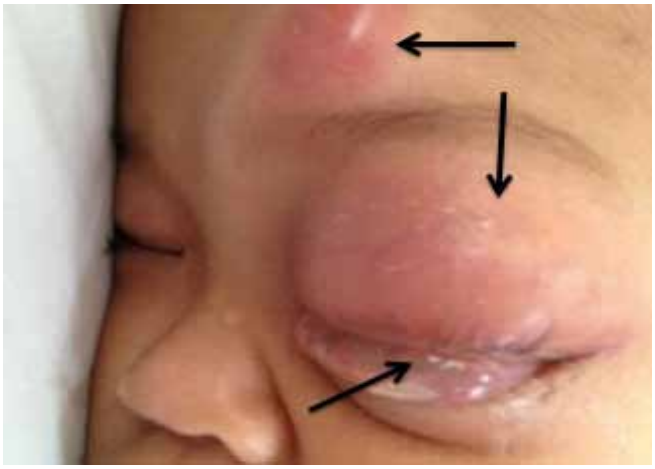
Management of complicated orbital cellulitis in children requires a coordinated multidisciplinary approach involving pediatrician, ophthalmologist and otorhinolaryngologist, and if necessary neurology and neurosurgical team. Antibiotic is the mainstay of treatment, but surgical intervention should be considered if abscess is evident on CT scan, or if clinical deterioration persists albeit appropriate antibiotics. Frequent evaluation of the child is necessary to check for response to treatment and evaluate signs of optic nerve involvement and intracranial complications [6,13].

We present a case of folliculitis extending into preseptal and orbital abscess in an young boy, which on first presentation showed a frontal mass with unilateral severe swollen eyelid, mimicking a neoplasm.

Case Report

An 11 month-old boy presented to Emergency Room (ER) with severe swelling and redness of left eyelid since last three days, followed by fever and malaise. Four days earlier, his mother noticed a hard, reddish lump on his left forehead 1 x 1 cm. It became bigger during the next couple of days, with severe swelling of left eyelid, watery eyes, and copious yellowish discharge causing difficulty to open his eyes [Fig.1a]. There was history of stye on his forehead two weeks before, which resolved spontaneously. He had symptoms of upper respiratory tract infection about twice a month. No history of trauma, insect bites, allergy, lacrimation, toothache or discharge from his ear was noted. His older brother also had history of stye on his face two weeks back.

The systemic physical examination was unremarkable other than a slight fever (37.6°C). Visual acuity, eye movement and intraocular pressure of left eye (LE) were hard to be evaluated, as the patient was uncooperative. On external examination, there was a mass on the forehead 2.5 x 2 mm, mobile, hard in consistency, reddish, and seemed painful. The left eye was proptotic, swollen, red with purulent discharge. On slit lamp, the bulbar conjunctiva was chemotic, with conjunctival and ciliary injection. Epithelial defect 4 mm in diameter with no infiltrate was seen at the center of the cornea. Other part of the anterior segment was within normal limit, RAPD was negative. Fundus reflex was positive, but other details were hard to be evaluated. Examination of the right eye (RE) was unremarkable [Fig.1b].



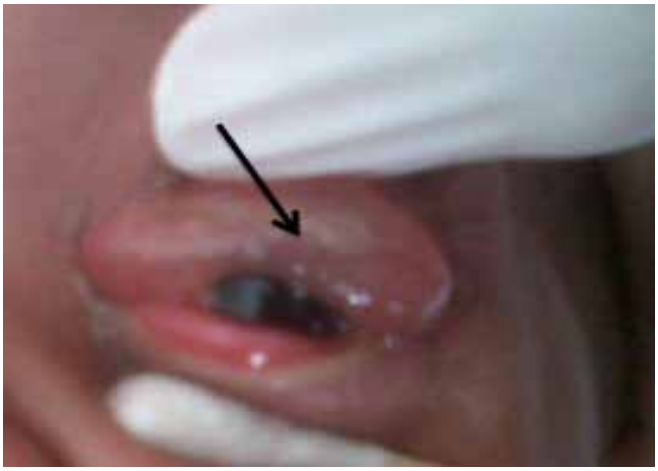


Fig.1(a): Proptosis, severe eyelid swelling and chemosis of the conjunctiva of the left eye, with a frontal mass on presentation. **(b):** Chemosis of the conjunctiva and erosion on the cornea.

Blood examination showed elevated white blood cells (WBC) count (19,900/µL). Orbital CT scan without contrast taken at the ER showed diffuse thickening of the superior-inferior left eyelid, extending to superior left orbital cavity with involvement of medial and superior rectus , retro-orbital fat in the superior left orbit, and lacrimal gland of LE [Fig.2a] . The lesion was displacing the globe anterior-inferiorly, causing proptosis [Fig.2b]. There were also extension of inflammatory signs to the frontonasal area and zygoma [Fig.2c]. The radiologist concluded these as signs of inflammation, but the possibility of neoplastic process was still possible. They suggested contrast enhanced orbital MRI.

Based on clinical findings, laboratory result and imaging, we diagnosed the patient as orbital cellulitis of LE, with differential diagnosis of malignancy. The patient was hospitalized and given intravenous (IV) ceftriaxone 2x200 mg, metronidazole 1x120 mg and levofloxacin eye drops (ED) 6xLE. He was consulted to pediatric, ENT, neurology, and dentistry department to look for source of infection. No systemic source of infection was found, but the medication was changed to amoxicillin-clavulanic acid 25 mg/kg body weight (BW) 3 times per day as the first line antibiotic. Polymixin B (Polygran®) eye ointment (EO) 3xLE and paracetamol 3x125 mg (oral) were added. Over the next two days, the patient was feverish again. Left eyelid swelling and mass on his forehead improved slightly [Fig.3]. We then administered methylprednisolone 1x4 mg (0.5 mg/kg BW) orally.

On the fifth day, we decided to change the antibiotic back to ceftriaxone 2x200 mg IV while maintaining all other therapy because the patient's condition remained the same. Due to only mild improvement in this patient, malignancy was still a possibility. Pediatric oncology department and oculo-oncology division were consulted, all suggested orbital MRI and biopsy to rule out malignancy. Intracranial complication had already been ruled out. The result of blood culture taken at the ER was negative. We took another blood test to evaluate the effect of antibiotic, which revealed WBC count of 10,540/µL, neutrophils 26.8% (low), lymphocyte 63.3% (high), erythrocyte sedimentation rate 10 mm, and C-reactive protein 1.4 mg/L.

Orbital MRI with contrast was done on the 9th day of hospitalization. The result suggested cellulitis

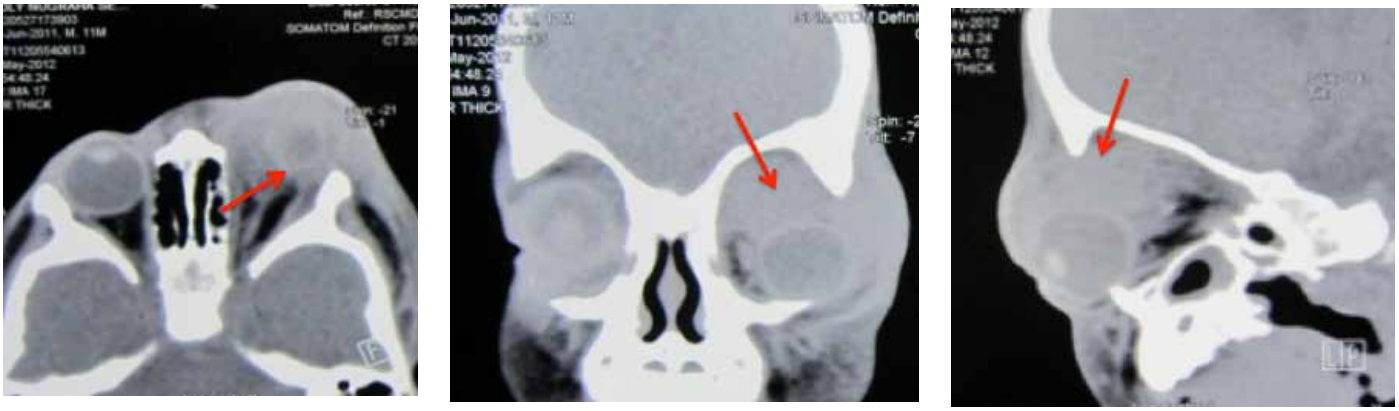


Fig.2(a): Orbital CT scan axial slice showing diffuse thickening of superior-inferior left eyelid, extending to the superior left orbital cavity. **(b):** Coronal slice showing the left globe displaced anterior-inferiorly **(c):** Sagittal slice showing extension of inflammation to lacrimal gland, superior orbital cavity, medial and superior rectus and retro-orbital fat of LE.

with multifocal abscess at the left superior eyelid until frontonasal region, extending into the orbital cavity [Fig.4a,4b,5a,5b]. Edema of the intra-orbital fat tissue and left lacrimal gland caused infero-anterior displacement of the globe [Fig.4c,4d]. In the mean time, the patient's improvements were below expectation after more than seven days of conservative therapy [Fig.6]. We decided to perform incisional biopsy and drainage of the frontal mass and left superior eyelid abscess.

Yellowish pus was revealed on biopsy. Specimens were taken for microbiologic and histopathologic examination. The next day, the patient's condition markedly improved and he was discharged. Oral cefadroxil 3x500 mg, metronidazole 3x250 mg, ibuprofen syrup 3x5 ml, and topical antibiotic plus steroid (TobrosonTM ed 6xLE) were given post surgery.

On follow-up seven days post-surgery, the patient showed some improvement. His upper eyelid was still slightly swollen and ptotic, but other parts were unremarkable [Fig.7a,7b]. His visual acuity were 1.2 logmar RE and 1.3 logmar LE (Cardiff cards). All medications were maintained until two weeks after surgery. Microbiologic culture of the pus revealed Staphylococcus aureus. Histopathological examination showed inflammatory cells and non-specific abscess wall. Two months later, ptosis of his left eye decreased (margin reflex distance 3 mm) [Fig.7c]. Visual acuity was 0.3 logmar (6/12)

Fig.3: Picture of the patient taken on day 3.

(Cardiff cards). Streak retinoscopy revealed S-4.00 RE and S-6.00 LE and spectacles were prescribed.

Discussion

When presented with a young child with signs of inflammation in the periorbital area, it is crucial to differentiate preseptal from orbital cellulitis, because both will require a different management. Orbital or post-septal involvement can give sight and even life-threatening complications. Clinical signs of post-septal involvement reported in the literature were erythematous eyelid swelling, ophthalmoplegia, chemosis, proptosis, pain, fever,

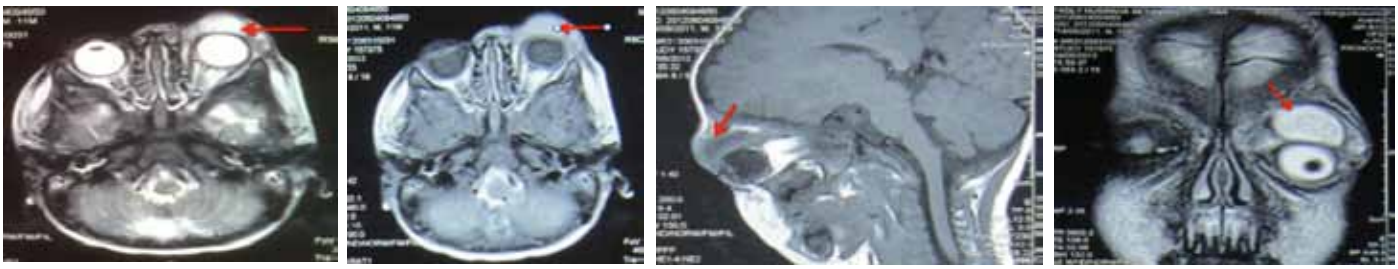


Fig.4(a,b): Orbital MRI showing inflammatory lesion with abscess at the left superior eyelid. **(c):** Extension of inflammation to the orbital cavity, edema of intra-orbital fat tissue and left lacrimal gland. **(d):** The abscess was displacing globe infero-anteriorly.

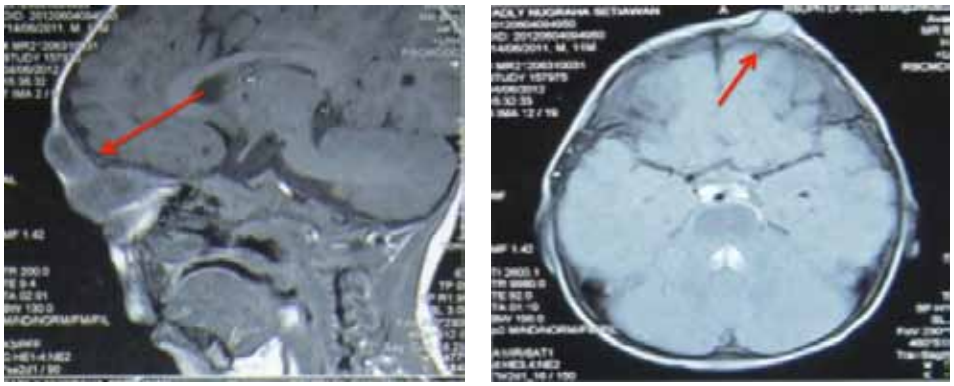


Fig.5(a): MRI demonstrating frontal-nasal abscess. **(b):** Frontonasal abscess was related with the upper eyelid abscess of LE.

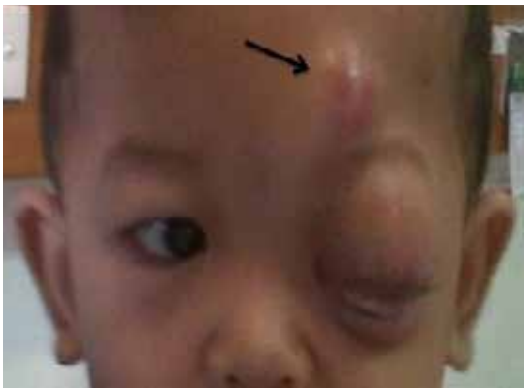


Fig.6: Picture of the patient on day 8 of hospitalization showing reduced edema of the frontal mass and upper eyelid of LE.

Fig.7(a): Picture of the patient day 1 and 8 **(b):** after surgery. The eyelid and frontal abscess had resolved but there were still slight edema and ptosis. **(c):** The patient two months after surgery, with no more edema and decreased ptosis of the left eyelid.

blurred vision, ptosis, headache/drowsiness, leucocytosis, and RAPD [2,4].

In young children, it is often hard to assess post-septal involvement, partly because the lids may be shut tight with swelling and the difficulty in examining an uncooperative child [2]. Clinical signs of orbital cellulitis can also be absent in 65% of children younger than 3 years [14]. In such cases, an elevated C-reactive protein can suggest orbital involvement in children (83% in orbital vs 44% in preseptal cellulitis) [3]. Other modality that aids in differentiating pre-septal and orbital cellulitis is imaging. The gold standard or the first line imaging modality for orbital cellulitis is high resolution orbital CT scan with contrast, with MRI as the second-line [15,16].

The differential diagnosis for orbital inflammatory disease is broad and includes idiopathic orbital inflammatory disease, thyroid ophthalmopathy, neoplasm, sarcoidosis, and rheumatologic disease including Wegener's granulomatosis, polyarteritis nodosum, and giant cell arteritis [3,17]. Although neoplasm and autoimmune disease are rare in children, they should be borne in mind, especially if there is no response to treatment [2]. Nevertheless, the majority of these conditions have an insidious onset, unlike the acute onset of orbital cellulitis, and can be readily distinguished on the basis of orbital imaging [13].

We found fever, proptosis, severe eyelid swelling and chemosis of the conjunctiva in our patient, which suggested post-septal involvement. A differential diagnosis with malignancy was still considered due to the presence of a reddish mass 2.5x2 cm about 2 cm above his left eyebrow. Later on, the patient also showed slow response to antibiotic, as the eyelid edema and frontal mass was nearly unchanged in size after 1 week of therapy. It turned out that the mass originated from folliculitis complicating into an abscess.

An abscess is best seen with orbital imaging, but clinical signs may suggest the presence of these entities [3,18]. Orbital cellulitis without abscess more commonly presents with axial proptosis. A subperiosteal abscess (SPA) typically presents with nonaxial proptosis and limited mobility towards the abscess. An intraorbital abscess is extremely rare and if located intraconally, it will cause significant proptosis and visual decline despite antibiotic therapy [18]. Another rare complication is the development of lid abscess. Pandian *et al*. found 6.9% lid abscess in children with preseptal cellulitis and 10% in orbital cellulitis [9].

Our patient had an axial proptosis at initial presentation and the result of the CT scan did not suggest any subperiosteal, intraorbital, or lid abscess. Several days later, however, the proptosis became nonaxial. Although the non-axial proptosis could be a sign of an abscess formation, it was not clearly seen in the initial orbital CT scan, because it was done without contrast due to financial problem at the time. Orbital MRI with contrast, when finally performed, confirmed of abscess of the frontonasal area and superior left eyelid, extending into the orbital cavity.

Hodges and Tabbara noted in their series that abscess developing over 24-48 hours may produce only non-specific inflammatory signs on CT scan and not identified as an abscess. They also found that abscess formation often occur after 2-40 days delay in seeking medication (mean 9.4 days) [19]. Meanwhile, Rudloe *et al*. reported that patients presenting with ophthalmoplegia, proptosis, moderate-to-severe periorbital edema, and a peripheral blood neutrophil count > 10,000/ µL are considered high risk for developing abscess, and will mostly benefit from emergent MRI [11].

Our patient previously had a history of a reddish lump on his forehead that his mother

thought was a stye (folliculitis). This can developed into furunculosis. Furuncles are infections of the hair follicle, frequently caused by *S.aureus*, in which suppuration extends to the deep dermis and small abscess develops [20]. Furunculosis on the patient's forehead can spread into the adjacent upper eyelid soft tissue, causing preseptal cellulitis. Posterior progression of the infection into the orbit then took place, resulting in orbital cellulitis. The furuncle in our patient had further enlarged, mimicking a neoplasm.

Berenguer *et al*. [14] found skin infection as an etiology in only 7% children with orbital cellulitis, but Liu *et al*. [2] reported it as the most common (19.4%) in their series. Prior history of infection, household contact with a skin or soft tissue infection and a crowded living space were predisposing factors in our patient [20].

Management of orbital cellulitis consists of medical and surgical therapy. Medical management focuses primarily on aggressive antibiotic therapy while treating the underlying predisposing factors. Surgical intervention is indicated in cases of orbital cellulitis with an associated foreign body and abscess, although in cases with an associated abscess the precise need and timing of surgery is less clearly defined [21]. Empiric antibiotic therapy should be given before the microbiologic result from blood or pus culture is obtained. A combination of broad spectrum antibiotics covering for both gram-positive and gram-negative organism is required for preseptal cellulitis, with the addition of anaerobic cover for orbital cellulitis [22]. Corticosteroid is used to control and suppress inflammatory response in orbital cellulitis, but there are not many studies on the use of corticosteroids in children with orbital cellulitis, thus it remains controversial [5,7,9]. Yen and Yen reported its use in patient with subperiosteal abscess [23]. In their series, if began in conjunction with intravenous antibiotic at the time of admission, there was a slight trend towards shorter hospitalization and fewer drainage of abscess.

Guidelines on the indications for surgical intervention in the literature generally indicate surgery for nonspecific abscess if there is progressive orbital signs and/or symptoms after 48 hours of adequate antibiotic therapy [9,17,21,24,25]. After surgery, Kloek and Rubin recommended an outpatient oral antibiotic of 1-2 weeks following 1-2 weeks course of intravenous antibiotic [18]. Other author recommended parenteral antibiotic for at least 1 week, before switching to oral therapy to complete a 3-weeks course [6].

Conclusion

Multidisciplinary assessments are required to differentiate pre-septal or orbital cellulitis and malignancy, especially in children, in order to administer appropriate treatment. Orbital imaging with contrast can aid in the diagnosis and to look for evidence of abscess. In orbital cellulitis, aggressive intravenous antibiotics with steroid are required until infection is controlled. When there is no significant clinical improvement with conservative management or if an abscess is evident, surgical intervention must be considered and promptly undertaken.

References

1. Buchanan MA, Muen W, Heinz P. Management of periorbital and orbital cellulitis. Paediatrics and Child Health. 2012;22(2):72-77.
2. Liu IT, Kao SC, Wang AG, Tsai CC, Liang CK, Hsu WM. Preseptal and orbital cellulitis: a 10-year review of hospitalized patients. J Chin Med Assoc. 2006;69(9):415-422.
3. Watts P. Preseptal and orbital cellulitis in children: a review. Pediatrics and Child Health. 2011;22(1):1-8.
4. Chaudry IA, Al-Rashed W, Arat YO. The Hot Orbit: Orbital Cellulitis. Middle East Afr J

Ophthalmol. 2012;19:34-42.
5. Hauser A, Fogarasi S. Periorbital and Orbital Cellulitis. Pediatrics in Review 2010;31:242-248.
6. Georgakopoulos CD, Eliopoulou MI, Stasinos S, Exarchou A. Periorbital and orbital cellulitis: a 10-year review of hospitalized children. Eur J Ophthalmol. 2010;20(6):1066-1072.
7. Yang M, Quah B, Seah L, Looi A. Orbital cellulitis in children: medical treatment versus surgical management. Orbit. 2009;28:124-136.
8. Chaudry I, Shamsi F, Elzaridi E, Al-Rashed W, Al-Amri A, al-Anezi F, *et al*. Outcome of treated orbital cellulitis. Ophthalmology. 2007;114(2):345-354.
9. Pandian DG, Babu RK, Chaitra A, Anjali A, Rao VA, Srinivasan R. Nine year's review on preseptal and orbital cellulitis and emergence of community-acquired methicillin-resistant Staphylococcus aureus in a tertiary hospital in India. Indian J Ophthalmol. 2011;59:431-435.
10. Sepahdari AR, Aakalu VK, Kapur R, Michals EA, Saran N, French A, *et al*. MRI of orbital cellulitis and orbital abscess: the role of diffusion-weighted imaging. AJR. 2009;193:244-250.
11. Rudloe TF, Harper MB, Prabhu SP, Rahbar R, VanderVeen D, Kimia AA. Acute Periorbital Infections: Who Needs Emergent Imaging? Pediatrics. 2012;125:179-183.
12. Botting A, McIntosh D, Mahadevan M. Paediatric pre- and post-septal peri-orbital infections are different disease: a retrospective review of 262 cases. Intl J Pediatric Otorhinolaryngol. 2008;72:377-383.
13. Jain A, Rubin PA. Orbital cellulitis in children. Int Ophthalmol Clin. 2001;41:71-86.
14. Berenguer A, Esteves I, Girbal I, Prata F, Rocha S, Marques AMG. Orbital cellulitis: a 17-year review of hospitalized children. 30th Annual Meeting of the European Society of Infectious Disease [cited 2012, August 8]; Available at https://www.kenes.com/espid2012/abstracts/pdf/202.pdf
15. Kapur R, Sepahdari AR, Mafee MF, Putterman AM, Aakalu V, Wendel LJA, *et al*. MR Imaging of Orbital Inflammatory Syndrome, Orbital Cellulitis, and Orbital Lymphoid Lesions: The Role of Diffusion-Weighted Imaging. Am J Neuroradiol. 2009;30:64-70.
16. Cannon PS, McKeag D, Radford R, Ataullah S, Leatherbarrow B. Our experience using primary oral antibiotics in the management of orbital cellulitis in a tertiary referral centre. Eye. 2009;23:612-615.
17. Fincham G, Bhutta MS. Orbital cellulitis: assessment and management. British J Hospital Medicine. 2009;70(7):108-110.
18. Kloek CE, Rubin PAD. Role of Inflammation in Orbital Cellulitis. Intl Ophthalmol Clin. 2006;46(2):57-67.
19. Hodges E, Tabbara KF. Orbital cellulitis: review of 23 cases from Saudi Arabia. British Journal of Ophthalmology. 1989;73:205-208.
20. Bernard P. Management of common bacterial infections of the skin. Current Opinion in Infectious Diseases. 2008;21:122-128.
21. Lee S, Yen MT. Management of preseptal and orbital cellulitis. Saudi Journal of Ophthalmology. 2011;25(21-29).
22. Seltz LB, Smith J, Durairaj VD, Enzenauer R, Todd J. Microbiology and Antibiotic Management of Orbital Cellulitis. Pediatrics. 2011;127.
23. Yen MT, Yen KG. Effect of Corticosteroids in the Acute Management of Pediatric Orbital Cellulitis With Subperiosteal Abscess. Ophthalmic Plastic and Reconstructive Surgery. 2005;21(5):363-367.
24. Garcia GH, Harris GJ. Criteria for nonsurgical management of subperiosteal abscess of the orbit: analysis of outcomes 1988-1998. Ophthalmology. 2000;107:1454-1456.
25. Todman MS, Enzer YR. Medical Management versus Surgical Intervention of Pediatric Orbital Cellulitis: The Importance of Subperiosteal Abscess Volume as a New Criterion. Ophthal Plast Reconstr Surg. 2011;27(4):255-259.