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Case Report

Severe Orbital Cellulitis Secondary to Chronic Sinusitis: Challenges in Saving the Eye

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Abstract

Orbital cellulitis is a relatively common disease affecting predominantly the paediatric population. Most cases occur as a result of spread from the nearby sinuses. Other causes include penetrating trauma or extension from infected adjacent structures.If left untreated, this condition may result in devastating sequelae such as orbital apex syndrome, cavernous sinus thrombosis, meningitis, cranial nerve palsies, intracranial abscess formation and even death. A 47 year old immunocompetent Burmese lady presented with left eyelid swelling of 2 days duration associated with eye redness, blurring of vision and diplopia. Previously, there was history of right maxillary sinusitis and parapharyngeal abscess 9 months prior to presentation. On examination, she was afebrile with vision of 1/60 for the left eye with positiverelative afferent pupillary defect (RAPD). The eye was proptosed and swollen with restricted extraocular movements in all gazes. Conjunctiva was injected with chemosis and there was corneal epithelial bedewing. Otherwise anterior chamber was quiet and intraocular pressure was 51mmHg. Bilateral fundus examination was normal. Computed tomography (CT) scan of the orbit and paranasal sinus showed dense sinusitis and periosteal abscess at the lateral orbital wall.She was started on intravenous (IV) Cefuroxime and Metronidazole and underwent Functional Endoscopic Sinus Surgery (FESS) and orbital decompression. Intra-operatively there was pus and debris at the left anterior ethmoid, maxillary and sphenoid air sinuses and cultures revealed *Klebsiella pneumoniae* which was sensitive to Cefuroxime. Despite medical and surgical treatment, left orbital swelling only reduced minimally. However after starting intravenous Dexamethasone the swelling dramatically improved. She completed 10 days of intravenous Dexamethasone. Upon discharge, she was given oral Dexamethasone 2mg daily for 2 weeks and completed 2 weeks of oral Cefuroxime and Metronidazole. Intraocular pressure normalised and vision recovered to 6/9. A repeat CT orbit 3 weeks later showed resolving preseptal and periorbital collection.

Keywords: abscess, complications, infection, Orbital Cellulitis, sinusitis

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Introduction

Orbital cellulitis is a relatively common ocular disease which may be lead to devastating visual and life-threatening outcome if left untreated (1,2). It commonly occurs as a result of secondary extension of infection from the ethmoid sinus in particular (1).

Intravenous antibiotic therapy is the mainstay of treatment**,** followed by oral antibiotics once the infection shows signs of significant improvement (3)**.** Thankfully, complications from orbital cellulitis have become rare with efficient use of antibiotic treatment (4).

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However, treatment of orbital cellulitis still poses a formidable challenge even with the advent of new antibiotic therapies and hi tech diagnostic technologies (1). Some cases require a prolonged course of multiple antibiotics and some cases may even improve with a short course of steroids. This case report illustrates the abovementioned challenges in managing a patient with recurrent maxillary sinusitis who presented with left orbital cellulitis.

Case Report

A 47 year old immunocompetent Burmese lady presented with a history of left eyelid swelling of 2 days duration. The swelling was associated with eye redness, blurring of vision and diplopia. Otherwise there was no history of pain on eye movements, fever, upper respiratory tract symptoms, allergies or trauma. She had a history of sinusitis with right maxillary sinusitis and parapharyngeal abscess 9 months ago this year. Cultures revealed inoculation by Streptococcus viridans. She was successfully treated with intravenous Dexamethasone for 3 days and intravenous Augmentin and Metronidazole respectively for a total of 2 weeks.

On examination, she was afebrile with visual acuity (VA) of 1/60 for the left eye with positive relative afferent pupillary defect (RAPD). The left eye was proptosed and the upper and lower lids were diffusely swollen and tense with signs of inflammation. Extraocular movements were severely restricted in all gazes for the left eye. Conjunctiva was injected with chemosis and there was corneal epithelial bedewing. Otherwise anterior chamber was quiet with no cells or hypopyon. Intraocular pressure was raised at 51mmHg. Fundus examination revealed a pink optic disc with CDR 0.3 and normal retina bilaterally.

A contrasted computed tomography (CT) scan of the brain, orbit and paranasal sinuses revealed features suggestive of left maxillary sinus mycetoma with left intraconal extension and orbital cellulitis. The images revealed streakiness of the left lateral extraconal space and adjacent thickening of the left lateral rectus muscle (Fig. 1).

Haematological investigations such as fasting blood sugar and white cell counts were normal, ESR was mildly raised at 30and CRP was normal. In view of the history of recurrent sinusitis causing orbital complications in a patient who was premorbidly well, she was also investigated for possible causes of immunosuppression. However, HIV, VDRL, Hepatitis B and Hepatitis C titres were non-reactive.

She was started on intravenous (IV) Cefuroxime and Metronidazole and underwent Functional Endoscopic Sinus Surgery and orbital decompression. Intra-operatively noted to have pus and debris at the left anterior ethmoid, maxillary and sphenoid air sinuses. Intra-operative cultures revealed an infection by *Klebsiella pneumonia* which was sensitive to Cefuroxime. Despite treatment with antibiotics and decompression, left orbital swelling only reduced minimally. Three days after the surgery, the right lower lid started to appear inflamed.

A repeat CT orbit was done to rule out contralateral eye involvement or cavernous sinus thrombosis. The images showed left maxillary sinus mycetoma with worsening left orbital cellulitis. There was also a new focal collection lateral to the left lateral rectus muscle suggestive of worsening inflammation (Fig. 2).

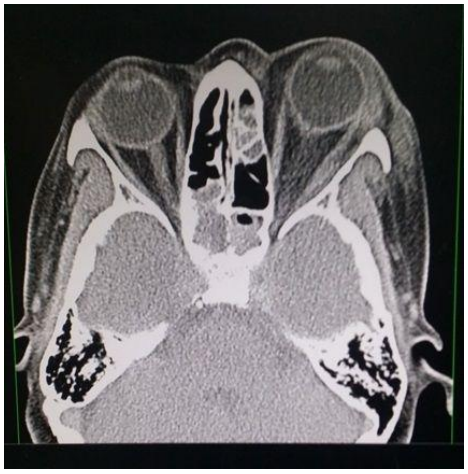

Figure 1: Showing left eye proptosis, streakiness of the left intraconal space and left lateral extraconal space

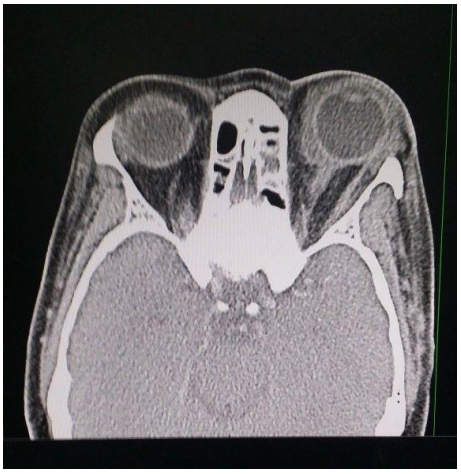

Figure 2: Showing increasing streakiness of left preseptal soft tissue extending medially, superiorly and laterally

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IV Dexamethasone 4mg was given and patient showed improvement in terms of reduction of lid swelling and improvement of visual acuity to 3/60 after administration. By this time she had received 4 days of IV Ceftriaxone and Metronidazole. Steroids were continued for another 4 days following which her VA improved to 6/12 with negative RAPD and improved extraocular muscle function.

She improved dramatically over the following days and was discharged in 10 days with a vision of 6/9. ESR readings had reduced to 24 which was within normal range. She completed oral Cefuroxime and Metronidazole for a total of 2 weeks.

During her follow-up to the clinic 1 week later, her LE vision remained the same with no RAPD. Extraocular movements had improved and there was minimal residual left lower lid swelling. She was given another course of oral Dexamethasone 2mg daily for 2 weeks.

She continued to improve and a repeat CT orbit 3 weeks later showed resolving preseptal and periorbital collection.

Discussion

Orbital (post-septal) cellulitis may be defined as an infection that has spread to the tissues beyond the orbital septum, which include the subcutaneous tissues and muscle in the orbit. Cellulitis of tissues situated in front of the orbital septum however is referred to pre-septal cellulitis. Orbital cellulitis is not as prevalent but may have more disastrous consequences.

Children under 18 years of age are particularly at risk of suffering from orbital cellulitis (1).There are several risk factors for this disease namely direct entry via penetrating or blunt trauma, orbital or periorbital surgery, haematogenous spread in a patient with concomitant bacteraemia, or spread of the infection or inflammation from neighbouring paranasal sinuses and appendages such as exhibited in this patient (5).

The most common cause of orbital cellulitis is direct extension of infection from the paranasal sinuses, especially from the ethmoid sinus due to its' thin medial orbital wall. Many studies have supported this fact with ethmoidal sinusitis being the primary focus of infection in 43% to 75% of patients (1).

Most patients present with significant eyelid swelling, blurring of vision, pain on eye movement, proptosis, ophthalmoplegia, general malaise and loss of appetite. In the history, symptoms of acute sinusitis or upper respiratory tract infection in the days prior to onset of ocular symptoms may be elicited. Our patient presented with several of the ocular symptoms as described above but denied any upper respiratory tract symptoms. The disease may progress rapidly, thus it is vital to recognise diagnosis and expedite treatment (2).

Imaging is a helpful tool in confirming diagnosis of orbital cellulitis. A contrasted CT scan of the orbit can be used to identify concurrent sinus disease and to detect presence of orbital and sub-periosteal abscesses (6). Orbital abscesses are usually found next to opacified paranasal sinuses particularly the medial orbital wall and the orbital floor (2). If clinical examination suggests orbital involvement an immediate CT scan is warranted to ascertain extent of orbital involvement, look for presence of abscess or foreign body and assess for possible sources of infection (1).

Complications from orbital cellulitis may occur from spread through valveless veins causing bilateral cavernous sinus thrombosis, second eye involvement, meningitis, brain abscess and also death (7).

To avoid the potential complications as listed above, intravenous antibiotics should be started swiftly for all cases of orbital cellulitis. Empirical treatment is started to make sure the common causative organisms which are Staphylococcus and Streptococcus, are covered. In order to provide wider coverage of other pathogens such as gram negative and anaerobic organisms, Metronidazole and Cefotaxime or Clindamycin are usually prescribed together. After receiving culture and sensitivity results, antibiotic choices may be altered (1).

Intravenous corticosteroids have been shown to reduce mucosal oedema and levels of inflammatory cytokines in the sinus mucosa of patients with acute and chronic sinusitis (8). However steroids are best started when clinical improvement is seen, preferably after antibiotic treatment has commenced (2). In 2013, a prospective randomized clinical study was performed in India on 21 patients to measure the role of corticosteroids as an adjunct in treatment of bacterial orbital cellulitis. The study revealed that patients who received steroids showed lesser conjunctival chemosis and pain and earlier resolution of inflammation. The risk of steroids in aggravating infection in patients who were administered antibiotics concurrently was low. Furthermore, those who had received steroids had a shorter stay at the hospital and lesser duration of antibiotics (9).

Our patient suffered from recurrent sinusitis with orbital complications and did not respond well to

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antibiotics. Her infective marker results were negative. Other possible causes for poor response to medical treatment include extensive orbital cellulitis requiring surgical intervention and polymicrobial infections. Studies have shown that those in the paediatric population respond better to intravenous antibiotics alone. Anaerobic infections, usually from a dental source also did not respond well to antibiotics (10).

Surgical intervention should be considered in patients who do not improve on maximum medical therapy, display worsening visual function/pupillary changes, or develop an orbital abscess, particularly in those cases that involve the orbital apex or intracranial extension (1).

As a conclusion, early diagnosis and prompt treatment may lead to excellent outcomes in orbital cellulitis. It is therefore vital to recognise the tell-tale symptoms and signs and to administer the appropriate antibiotic needed to combat the infection. Ophthalmologists should also be aware of the additional benefits steroids may have in reducing inflammation and hastening recovery.

Conclusion

Patients suffering from severe orbital cellulitis are at risk of increased morbidity. This case highlights the accelerated resolution of illness when steroids are used concurrently with antibiotics in treatment of bacterial orbital cellulitis.

References

1. Chaudhry I, Al-Rashed W, Arat Y. The hot orbit: Orbital cellulitis. Middle East Afr J Ophthalmol. 2012; 19(1):34.

2. Lee S, Yen M. Management of preseptal and orbital cellulitis. Saudi J Ophthalmol. 2011; 25(1):21-29.

3. Cannon P, Keag 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 (Lond). 2008; 23(3):612-615.

4. Cable B, Wassmuth Z, Mann E, Hommer D, Connely G, Klem C et al. The Effect of Corticosteroids in the Treatment of Experimental Sinusitis. Am J Rhinol Allergy. 2000; 14(4): 217-222.

5. Akçay E. Preseptal and orbital cellulitis. J Microbiol. 2014;4(3):123-127

6. Dankbaar J, van Bemmel A, Pameijer F. Imaging findings of the orbital and intracranial complications of acute bacterial rhinosinusitis. Insights Imaging. 2015; 6(5):509-518.

7. Achigbu E, Achigbu K. Bilateral orbital cellulitis: A case report and management challenges. Nigerian J Ophthalmol. 2017; 25(1):52.

8. Wallwork B, Coman W, Feron F, Mackay-Sim A, Cervin A. Clarithromycin and Prednisolone Inhibit Cytokine Production in Chronic Rhinosinusitis. Laryngoscope. 2002; 112(10):1827-1830.

9. Pushker N, Tejwani L, Bajaj M, Khurana S, Velpandian T, Chandra M. Role of Oral Corticosteroids in Orbital Cellulitis. Am J Ophthalmol. 2013;156(1):178-183

10. Periorbital/orbitalcellulitis. http://www.cancertherapyadvisor.com/paediatrics/periorbitalorbital-cellulitis/article/622332/ Last accessed on 26th April 2018