

Case report

Orbital Apex Syndrome secondary to odontogenic sinusitis

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Abstract

An orbital abscess is a rare complication of an odontogenic infection, but it can lead to high morbidity and mortality. This paper presents a case of orbital abscess secondary to an infection of upper molar teeth that developed after the tooth extraction. The direct spread of the infection through the oroantral fistula and extended to the orbit close to the superior orbital fissure.

Keywords: Abscess, orbital complication, sinusitis, odontogenic.

Introduction

The orbital and periorbital spaces infection is a rare complication of dental abscess after dental extractions¹. This complication can result in significant morbidity even life threatening condition when the infection spread to the brain²⁻⁴. About 70%-80% of cases of orbital infections developed as a complication of paranasal sinus infection. Other possible causes are spreading of infection from eyelids, tonsils, intracranial and middle ear²⁻⁴. The infective microorganism can reach the orbit through several pathways including direct extension, lymphatics as well as vascular systems^{1,3}.

Case Summary

A 60 years old Malay man a known case of hypertension and newly diagnosed Diabetes Mellitus presented with sudden onset of left periorbital swelling following a tooth extraction. He had history of left gum swelling for 1 week prior to admission which was progressively enlarged. It was associated with pain and not resolved by oral analgesics. He went to a dentist and extraction of the left upper 1st molar tooth was done. He started to develop the left periorbital swelling later in the evening. It was associated with fever, limitation in opening of the left eye with blurred vision, facial swelling, nausea and

vomiting. There was no headache and no recent upper respiratory tract infection.



Figure 1: Coronal MRI showed oroantral fistula and collection of pus in the left maxillary, ethmoidal and the orbit

Clinically, he was afebrile, with normal vital signs but mildly dehydrated. There was a left periorbital swelling with evidence of inflammation. There was no eye discharge. Cranial nerves examination revealed the left III, IV and VI cranial nerve palsy as well as loss of sensation over the V1 distribution. Oropharyngeal examination revealed no pus at

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the affected tooth socket. Nasoendoscopy showed oedematous nasal mucosa and thick mucopus discharge from the left maxillary sinus ostium. Magnetic resonance imaging (MRI) of the orbit and paranasal sinus (PNS) done, which revealed an oroantral fistula over the left maxillary sinus with left orbital abscess and features of pansinusitis (Figure 1). The diagnosis of left Orbital Apex Syndrome was made. He was started on Intravenous Amoxicillin Clavulanate Acid, Ceftriaxone, Metronidazole and insulin injection therapy for the diabetic control. He then underwent transnasal drainage of orbital abscess. Postoperatively he was observed in the ward for the parenteral antibiotic, vigorous nasal douching, eye care and diabetic control. Upon discharge, the proptosis and chemosis were improved but the total ophthalmoplegia and blindness persisted.

Discussion

Orbital infection is more clearly defined with reference to the orbital septum. Preseptal cellulitis is the inflammation anterior to the septum, characterized by eyelid oedema without other eye sign. It is common in young child. The inflammation posterior to the septum, known as postseptal cellulitis can be divided anatomically based on extraocular muscle into extraconal and intraconal diseases^{4,5}. Chandler et al. classified orbital inflammation into 5 groups: 1: preseptal cellulitis, 2: orbital cellulitis, 3: subperiosteal abscess, 4: orbital abscess, 5: cavernous sinus thrombosis⁶.

The sign of orbital infections include orbital pain, swelling, chemosis, limited ocular mobility, displacement of the globe as well as decreasing visual acuity. Significant abscess may results in ophthalmoplegia, proptosis and elevated intraocular pressure that may cause infarction of optic nerve, retina, choroids and leads to optic neuritis, optic atrophy and blindness^(4,7). All the symptoms were experienced by our patient.

There are few syndromes which are associated with orbital infections. Orbital Apex Syndrome

(OAS) has been described previously as a syndrome involving damage to the oculomotor nerve (III), trochlear nerve (IV), abducens nerve (VI), ophthalmic branch of trigeminal nerve (V1) in association with optic nerve dysfunction. The Cavernous Sinus Syndrome (CSS) may include all the OAS features with additional involvement of the maxillary branch of the trigeminal nerve (V2) and the oculosympathetic fibers⁸.

The Superior Orbital Fissure Syndrome (SOFS) or Rochon-Duvigneaud syndrome is often applied to the lesions located immediately anterior to orbital apex, which means features of OAS without optic nerve pathology^{1,7}. Thus, our patient was diagnosed as OAS based of left total ophthalmoplegia, loss of sensation over V1 distribution and loss of vision, which indicate optic nerve pathology.

Orbital abscess or orbital cellulitis is almost always secondary to acute sinusitis. Other possible causes are due to spreading of infection from eyelids, tonsils, intracranial and middle ear^(2,4). The spreading form the dental origin is very rare^{1,5,9}. The spread of odontogenic infection can occur in several pathways. First, may infect the maxillary or ethmoidal sinuses and continue directly to the orbit through any of the following: bone erosion, preformed dehiscence in orbital floor, the infraorbital neurovascular canal, or in the lamina papyracea. Second, it might spread to the pterygopallatine fossae and infratemporal fossae and enter the posterior orbit directly through the inferior orbital fissure. Third, the superior and inferior ophthalmic vein anastomoses anteriorly with the facial angular veins at the medial canthal region where the angular vein anastomoses with the supratrochlear and supraorbital veins. The inferior ophthalmic vein passes posteriorly through the inferior orbital fissure to anastomose with the pterygoid plexus. The valveless nature of these veins allows the rapid and uninterrupted spread of the infection. Finally the infection can enter through the septal space by the infection of the eyelid¹⁰⁻¹³.

The most common cause of odontogenic sinusitis include an abscess and periodontal disease that had perforated the Schenederian membrane including maxillary trauma, dental extraction, maxillary osteotomies or placement of dental implant². In this case, the extraction of left upper 1st molar was the most likely source of the infection, which can spread directly and extended into the maxillary sinus and ended up with orbital abscess. Even though there was no pus noted at the tooth socket post extraction, the traumatized maxillary alveolus may lead the spreading of the infection due to the very close anatomical relation to the floor of the maxillary sinus.

Computed tomography is the gold standard investigation when the orbital infections are suspected⁽¹¹⁾. Preoperatively it will guide the surgical approach, the paranasal sinuses involving and the intracranial extension as well as to allow monitoring the clinical progression¹. The MRI was also valuable which was done in this case, in particular to evaluate the lesion involving the orbital apex and the cavernous sinus.

The typical odontogenic sinusitis is believed to be mixed aerobic-anaerobic infection with the number of anaerobic outnumbering the aerobes¹³. The polymicrobial nature of dental infections was evident in many studies. *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis* are the most common pathogens in acute sinusitis¹⁴. The common organisms for the odontogenic sinusitis are *Peptostreptococcus spp*, *Fusobacterium spp*, *pigmented Prevotella* and *Porphyromonas spp*, which also predominate in periodontal and endodontal infection¹⁵. In our case the culture of the pus from the maxillary sinus revealed mixed growth.

When an orbital infection is suspected, early aggressive broad spectrum antibiotic therapy should be initiated, including the use of metronidazole for anaerobic coverage in order to avoid the complications. The total duration of antibiotic treatment depends on the clinical response, usually 2 to 3 weeks via the parenteral route, followed by 2 to 3 weeks orally after resolution of orbital infection¹⁶. A complete ophthalmologic evaluation is essential before and during the course of treatment^{1,16,17}. IV Amoxicillin Clavulanate Acid 1.2gm tds, IV Ceftriaxone 1 gm daily and IV Metronidazole 500mg tds were administered parenterally in our patient.

Surgical intervention must be considered in a case of orbital abscess in order to obtain adequate drainage of the pus, release pressure on the orbit and obtain a culture sample. The aim of treatment is to restore visual acuity and to prevent further fatal complications. An external approach will produce good drainage and if necessary can be combined with external ethmoidectomy. The maxillary sinus should be washed out for faster recovery^(16,17). In this case, the pus was drained via transnasally by endoscopic approach.

Postoperatively, the orbital infection improved, however the total left ophthalmoplegia persist and the vision could not be saved. He was observed in the ward about a month in view of poorly diabetic control as well as for vigorous nasal douching and for the eye care. Upon discharge his clinical condition much better, but the left ophthalmoplegia and vision was not recover. He however did not come for the visit after discharge and defaulted the treatment.

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