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CASE REPORT

Orbital Abscess arising from an Odontogenic Infection

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ABSTRACT

Aim: Presenting a rare complication of an odontogenic infection extending to the orbit.

Background: A 45-year-old male patient reported with periorbital swelling of eyelids, of the left eye, foul smelling nasal discharge and a pus draining sinus on the left lower eyelid area.

Case description: The patient gave history of pain in the left upper first molar tooth 1 week back. His intraoral examination showed poor oral hygiene with tenderness on percussion on the left maxillary first molar. Investigations showed possible extension of infection from left maxillary molar root to maxillary sinus and to the orbital floor.

Conclusion: A case of periapical infection of a maxillary left molar resulting in an orbital abscess is presented. Identification of odontogenic source of infections, institution of drainage, removal of offending teeth and appropriate antimicrobial therapy are mandatory in preventing loss of vision and cerebral extensions. The pathways of spread of the infection, treatment aspects, are discussed and complications are reviewed.

Keywords: Maxillary sinusitis, Orbit, Orbital cellulitis.

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INTRODUCTION

The cardinal signs of orbital infection from an odontogenic source (spreading either directly or through the lymphatic and vascular systems)[1] are impairment of visual acuity, proptosis, pain and limited ocular motility.[2] Abscesses that extend to the posterior orbital space can be life-threatening, because the infection can spread through the optic canal and ophthalmic veins to the meninges and the brain.

The purpose of this case report is to alert the clinician about the presenting signs of an orbital abscess due to an odontogenic infection and its management protocol.

CASE REPORT

A 43-year-old man was referred to the Department of Oral and Maxillofacial Surgery, Kannur Dental College, from the Department of Ophthalmology, Kannur Medical College, with complaints of pain and swelling in the left eye of 3 days duration (Fig. 1, patient with orbital abscess, protopsis of left eye). The patient gave history of pain in the left upper first molar tooth 1 week back (Fig. 2, showing caries on maxillary left first molar), for which he had taken medications. Tooth ache was also associated with a foul smelling nasal discharge. He gave history of trauma of the left side of the face around 2 weeks back. He gave a history of alcohol abuse, no other significant medical history was reported.

A physical examination revealed a moderately distressed patient with edema of the left upper and lower eyelids, chemosis, protrusion of the eyeball, restriction of extra-ocular eye movements. Vision in the right eye was 6/12 and in the left eye was 6/24, pupils were within normal limits, there was a pus draining sinus in the left infraorbital area and through the left nostril. His intraoral examination showed poor oral hygiene with tenderness on percussion

Fig. 1: Patient with orbital abscess and draining sinus

on the left maxillary first molar and caries on the first, second and third molar.

A computed tomographic (CT) scan of the left orbit and the paranasal sinuses was done, (Fig. 3, coronal CT scan showing infected maxillary sinus) along with waters views and panoramic radiographs (Figs 4 and 5, waters view showing haziness of left maxillary sinus, orthopantomogram showing proximal caries and periapical lesion of maxillary left first molar) which revealed proptosis of the left eye, minimal collection in the orbital floor; with a small dehiscence of the orbital floor, orbital apices were normal bilaterally, left maxillary sinusitis with obstructed osteomeatal complex and loss of fat plain of the molar root. A diagnosis of possible extension of infection from left maxillary molar root to maxillary sinus and to the orbital floor was made. The patient was admitted to hospital.

A needle aspiration of pus was done, which was sent for culture, his blood picture showed a high leukocyte count, other parameters were within normal limits. An antibiotic regime of ceftriaxone 2 gm/day, amikacin 500 mg/12th hourly, metronidazole 500 mg/12th hourly, diamox 250 mg/12th hourly, was started along with ranitidine hydrochloride and aceclofenac. His culture report showed heavy growth of anaerobic streptococci and aerobic group A streptococci. He was posted for exploration of the draining sinus, and nasal endoscopy under GA. Pus was drained at the two dependent sites medially and laterally in the infraorbital area. Nasal endoscopy was aborted as the anterior DNS was obstructing the passage of scopy, a significant amount of pus was drained through the infraorbital area and a drain was placed. There was continuous drainage of pus on the third day, his ocular moments were still restricted. On the fourth day, slough discharge was noted at the infraorbital area. He was posted for dental extraction of the left maxillary molars on the fifth day, after a full course of intravenous antibiotics. On the seventh day there was slight reduction in the lid edema, on the ninth day his vision had improved to 6/18 in the left eye. And by the start of the third week his vision was 6/12 in both the eyes, but the foul smelling nasal discharge continued, his second pus culture showed the same results with sensitivity to ciprofloxacin. He was posted for septoplasty, intranasal antrostomy and antral wash under GA. His condition improved fast, following which he was discharged at the end of the fourth week (Fig. 6, frontal profile of patient upon discharge).

Fig. 2: Caries on maxillary left first molar

Fig. 4: Waters view showing haziness of left maxillary sinus

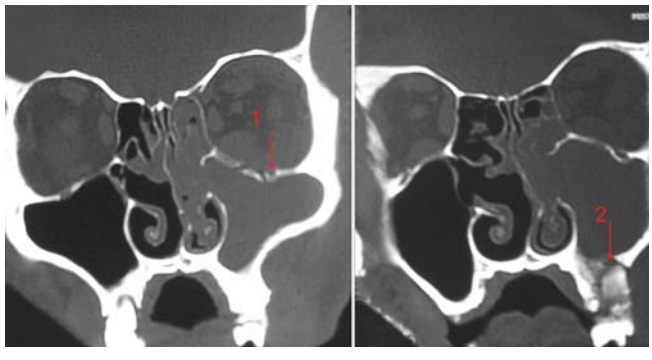

Fig. 3: Coronal CT scan showing infected left maxillary sinus

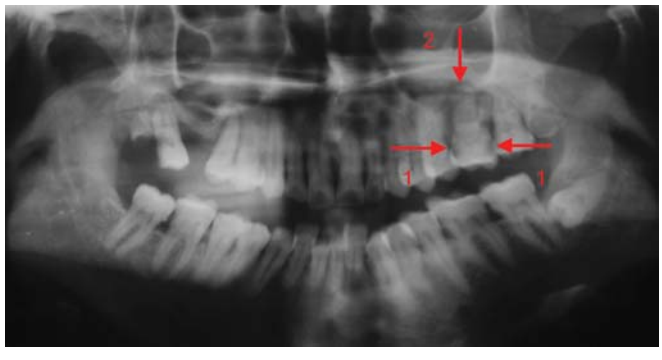

Fig. 5: OPG showing proximal caries and periapical lesion of maxillary first molar

Fig. 6: Frontal profile of patient upon discharge

DISCUSSION

The closed box anatomy of the orbit and surrounding structures, predisposes these tissues to serious sequelae when an infection spreads to this area. The lack of lymphatic drainage and numerous soft tissue spaces potentiate the establishment and extension of a preseptal and periorbital abscess. The venous drainage of the orbit is valveless and forms a network that interconnects the face, nasal cavity, orbit and paranasal sinuses. The superior and inferior ophthalmic veins connect the small vessels within the orbit with the cavernous sinus, allowing free flow of blood. However, the reflection of the periosteum of the orbit (periorbita), the palpebral fascia or the orbital septum separate the periorbital inflammation from those that impact on the orbit directly.[3,4]

Chandler et al[5] classified orbital infections into five groups according to their anatomic locations. This classification is useful in determining the clinical presentation, differential diagnosis, treatment and prognosis.

The spread of odontogenic infections to the orbit can occur through several pathways. First, the odontogenic infection may infect the maxillary or ethmoidal sinuses and continue directly to the orbit through any of the following: bone erosion, preformed dehiscence in the orbital floor, the infraorbital neurovascular canal or in the lamina papyracea. Second, the infection might have spread to the pterygopalatine and infratemporal fossae and enter the posterior orbit directly through the inferior orbital fissure. Third, the superior and inferior ophthalmic veins anastomose anteriorly with the facial and 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 venous plexus. The valveless nature of these veins allows the rapid and uninterrupted spread of the infection. Finally, an odontogenic infection can enter the orbit through the preseptal space by perforating the eyelid.[6,7]

In our case, the orbital abscess advanced from the periapical abscess of the upper left first molar, through the maxillary sinus and reached the orbit through perforation in the orbital floor as evidenced on the CT scans.

When an orbital infection is suspected, early aggressive broad-spectrum antibiotic therapy should be initiated. The most common organisms isolated from the blood, the paranasal sinuses of abscess are streptococcal species, such as *Streptococcus viridans*, *Streptococcus pneumonia*, *Streptococcus milleri* and *Streptococcus pyogenes*, and also *Staphylococcus aureus* and *Haemophilus influenzae* type B. The typical odontogenic infection is now believed to be a mixed aerobic-anaerobic infection with anaerobes outnumbering aerobes.[1,3]

A complete ophthalmologic evaluation is essential before and during the course of treatment. If an orbital abscess is suspected, surgical intervention must be considered in order to adequately drain the pus, release pressure on the orbit and obtain a culture. An external approach to drain an orbital abscess will produce good drainage, the location of the skin incision being dictated by the location of the abscess on the CT scan. The orbit being a pressure sensitive organ, which is confined within a close space, bleeding during an incision and drainage cannot be controlled with counter pressure, because such pressure might damage the optic nerve and eye, even with a short duration of ischemia. The intricacies of the orbital contents, multiple nerves, vessels and muscles that extend from the apex of the orbit to the globe are not easily manipulated without causing some damage in some cases. The surgeon must consider all of these principles when performing an orbital procedure.[8] The maxillary sinus can be washed out to help speed the resolution of the infection.[3]

The clinical manifestations of cavernous sinus involvement include marked eyelid edema and discoloration, opthalmoplegia, paresthesia in the distribution of the ophthalmic and maxillary division of the fifth cranial nerve, bilateral orbital involvement, altered states of consciousness and generalized sepsis[9] and these should not be overlooked. Cavernous sinus thrombosis should be strongly considered in patients whose disease process does not resolve within 48 hours or who experiences a sudden relapse.[7] CT is the gold standard when orbital infections are suspected. CT preoperatively will guide the surgical approach and allow monitoring of a resolving orbital abscess. CT can also reveal sinus disease and the intracranial extension of the infectious process. Failure to improve after

surgical decompression is always an indication for repeat imaging.[10] Contrast-enhanced paranasal sinus CT scan is mandatory and reliable to differentiate preseptal and postseptal orbital infection, as both conditions can present similarly and rapidly deteriorate.[11]

Persisting orbital abscess despite treating the odontogenic source of infection have been reported, necessitating an urgent orbitotomy for incision and drainage of the orbital abscess.[12]

The surgeon must retain a high index of suspicion for subsequent abscess formation also, despite proper initial intervention.

CONCLUSION

Infectious process that involves the eyes must be diagnosed and treated expeditiously because such process may fulminate in the deep orbit that lacks lymphatic drainage. Antibiotics alone may not be sufficient to prevent a fulminating infection that would render the eye functionless, besides no study has been done to show the effectiveness of antibiotic therapy alone in treating orbital and periorbital cellulitis due to dental infection.

Clinicians who treat the infections in and around the adjacent areas must understand the structure, functions, pathways of spread of infection into the orbit and also the necessity of a multidisciplinary approach in order to successfully manage a potentially serious ophthalmic infection.

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