



SIGHT THREATENING ORBITAL CELLULITIS FROM OSTIO-MEATAL SINUSITIS DUE TO MIXED INFECTION: A CASE REPORT

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ABSTRACT **INTRODUCTION:** Orbital cellulitis is an emergency and serious infection of the soft tissues of the orbit behind orbital septum which can be sight and life threatening. *Klebsiella pneumoniae* and Coagulase negative staphylococci causing orbital cellulitis from the paranasal sinuses is a rare outcome. **CASE REPORT:** A 55-year diabetic male attended tertiary care hospital presented with swelling of the left side of the face involving left eye with diminution of vision associated with poor glycemic control. VA on bedside was CF 3m and on fundoscopic examination there was papilloedema. Clinical examination disclosed orbital cellulitis and left sided osteo-meatal sinusitis confirmed on MRI. *Klebsiella pneumoniae* was isolated from pus and culture sensitivity and Coagulase negative Staphylococci from blood culture. The case has been diagnosed as osteo-meatal pattern sinusitis as the primary source of infection from Otorhinolaryngology department. Vigorous treatment with intravenous antibiotic therapy, anti-inflammatory drugs, topical eyedrops and ointment, along with control of blood sugar improved the general condition of the patient. However, the VA after 7 days was PL negative and on fundoscopic examination there was optic atrophy. **DISCUSSION:** Orbital cellulitis in severe scenario due to mixed infection from osteo-meatal sinusitis along with immunocompromised state may be characterized by multiple cranial nerve palsies (II-VI) causing ptosis, proptosis, total ophthalmoplegia, decreased visual acuity and pain. Severe visual loss can occur due to mechanical pressure of the inflamed orbital structures. **CONCLUSION:** Thus, mixed infection from Osteo-meatal sinusitis causing orbital cellulitis may lead to blindness. Therefore, early diagnosis and treatment may salvage the vision.

KEYWORDS : Orbital cellulitis, *Klebsiella pneumoniae*, Coagulase Negative Staphylococcus, Optic atrophy

INTRODUCTION:

Orbital cellulitis is a serious infection which involves fat and orbital contents present within the orbit. The causative organisms are commonly bacterial but can also be polymicrobial often including aerobic and anaerobic bacteria and even fungal or mycobacteria.^[1] It is primarily diagnosed clinical and physical examination combined with signs and symptoms. The most important clinical feature is the presence of ophthalmoplegia, pain with eye movement, and/or proptosis. It is important to diagnose, investigate with imaging to determine if the source is from the sinuses as it is closely associated with the orbit and are commonly the source of infection from direct contiguous spread. Without proper diagnosis and treatment, the infection can progress to the adjacent anatomical areas and results in serious complications like loss of vision, subperiosteal abscess, orbital abscess, and intracranial extension of infection. Treatment with antibiotics for aerobes and anaerobes is important along with antifungal drugs when fungal infection is suspected. Analgesics used to control pain. Sinus surgery may be required for the treatment of orbital cellulitis due to sinusitis or pansinusitis. Management of orbital cellulitis needs a multidisciplinary team of the ophthalmologist, otorhinolaryngologist, medicine specialist and neurosurgeon.^[2]

CASE REPORT:

A 55-year diabetic male presented with swelling of the left side of face, diminution of vision in left eye, pain, ptosis since last 7 days. This was preceded by headache 10days back which wakes the patient at night and was gradually increasing in intensity. The patient was treated by the primary physician with oral antibiotics, analgesics and topical eye drops but there was no improvement in symptoms. Following non-resolution after 3 days, he presented us for a second opinion. He was a known case of type 2 diabetes since last 10 years. He was a diagnosed case of CKD. On general examination the patient was febrile, conscious, alert, oriented to time place and person. He was having pallor, central obesity and hypopigmented occasional patches in the insulin injection sites.

On ocular examination, the patient had generalized facial swelling in left half of the face. His visual acuity was 6/12 in right eye and Counting finger 3m in left eye. The anterior segment of right eye was normal, with few dot haemorrhages and hard exudates in the posterior

segment. In the left eye, there was swelling of the lids, severe ptosis of the upper lid, erythema, tenderness, mild proptosis and total ophthalmoplegia. Intraocular pressure was digitally raised with significant resistance to retropulsion. The anterior segment of the left eye showed diffuse severe conjunctival congestion, chemosis with a sluggish reacting pupil and early cataractous changes. The posterior segment of the left eye showed hazy media due to lenticular opacity, and few dot haemorrhage and hard exudates surrounding macula.

The patient had developed pustular swelling in left maxillary area of size 3x4 mm in size after 11 days.

The blood parameters were deranged with increase in WBC, Neutrophil, FBS, PPBS, HbA1c, Urea, creatinine, TSH, AST, ALT, ALK and decrease in Hb, HCT, MCV, MCH, HDL.

Computed tomography (CT) of nose and paranasal sinuses showed mucosal thickening and multiple air foci in left maxillary sinus and ethmoidal air cells. Rectus muscles were oedematous on left side with mild intraconal fat stranding. There were mild proptosis of left globe, soft tissue thickening and fat stranding. Inferior turbinate was hypertrophied. It suggested osteo-meatal pattern of sinusitis.

MRI of orbit showed ill-defined collections with overlying soft tissue swelling involving left orbito-zygomatic-maxillary-mandibular region extending to left buccal space and superficial lobe of left parotid gland with oedematous and bulky masseter, buccinator and zygomaticus major muscle. There were left retro-orbital inflammatory changes with proptosis suggestive of orbital cellulitis. Left cavernous sinus appears bulkier than the right. The optic nerve showed normal intensity.

A diagnosis of Orbital cellulitis with left sided Osteo-Meatal sinusitis and Type 2 diabetic mellitus and CKD was made.

Initially he was started on empirical treatment with broad-spectrum antibiotics, piperacillin + tazobactam 2.25gm TDS, insulin, tramadol, chymotrypsin + trypsin, antibiotic eye drops and ointment and artificial tear drops.

On culture sensitivity of the pus, *Klebsiella pneumoniae* was found and on blood culture it showed growth of coagulase negative *Staphylococci*. Thus, Orbital cellulitis was found to be due to mixed infection along with immunocompromised state of the patient.

He was switched to intravenous injection Linezolid 600mg BD, Clindamycin 300mg TDS, Liposomal Amphotericin B OD along with previous medications. He received the medications for 7 days and there was improvement in general symptoms but there was no restoration of ocular signs with vision deteriorating to PL negative and optic atrophy on fundoscopy.

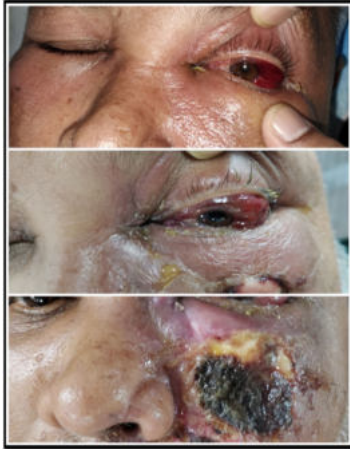


Figure 1:(a) DAY 1 of orbital cellulitis, (b) DAY 4 of pustule in maxillary area, (c)DAY 14 of necrotizing fasciitis

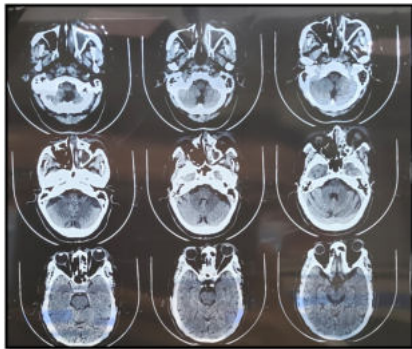


Figure 2: Serial axial scan of CT NOSE & PNS: Left sided osteomeatal pattern sinusitis with left sided orbital cellulitis

DISCUSSION:

Orbital cellulitis in severe scenario due to mixed infection from osteomeatal sinusitis along with immunocompromised state may be characterized by multiple cranial nerve palsies (II-VI) causing ptosis, proptosis, total ophthalmoplegia, decreased visual acuity and pain.^[3] Severe visual loss can occur due to mechanical pressure of the inflamed orbital structures that can further complicate as raised intraocular pressure with reduced retinal circulation and direct compressive optic neuropathy or compression of the small vessels of the optic nerve leading to ischemic optic neuropathy.

Our review of literature revealed case reports defining sight-threatening complication of orbital cellulitis due to mixed infection.

Rutar et al (2005), despite initiation of appropriate antibiotics early in the course of infection in MRSA Orbital cellulitis, the patient lost sight in both eyes. Drainage of the paranasal sinuses by surgical methods and use of intravenous corticosteroids and heparin led to the improvement of orbital cellulitis.^[4]

Klebsiella pneumoniae have capsules made of polysaccharides that inhibits phagocytosis of the host and may cause severe invasive diseases. It has been reported that poor glycaemic control may stimulate capsular polysaccharide biosynthesis, further impairing the phagocytosis against prominently virulent capsular serotypes K1 and K2 in patients with type 2 diabetes.^[5,6]

Ghiam et al (2019) documented *Klebsiella pneumoniae* causing orbital cellulitis, despite aggressive and early intervention with antibiotics and vitrectomy the condition of patient continued to worsen and evisceration was required to control the infection.^[7]

Patients more than 15 years of age have complex infections caused by multiple aerobic and anaerobic organisms that are difficult to clear despite medical and surgical management. With increasing age, the sinuses enlarge and the ostia becomes narrow creating favourable conditions for anaerobic bacterial growth. With increasing age, the infection gets more complex. In mixed infections, aerobes consume oxygen which encourages anaerobic microbial growth. Furthermore, anaerobes produce B-lactamase which renders antibiotics ineffective.^[8]

Yang et al (2010), reported overall recovery but decreased visual acuity in *Klebsiella pneumoniae* Orbital Cellulitis with Extensive Vascular Occlusions in a Patient with Type 2 Diabetes.^[9]

CONCLUSION:

Herein we report a case of rapidly progressive Orbital cellulitis due to coagulase negative *Staphylococcus* and *Klebsiella pneumoniae* in a 55-year immunocompromised diabetic male resulting in vision loss and optic atrophy. The purpose of presenting the case is to highlight the sight treating complication of orbital cellulitis due to mixed infection. To conclude orbital cellulitis warrants a prompt diagnosis, medical and surgical management.

DECLARATION OF PATIENT CONSENT

All appropriate patient consent forms have been obtained. In the form of the patient has given his consent for his images and other clinical information. The patient understands that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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CONFLICTS OF INTEREST: There are no conflicts of interest

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