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CASE REPORT

# Hidden Germ of the Immunocompromised: A Case of Fungal Orbital Cellulitis

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## *ABSTRAK*

*Selulitis orbital merupakan jangkitan di tisu orbit yang kemungkinan menyebabkan kecederaan yang serius jika tidak dirawat segera. Penyakit ini memerlukan rawatan yang lebih agresif dan itulah sebabnya adalah penting untuk membezakan penyakit ini daripada penyakit yang tidak begitu membahayakan nyawa seperti selulitis praseptal. Kes ini membincangkan mengenai seorang pesakit selulitis orbital dan mempunyai komplikasi daripada penyakit tersebut. Kelewatan memberi antibiotik yang sesuai akhirnya menyebabkan pesakit ini meninggal dunia. Kelewatan ini adalah disebabkan pesakit ini adalah pesakit terimunokompromi dan mempunyai organisma lain daripada populasi normal.*

*Kata kunci: immunokompromi, orbital, sellulitis*

## ABSTRACT

Orbital cellulitis is an infection of the orbital soft tissue that could possibly lead to serious complications if treatment is delayed. It is important to differentiate this condition from a less life-threatening condition like preseptal cellulitis as orbital cellulitis would require a more aggressive treatment than the former condition. The present case discusses about a patient who was diagnosed with orbital cellulitis and developed complications from the disease. The delayed administration of the appropriate antibiotic subsequently led to the patient's death. The delay was because of the reason that the patient belonged to the immunocompromised group who harbour different causative organism than the normal population.

Keywords: cellulitis, immunocompromise, orbital

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## INTRODUCTION

Orbital cellulitis, also known as post-septal cellulitis is the infection of orbital soft tissue posterior to the orbital septum. This condition may be life-threatening and vision-threatening, and must be treated as inpatient with IV antibiotics, and occasionally surgical drainage (Lee & Yen 2011). It is important to differentiate this condition from periorbital (preseptal) cellulitis, which is an infection of the eyelid and periocular tissue that is anterior to the orbital septum. Periorbital cellulitis tends to take a benign course and can be treated as outpatient. Computed Tomography (CT) scan would be a good modality to differentiate the two conditions (Duarte Reis et al. 2002). One of the complications of orbital cellulitis is cavernous sinus thrombosis (Tsirouki et al. 2018). Prompt recognition and initiation of therapy is important to minimize complications, and yet, the diagnosis of orbital cellulitis possesses a challenge especially for Emergency Department (ED) personnel. In this case report, we present a challenging case of orbital cellulitis which eventually led to cavernous sinus thrombosis and death.

## CASE REPORT

A 70-year-old male with background history of diabetes mellitus, hypertension, chronic hepatitis B infection with seroconversion, presented to the ED with right sided periorbital swelling which started one day prior to presentation. The swelling had a sudden onset but was painless. He denied any trauma or insect bite to the facial area. He had no allergy or intake of any new food. The swelling was associated with fever and minimal rhinorrhea, but there was no ear symptoms, gum swelling or headache. He vomited twice on the day of presentation and twice on the day before and had reduced oral intake. He missed his diabetic medications on the day of presentation.

Upon arrival to the ED, his documented temperature was 38°C, heart rate 86 beats/minute, blood pressure was 132/70 mmHg, respiratory rate was 18 breaths/minute and oxygen saturation was 98% under room air. He was comfortable looking, able to talk in full sentence, and not tachypnoeic. His pulse volume was good, he appeared pink and not jaundiced. Examination of his face revealed right sided facial and periorbital swelling which was slightly erythematous, but was soft and non-tender to touch. He was only able to open his right eye partially due to the swelling. Extraocular muscle movements were intact in both eyes. His pupils were both equal and reactive. Inspection of the oral cavity noted swollen right hard palate which was non-tender, and multiple white patches were seen in the oral cavity.

A bedside blood gas was ordered and it did not show any acidosis. However, serum glucose of level was 37 mmol/L and lactate level was 1.3 mmol/L. In view of hyperglycemia, he was started on IV hydration with normal saline while waiting for the rest of the investigations. He had raised total white cell count of 18.8

x $10^9$/L (predominantly neutrophils), haemoglobin level of 12.2 g/dL, platelet count 219 x $10^9$/L, sodium 123 mmol/L (redistributive hyponatremia secondary to hyperglycemia; corrected sodium level would be 132 mmol/L), potassium 4.6 mmol/L, urea 18.2 mmol/L and creatinine 215.4 µmol/L. His calculated serum osmolarity was 301.2 mosm/L. The impression at that time was sepsis secondary to right facial cellulitis with uncontrolled diabetes mellitus and acute kidney injury.

He was referred to Ear, Nose and Throat (ENT) Department medical team and was started on ceftriaxone and metronidazole while waiting for the respective team to review him at the ED. A repeated blood gas 8 hours later showed that he started to develop metabolic acidosis with a pH of 7.220, bicarbonate level of 14.8 mmol/L, pCO2 41.7 mmol/L and lactate of 2.2 mmol/L. His blood pressure started to come down with ensuing cold peripheries. However, his GCS remained full all the while and he was never tachypnoeic, and able to respond well to his surroundings. He was immediately started on a fluid regime for diabetic ketoacidosis and an insulin infusion with close monitoring. Noradrenaline infusion was started subsequently after his blood pressure failed to respond to the fluid resuscitation.

A CT scan revealed a right orbital and facial cellulitis, right sided sinusitis, bilateral dilated superior ophthalmic vein, likely due to edema and minimal patchy meningeal enhancement at right temporal fossa in which early meningitis could not be excluded. A Magnetic Resonance Imaging (MRI) of the brain could not proceed on the same day because the patient was restless, despite multiple doses of sedation given. He was then intubated for airway protection and admitted to the Intensive Care Unit (ICU).

The MRI investigation of brain was done on the second day of admission. It was reported as right maxillary and bilateral ethmoidal sinusitis, right facial and bilateral orbital cellulitis and ocular myositis complicated with cavernous sinus thrombosis hyperacute infarct of right middle cerebral artery territory. A flexible laryngoscopy was done by the ENT team which noted the presence of minimal mucous from right medial meatus and a polypoidal mass from middle meatus. A swab was sent for culture and sensitivity. In view of the orbital involvement, he was also referred to an ophthalmology team for co-management. His intraocular pressure was measured daily by the ophthalmology team and it was noted to be increasing as the disease progressed. We were able to achieve a good control of his serum glucose level on the third day of admission. On the third day, his culture report from right middle meatus mass (taken on first day of admission) showed *Rhizopus* spp. was isolated and he was started on IV amphotericin B, immediately.

On the fourth day of admission, he was sent for a functional endoscopic sinus surgery (FESS) under the ENT team, the first surgical intervention that the patient received. Intraopeartively, multiple procedures were done. These include bilateral uncinectomy, wide

middle meatal antrostomy, anterior and posterior ethmoidectomy, and sphenodoitomy. Despite various attempt to clear off the infection, the patient's condition did not improve and he was pronounced dead on eighth day of admission.

## DISCUSSION

Both orbital and periorbital cellulitis occur more commonly among the pediatric population (Lee & Yen 2011). Orbital cellulitis is prevalent among the age of 0-15 years, due to the relatively incomplete immunologic development in this age group (Chaudhry et al. 2012). The causative agents are usually polymicrobial, with *Staphylococcus aureus*, *Streptococcus pneumoniae*, and anaerobes being most common (Tsirouki et al. 2018). However, in diabetics and immunocompromised patients, Mucorales and *Aspergillus* spp. are the typical causative fungal agents (Tsirouki et al. 2018; Buchanan et al. 2012) and should be considered, where the treatment involve extensive surgical debridement, in addition to aggressive antifungal therapy (Lee & Yen 2011). In mucormycosis, *Rhizopus* sp. is the most common causative agent (Farooq et al. 2015), as seen in this case.

Mucormycosis is rare, and more frequently seen in diabetic patients. The mechanism of spread of *Rhizopus* sp. is facilitated by high amount serum iron and glucose (Farooq et al. 2015). Uncontrolled diabetes mellitus remain the most commonly associated condition in orbital mucormycosis (Farooq et al. 2015). Furthermore, acidoketosis is a favourable metabolic stat where there will be rapid growth of Mucorales (Toumi et al. 2012). In this patient, the blood sugar was high upon presentation, which might the favourable factor for the spread of *Rhizopus* sp. Although no acidosis was seen in initial blood gas, acidotic quickly set in after few hours and his condition deteriorated which eventually required aggressive fluid and vasopressor management. Furthermore, this patient already had evidence of renal insufficiency upon presentation to the ED. Severe renal insufficiency is an additional risk factor for the onset of mucormycosis in diabetic patients, as well as for death (Toumi et al. 2012).

In our case, there was a delay in sending the patient for a CT scan. One of the reasons was because the patient was not stable enough to leave the ED due to the concurrent septic shock and uncontrolled hyperglycemia which required close monitoring. In cases where there is a difficulty in performing a CT scan, a bedside ultrasound could be performed to assist in establishing the diagnosis. A scientific paper published in 2012 reported that ultrasound can be used to easily assess the orbit and to monitor response to treatment without additional exposure to radiation (Derr & Shah 2012). In periorbital cellulitis, oedematous swelling of the eyelids may be seen anteriorly, whereas in orbital cellulitis, a heterogenous collection of hyper- and hypoechoic material may be seen surrounding the orbit from within the orbital septum (Derr & Shah 2012).

In mucormycosis, amphotericin

B along with aggressive surgical debridement remains the mainstay of treatment (Farooq et al. 2015; Toumi et al. 2012). While treating for fungal orbital cellulitis, intra-orbital catheter delivery of amphotericin B may be useful as adjunctive therapy (Farooq et al. 2015). In addition to that, blood glucose control should be optimized in patients who are diabetics as uncontrolled blood sugar tends to worsen the condition. There was a delay in initiating antifungal treatment in this patient as fungal infection was not suspected initially, and it was only started after reviewing patient's culture report.

## CONCLUSION

In conclusion, medical personnel should always be aware that fungi could be one of the causative agent in a diabetic patient who presented with orbital cellulitis. Patient should receive early CT scan to help differentiate between periorbital and orbital cellulitis and the extent of the involvement. If CT scan was not readily available, a bedside ultrasound might be useful in differentiating orbital cellulitis from periorbital cellulitis. Antibiotic and antifungal therapy should be initiated early when the patient presented to the ED without waiting for the culture report. Early debridement should also be considered in this group of patients. In addition, a good control of serum glucose level is mandatory so that patient does not go into ketoacidosis which will speed up the growth of Mucorales.

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