

Bilateral orbital cellulitis secondary to furunculosis a case series**Mat-Min Faridah^{1,2}, Yaakub Azhany^{2,3}, Nor-Anita Omar¹, Rasdi AR^{1,2}, MaizanYaacob¹**¹Department of Ophthalmology, Hospital Sultanah Nur Zahirah, Jalan Sultan Mahmud, 20400 Kuala Terengganu, Terengganu²Department of Ophthalmology, School of Medical Sciences, Health Campus, UniversitiSains, Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia³Hospital UniversitiSains Malaysia, 16150, Kubang Kerian, Kelantan, Malaysia***Corresponding author**

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Abstract: Orbital cellulitis is potentially severe, life threatening infection of the ocular adnexal and orbital tissue. Commonly it is a complication of infection at para nasal sinus, and rarely from facial skin infection. Without appropriate management, orbital cellulitis may lead to serious complication such as cavernous sinus thrombosis and even death. Three case report of orbital cellulitis secondary to furunculosis at the face region complicated with cavernous sinus thrombosis are reported. Blood cultures revealed *Staphylococcus Aureus* in all cases. Despite of vigorous care given unfortunately one patient died due to sepsis. In conclusion simple furunculosis at the face region can lead to devastating complication such as orbital cellulitis and cavernous sinus thrombosis. Prompt treatment is mandatory to avoid loss of vision and intracranial complication.**Keywords:** Orbital cellulitis, furunculosis, cavernous sinus thrombosis.

INTRODUCTION

Orbital cellulitis is an uncommon condition associated with severe complications. It is potentially lethal disease, sight and life threatening if untreated. It was reported that prior to the discovery of antibiotics mortality rates of 20% to 50%, and blindness in 20% to 55% of the survivor [1, 2]. The infection most commonly originates from sinuses particularly ethmoid sinus in children. Some cases are due to spread of skin infection affecting the middle third of the face [3]. Furunculosis is deep infection of the hair follicle leading to abscess formation with accumulation of pus and necrotic tissue. In the presence of furunculosis, the infection may spreads through the dermis and subcutaneous tissue then via haematogenous spread to cavernous sinus. Other less common etiologies include direct inoculation from a puncture wound, retained foreign bodies, secondary to orbital fracture or surgery, dacryocystitis and orbital tumours [4, 5]. With the advent of antibiotic era, its frequency has dramatically decreased. Three cases are described, and all of them presented with almost similar presentation.

on her nose (Figure 1). The pustules burst spontaneously and the surrounding skin became erythematous and later spread to periorbital and forehead region. The diagnosis of bilateral orbital cellulitis and cavernous sinus thrombosis was made based on CT scan. CT scan showed retrorbital inflammation and dilatation of right superior ophthalmic vein with no abscess collection noted. However, after 2 days of admission, her general condition deteriorated and she was managed in ICU.

She was empirically treated with broad spectrum intravenous antibiotics, (Intravenous amoxicillin/clavulanic acid 30mg/kg/dose tds, Intravenous cloxacillin 50 mg/kg/dose qid and Intravenous metronidazole 7.5mg/kg/dose tds. Intravenous cefuroxime 50mg/kg/dose tds was added later. She was also Started on intravenous heparin infusion 15-25 unit/kg/hr. Her condition responded well with the antibiotic and anticoagulant. Blood culture grew *Staphylococcus Aureus*. Her follow up at 3 months noted normal visual acuity and she was healthy.

Report of three cases**Case 1**

An 11 years old girl was admitted with bilateral painful eye redness associated with eyelid swelling and fever. One week prior to admission, the patient was partially treated by general practitioner with oral antibiotic (Oral cloxacillin 250mg qid) for pustules



Fig 1: Bilateral lid edema and partially healed nasal furunculosis (arrow).

Case 2

A 15 years old boy, presented with two days history of high grade fever with bilateral periorbital swelling associated with pain, redness and diplopia. There was a pustular lesion on the right forehead noted a week prior to presentation (Figure 2). The lesion burst with inflamed surrounding area involving the upper half of the face.

On admission her right visual acuity was 6/6 and the left side was 6/60 with positive relative apparent pupillary defect (RAPD). Bilaterally, there were ecchymosis, exophthalmos and extra ocular movement restricted in all direction. Urgent CT scan revealed irregular heterogeneous enhancement and thickening of sclera and globe, involving both pre and post septal region in both eye. The superior ophthalmic vein were also dilated (figure 3). The diagnosis of bilateral orbital cellulitis with cavernous sinus thrombosis was made. He was treated intensively with intravenous antibiotics (cefuroxime 750mg tds, cloxacillin 500mg qid and metronidazole 500 mg tds and intravenous heparin infusion 15-25 units/kg/hrs. Blood culture grew *Staphylococcus Aureus*. He responded well to the treatment and gained final good vision of 6/6 bilaterally with residual vertical diplopia.



Fig 2: Bilateral orbital cellulitis with right forehead furunculosis (arrow).

Case 3

A 19 years old man, an estate worker was brought into emergency unit in a comatose state. History revealed an episode of fever for one week duration followed by bilateral periorbital swelling. He

was intubated immediately as the condition deteriorated.

Ocular examination showed bilateral severe proptosis and chemosis. The pupils were not reactive and the intraocular pressure was high in both eyes (Right eye 50mmHg/Left eye 45mmHg). Ruptured pustular lesion was noted on his nose. Urgent CT scan was performed and showed bilateral proptosis and dilated superior ophthalmic vein. He was initially treated intensively with empirical intravenous antibiotic (ceftriaxone 1 gm bd, cloxacillin 500mg qid, metronidazole 500 mg tds) and anti-coagulant heparin infusion 15-25 units/kg/hrs. Intravenous Vancomycin 1 gm bd was added based on blood culture result. His condition deteriorated and MRI brain was performed and revealed cerebral abscess and subperiosteal abscess. Drainage was deferred as his general condition was not stable. He succumbed to death at three weeks of admission as he was complicated with disseminated intra vascular coagulopathy. Blood culture grew poly microbial including *Multiple Resistance Staphylococcus Aureus* (MRSA).



Fig 3: Bilateral severe proptosis and chemosis, Arrow shows furunculosis

DISCUSSION

The causes of furunculosis are often obscure and usually mild infection will be treated conservatively. Commonly the furunculosis start localized with a single infection and usually it successfully treated by wound care and antiseptic as local application and cleanser. However, external spread of bacteria from existing infection to deeper area may lead to serious complication.

Any orbital infections derived from adjacent area are serious disease. They may reach the orbit through dehiscence of its bony wall or by means of interference with venous drainage of the orbital contents. There are many direct connections in between the orbital veins to facilitate this spread depending on the localization and their relation to the orbital septum and the periosteum [4, 5]. Furthermore orbital veins have no valves and can drain inferiorly to the

peterygoid plexus or posteriorly to the cavernous sinus. This posterior communication with the intracranial vascular spaces may allow spread of infection leading to septic thrombosis of cavernous sinus, meningitis, brain abscess and death [6]. The spread of infection had resulted in developing bilateral cavernous sinus thrombosis in these patients. The diagnosis requires early establishment and treatment as it is associated with a high mortality rate of 20-30%.

In pre antibiotic era, orbital cellulitis usually appear as an acute infection which in frequently led to blindness and even death. Sometimes patient may presence with less dramatic sign and symptoms.

In our series, we observed similar presentation whereby all patients presented with history of having pustule lesion over the face region prior to the periorbital swelling. It involved nasal bridge (case 1 and case 3) and forehead (case 2). They had been partially treated with oral antibiotic by general practitioner. Orbital cellulitis is typically disease of children and adolescent, with peak age of incidence during the first 15 years of age. In older children or adult the disease is more severe [7]. This corresponds with our three cases in which the older the age have severe form of illness and finally succumbed to death.

Most common cause for the orbital cellulitis is para nasal sinusitis, especially ethmoid sinusitis, therefore, predisposing factors especially any history of sinus disease or sinus surgery should be sought. In our case series, none had any history of chronic rhinitis, trauma or underwent any surgery. There was no heart murmur to suggest endocarditis to account for an exogenous cause of orbital cellulitis. The similar presentation was present of pustular lesion over the face region for few days before developed both orbital swelling and redness.

Both of the survived patient has been started on oral antibiotics for the furunculosis by primary physician before initial referral. Even the diagnosis of orbital cellulitis can be done clinically, the radiological finding is almost mandatory in looking for complications. Computer tomography (CT) scans of orbit and brain will outline the extent of orbital involvement. It also can find the cause and best determines the best surgical approach to be used. Radiographic finding in these patients did not show involvement of any para nasal sinus. The lack of significant finding fluid in the para nasal sinus may be because all of them had been partially treated by local general practitioner resulting in partial resolution of the sinusitis.

The microbial flora associated with orbital cellulitis would reflect the most common flora found at

that site. The most predominant cause is *Heamophilus influenza*, *Streptococcus sp* in particular *Streptococcus pneumonia* and *pyrogenes* [7]. In the post *Heamophilus influenzae* type-B vaccine era, *Heamophilus* is no longer a significant pathogen in orbital cellulitis [9]. Other principles bacterial include *Staphylococcus aureus* and anaerobes [8]. Poly microbial infection is also common and may be more frequent in older patient [4].

Our patients grew same organism which is *Staphylococcus Aureus* from blood cultures. As the skin being the route of infection in these cases, the normal skin flora such as *Staphylococcus Aureus* can spread to the orbit. Productions of toxin promote their virulence which leads to the inflammatory response.

The mainstay of therapy is aggressive antibiotic administration. Third generation intravenous cephalosporin such as ceftriaxone and cefotaxime would offer good cover of both gram-positive and gram-negative bacteria implicated in orbital cellulitis. Although *Staphylococcus aureus* is the usual cause, broad spectrum coverage for gram-positive, gram negative and anaerobic organisms should be instituted pending the outcome of cultures. The antibiotic utilized (cloxacillin, cefuroxime and metronidazole) to treat all three cases were appropriate empirical antibiotic to cover possible causative organisms including anaerobes. One of the patients failed to improve on aggressive antibiotic therapy. There are many factor should be considered including the organism may have developed resistance towards particular or combination of antibiotic or due to intracranial extension.

Despite significant advances in antimicrobial therapies and diagnostic technologies, the management of orbital cellulitis often remains challenging, and rapid diagnosis and prompt initiation of therapy are important in minimizing complications and optimizing outcomes.

CONCLUSION

Furunculosis is a mild and common infection of the skin by *Staphylococcus Aureus*. Unfortunately, the spreading of the bacteria may lead to a serious life threatening complication such as cavernous sinus thrombosis. Prompt diagnosis and treatment is vital in dealing with this infection.

COMPETING INTERESTS Authors have declared that no competing interests exist.

CONSENT

Informed consent was obtained from the patient and guardian for publication of this case report and accompanying images.

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