Preseptal Cellulitis Or Orbital Cellulitis?

LT Lim[1], D Miller[2], EY Ah-kee[3], A Ferguson[1]

ABSTRACT

Preseptal cellulitis and orbital cellulitis can both present with increasing swelling, tenderness and redness around the eye, but their management differs. Preseptal cellulitis is more common and much less aggressive than orbital cellulitis. In contrast, orbital cellulitis is a medical emergency requiring urgent management. In this article, we provide a systematic approach to distinguish between preseptal cellulitis and orbital cellulitis at presentation, as the distinction between the two entities and the prompt recognition of orbital cellulitis can be potentially life-saving.

Keywords: Management, orbital cellulitis, preseptal cellulits

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RESUMEN

La celulitis preseptal y la celulitis orbitaria pueden presentarse ambas con creciemte hinchazón, sensibilidad y enrojecimiento alrededor del ojo, pero su tratamiento es diferente. La celulitis preseptal es más común y mucho menos agresiva que la celulitis orbitaria. En cambio, la celulitis orbitaria constituye una emergencia médica que requiere tratamiento urgente. En este artículo, ofrecemos un enfoque sistemático para distinguir entre celulitis preseptal y celulitis orbitaria en su manifestación, ya que distinguir entre las dos afecciones y el pronto reconocimiento de la celulitis orbitaria, puede potencialmente salvar una vida.

Palabras claves: tratamiento, celulitis orbitaria, celulits preseptal

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INTRODUCTION

Increasing swelling, tenderness and redness around the eye is not an uncommon presentation to primary care or emergency departments. Commonly described erroneously by non-ophthalmologists as periorbital cellulitis, preseptal cellulitis is more common and much less aggressive than orbital cellulitis. In contrast, orbital cellulitis is a medical emergency requiring urgent management. The presentations of the two entities do overlap, however, their management differs. This important distinction can potentially be life-saving, especially in some rural areas, where an opinion from ophthalmology services can only be sought by phone initially due to transport logistics. It also ensures better use of emergency resources should the diagnosis be the lesser of the two conditions. In this article, we provide a systematic approach to distinguish between preseptal cellulitis and orbital cellulitis at presentation, so that the patient can be managed appropriately.

Distinguishing between preseptal cellulitis and orbital cellulitis at presentation

The first step in the evaluation of the patient should include a comprehensive and detailed history of the presenting complaint. The clinician should enquire about the following:

Onset, duration – Both preseptal cellulitis and orbital cellulitis present acutely, usually within two to three days, although orbital cellulitis tends to progress rapidly, with worsening of symptoms over a short period of time. Preseptal cellulitis tends to be a slower progression.

Age – The age of the patient is important in the management of preseptal and orbital cellulitis. This is partly because circumstances can deteriorate rapidly in children. Preseptal cellulitis in a child needs special attention and close follow-up, as this may develop into orbital cellulitis due to the under-developed orbital septum.

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Past medical history – This is particularly important, as orbital cellulitis may be associated with sinus pathology. Therefore enquiries regarding history of sinusitis are relevant here. Recent history of trauma around the eye is also important, as a small cut can be the cause of preseptal cellulitis. Furthermore, preseptal cellulitis can also be associated with insect bites.
General health – This is an equally important aspect of history taking. Immunocompromised patients for any reasons are at increased risk of preseptal and orbital cellulitis. Diabetes is also a risk factor for orbital cellulitis, particularly mucormycosis infection of the orbit, which can be very aggressive [albeit quite rare] (1, 2).

A comprehensive ophthalmic examination should then be performed, including the following components:
Check visual acuity – Visual acuity should always be checked in all eye patients. This can be done using a Snellen chart to measure unaided vision, and those recorded with less than 6/9 vision should be tested with a pinhole occluder (to establish if reduced vision is due to a refractive element). If the orbit is involved with optic nerve compression, the visual acuity will be significantly reduced with no improvement with pinhole.
Check for relative afferent pupillary defect (RAPD) – The presence of RAPD signifies optic neuropathy, and in the case of orbital cellulitis, is due to compression of the optic nerve. A RAPD would not be expected with preseptal cellulitis.
Colour vision – This can be done with the Ishihara colour vision booklet. Reduced colour vision can be a feature of orbital cellulitis with optic nerve compression. In preseptal cellulitis, reduced colour vision is not a feature.
Confrontational visual fields – Visual fields may be constricted in orbital cellulitis, but should be normal in preseptal cellulitis. However, eyelid swelling may make it difficult to properly assess this.
Ocular motility – Eye movement can be subtly restricted in orbital cellulitis, with possible diplopia. Eye movement should be normal in preseptal cellulitis.
Temperature – Orbital cellulitis usually presents with pyrexia, whereas pyrexia is uncommon in preseptal cellulitis.
Unilateral proptosis – A late sign most simply assessed by the examiner looking down from above the patients head to identify an asymmetrical forward protrusion of the globe and surrounding lid tissue. Proptosis represents a mass effect in the defined volume of the orbital compartment and is associated with orbital cellulitis.

MANAGEMENT

Preseptal cellulitis

Preseptal cellulitis is defined by inflammation of the soft tissue and skin anterior to the orbital septum. A retrospective review of hospitalized patients found that skin lesions in children and dacryocystitis in adults were the most common in cases of preseptal cellulitis (3). Oral antibiotics are the first line of treatment of preseptal cellulitis. A seven-day course of co-amoxiclav or clarithromycin can be prescribed, as dictated by local protocol. Patients can be followed up and reviewed at the outpatient eye casualty within five days for adult cases. Marking the outline of the swelling can also help for further monitoring of symptoms.

In general, patients can be reassured and advised that symptoms should settle within three to four days. However, more severe cases may require admission for intravenous antibiotics (a clinical judgement call). Preseptal cellulitis is more common in children than adults. Sobol *et al* (4) reported that of 139 children admitted to hospital over a 10-year period with complications of sinusitis, 72% presented with preseptal cellulitis, 19% with orbital cellulitis and 9% with subperiosteal abscess. In children with preseptal cellulitis, hospital admission is required for intravenous antibiotics and close observation. A 15-year review of inpatient preseptal cellulitis by Chaudhry *et al* (5) showed that the most common systemic antibiotic regimens were cephalosporin and aminoglycoside. The study also revealed that of 104 patients admitted for preseptal cellulitis, 10 patients were readmitted with complications within two weeks to three months after discharge. It is also important for clinicians to be aware of late complications of preseptal cellulitis that require further treatment and can present up to six months following initial treatment. These include eyelid scarring, subacute lid abscesses, eyelid necrosis or inability to close eyelids completely. Obtaining a clinical diagnosis can be challenging in children due to a lack of cooperation for complete examination at the time of presentation. A computed tomography (CT) scan is recommended in the evaluation of children with suspected preseptal cellulitis in whom severe eyelid swelling prevents appropriate ophthalmic examination (6).

Orbital cellulitis

Orbital cellulitis is defined as a compartmental inflammation and infection of the deep orbital cavity structures behind the orbital septum, including orbital fat, extraocular muscles and paranasal sinuses. The findings of a retrospective case series of patients referred to a tertiary care eye centre suggest that untreated sinusitis and prior history of orbital trauma were the two major causes of orbital cellulitis (7). Orbital cellulitis is a medical emergency requiring admission. Delayed treatment can potentially lead to serious complications such as severe visual impairment, meningitis, brain abscess, cavernous sinus thrombosis, or even death (8).

Both children and adults with suspected orbital cellulitis should be referred to secondary care and subsequently admitted for a course of intravenous antibiotics and possibly blood cultures to evaluate bacteraemia (9, 10). Treatment regimens will be dictated by the local protocols or by advice from the local microbiologist, depending on the local trends in antibiotics sensitivity, as some communities may have specific flora with varied resistance profiles.

Previous studies have identified *Staphylococcus* and *Streptococcus* species as being the most common pathogens in orbital cellulitis (11, 12). In most cases, treatment regimens will

involve empiric coverage of such Gram-positive organisms. Moreover, commonly administered antibiotics to also cover Gram-negative and anaerobic organisms include third generation cephalosporins, metronidazole, ciprofloxacin and clindamycin (13). Initial management of orbital cellulitis also involves radio-imaging of the orbits, paranasal sinuses and head by CT scan. This will enable identification of disease extension into the orbit and evidence of sinus disease or orbital and subperiosteal abscesses. In addition, a nasal decongestant can be considered to promote sinus drainage in orbital cellulitis. The overall management of orbital cellulitis will require continued input from ophthalmologists and ear, nose and throat (ENT) specialists. Indications for surgery include signs of optic nerve involvement, orbital cellulitis refractory to medical treatment, orbital abscess on CT, gas within abscess space, concurrent chronic sinusitis and dental infection (14, 15).

The following Figure and Table summarise the differences between preseptal and orbital cellulitis.

In conclusion, we hope that this communication will alert colleagues, particularly those not involved in the field of ophthalmology, to the importance of making the distinction between preseptal and orbital cellulitis at presentation in order to refer patients appropriately and avoid potential complications.

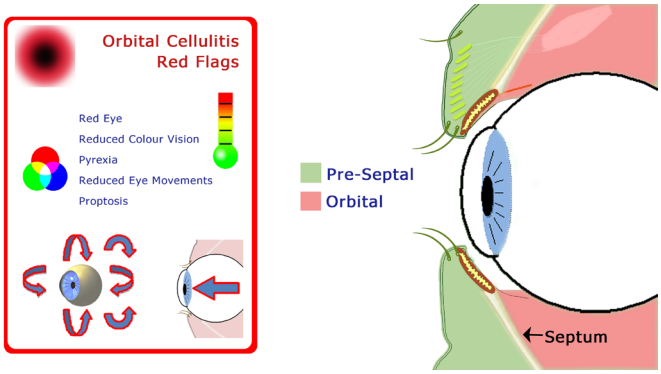

Figure: Red flags for orbital cellulitis and anatomical differences between preseptal cellulitis and orbital cellulitis.

Learning points:

- Preseptal cellulitis is an inflammation of the soft-tissue and skin anterior to the orbital septum and characterized by eyelid swelling, tenderness, redness and heat
- Orbital cellulitis is compartmental inflammation and infection of the deep orbital cavity structures behind the orbital septum, including orbital fat, extraocular muscles and paranasal sinuses
- Preseptal cellulitis is more common and less aggressive than orbital cellulitis
- Orbital cellulitis is a medical emergency requiring immediate management
- A thorough history taking and examination can help to distinguish between preseptal and orbital cellulitis
- The distinction between preseptal and orbital celluli tis and the prompt recognition of the latter can be potentially life-saving

Table: Differences between preseptal and orbital cellulitis

	Preseptal	Orbital
Presentation	Preceding minor trauma, chalazion, insect bite, sty, make-up entering eye	Preceding upper respiratory tract infection, sinusitis with unasal discharge, nasal congestion
Anatomy	Inflammation exclusively in the soft-tissue and skin anterior to orbital septum	Compartmental inflamation of the deep orbital cavity structures behind orbital septum *ie* orbital fat, extra-ocular muscles and paranasal sinuses, potentially meningitis
Source of infection	Innocuous trauma or skin break	Spread of paranasal sinus infection
Progression of infection	Acute onset, slow	Acute onset, rapid progression
Eye involvement	Nil	+++
Sight involving	No	Yes
Red eye	No	Yes
Symptoms	• Tender indurated oedematous hot red skin • Mild pain • Watering eye • Blurred vision (not objectively reduced)	• Pain • Headache • Diplopia • Reduced vision • Systemically unwell
Signs	• Conjunctivitis • Severely oedematous indurated lids with redness tenderness and skin cellulitis • Periorbital oedema potentially forcing eye closure • Source skin lesion/break/bite • Local lymphadenopathy	• Sinus tenderness • Pyrexia • Secondary ptosis • Reduced eye movements • Reduced visual field • Reduced colour vision • Proptosis • Relative afferent pupillary defect
Management	• Seven-day course of oral antibiotics *ie* co-amoxiclav/clarithromycin (as dictatedby local protocol) • Outpatient eye casualty review within five days • Consider outline marking skin • Advise patient should improve in three to four days	• Same day admission • IV antibiotics • Nasal decongestants • Computed tomography of head • ENT/ophthalmology joint care

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