Trust Guideline for the Management of Children with Periorbital Cellulitis

A Clinical Guideline

For use in:	Jenny Lind Paediatric Department
By:	Jenny Lind Paediatric Department staff
For:	Children (1 month - 16 years) presenting with the symptoms and signs of periorbital cellulitis
Divisions responsible for document:	Divisions 2 and 3
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Names and job titles of document authors:	Dr Vivek Kalra, Consultant Paediatrician, NNUH
Name of document author's Line Manager:	Dr Aravind Shastri
Job title of author's Line Manager:	Clinical Director
Supported by:	Mr Narman Puvanachandra (Ophthalmology), Mr Andy Bath (ENT), Dr Azeikah Fiaz (Radiology), Dr Ourania Kakisi (microbiology)
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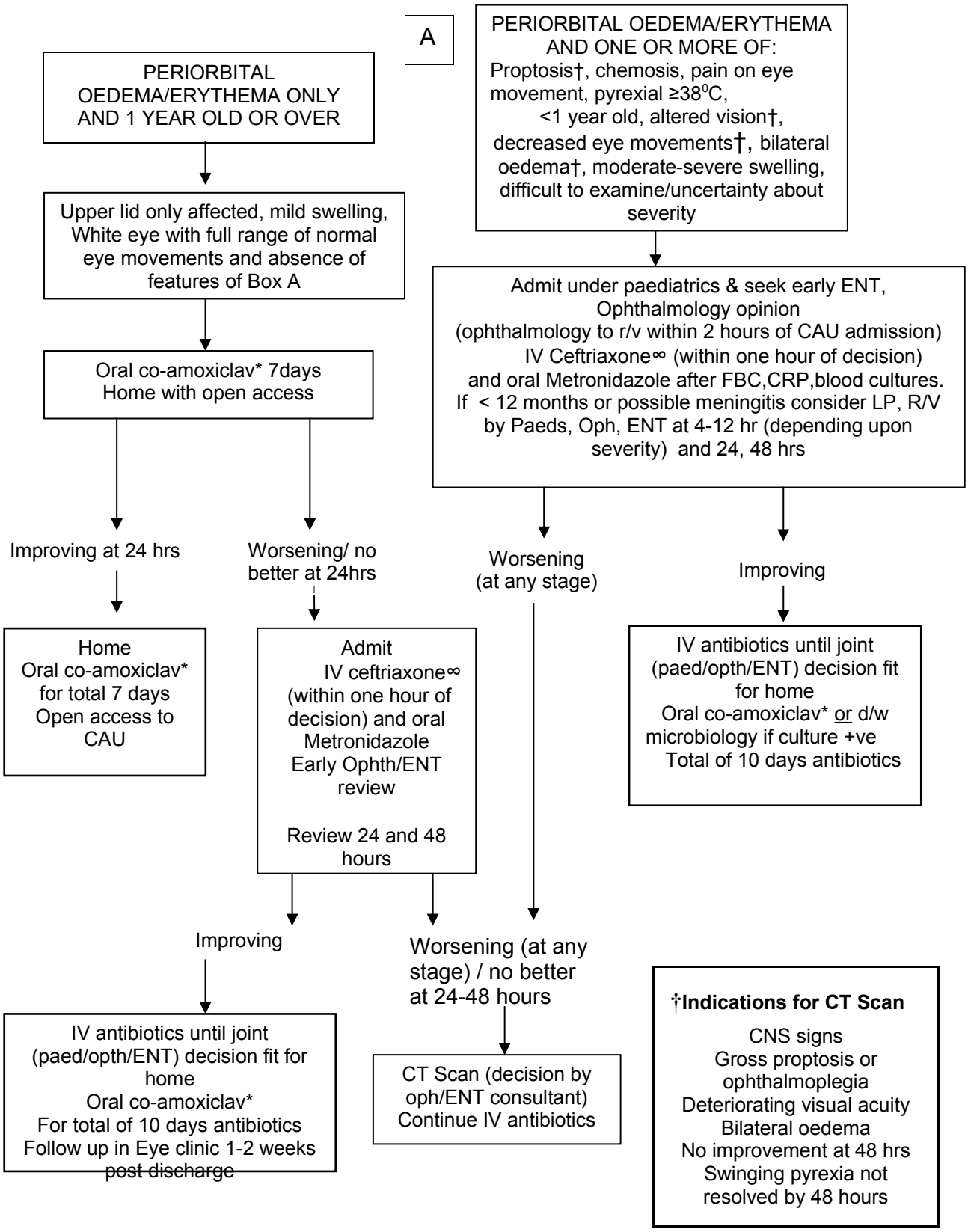
This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.

Quick Reference Guideline



*Clarithromycin (±metronidazole, see guidance below) in case of penicillin allergy
∞Vancomycin, gentamicin and metronidazole in true penicillin allergy (anaphylaxis)

Version and Document Control:

Version Number	Date of Update	Change Description	Author
4	20/10/2020	Updated in keeping with available evidence	Dr Vivek Kalra
4.1	21/01/2021	Minor amendments	Dr Vivek Kalra

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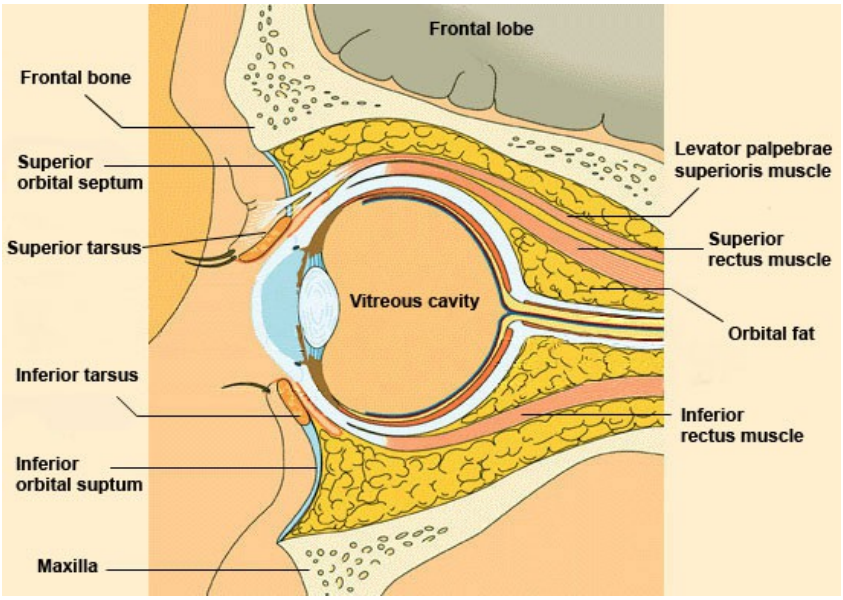
Background

Peri-orbital or pre-septal cellulitis is the infection of the skin and other soft tissues surrounding the eyes. Infection involving the orbit and its contents is usually referred as orbital cellulitis. In order to understand these terms better, it's important to first understand the anatomy of human eye.

'Orbital Septum' is a tough fibrous layer of fascia arising from the orbital rim. This is attached to the tarsal plates of the eyelids and provides a physical barrier to infection between the superficial structures of the face and the deep orbital structures. Infection in the pre-septal area is usually referred to as Peri-orbital or pre-septal cellulitis while in the post-septal region is referred to as Orbital Cellulitis.



Etiology and pathophysiology

Periorbital infection is a relatively common presentation in children[1-3]. Peri-orbital cellulitis is due to the local infection of the skin of the face which could be secondary to superficial infection of the eyelids such as dacrocystitis or a stye. It could also be secondary to an insect bite or a wound[5-6]. Commonest organisms are Streptococcus pyogenes, Staphylococcus epidermidis and Staph aureus.

Orbital cellulitis on the other hand is an ophthalmic emergency that can cause sight-threatening or life-threatening complications. It is usually a complication of the sinus disease, most commonly ethmoid sinusitis. It could also result from orbital trauma or less commonly via haematogenous spread.

An infection stemming from the ethmoid sinus is rapidly progressive, especially because the thin lamina papyracea is the only border between the ethmoid sinus and the orbit. The infection extends posterior to the septum, leading to the development of subperiosteal collections. This may exert a mass effect leading to local complications such as orbital nerve compression and can extend intracranially.[4]

The commonest organisms causing orbital cellulitis are Strep. Pyogenes, Strep pneumoniae, Staph aureus and Staph. Epidermidis. Hemophilus species is seen less frequently as a causative agent in post HIB immunisation era[7]. There are now increasing instances of methicillin-resistant Staphylococcus aureus (MRSA) causing orbital cellulitis.

Clinical assessment

Children who present with periorbital swelling and erythema require a focused history and thorough examination to determine if they are systemically well and if the infection is localised to the preseptal region or has extended beyond the orbital septum. [2,5,8,9] However, it's not always straight forward to differentiate between the two as both conditions can present with similar initial features.

History:

In many cases, there will be a history of sinusitis, URTI, trauma, infection from a nearby area or insect bites (see above- etiology and pathogenesis). Note for ophthalmic complaints (reduced vision, painful eye movements, onset of redness and swelling). Look for systemic symptoms like fever. Look out for features to suggest meningeal involvement like headache, reduced consciousness levels. Check Immunisation status and features to suggest comorbidities (like diabetes) or immunocompromised status.

Examination:

Peri-orbital cellulitis presents with periorbital erythema, edema and eyelid swelling. It is usually possible to open the eye sufficiently to examine it. Complaints are usually unilateral. Vision, globe motility and intraocular pressures are normal as the infection and inflammation are superficial and anterior to the periocular tissue with no involvement of the extraocular muscles. Pupils are normal, with no injected conjunctiva or sclera and no chemosis. The child is systemically well with no temperatures.

Orbital cellulitis also presents with periorbital erythema, edema and eyelid swelling. However, orbital cellulitis occurs after more extensive infection posterior to the orbital septum which could result in proptosis, limited and painful extraocular movement, ophthalmoplegia, chemosis, injected conjunctiva and sclera and reduced vision and loss of red colour perception. Pupils could be asymmetrically reactive to light with RAPD. The child may be systemically well but may show signs of systemic upset and fever.

If a child has any features suggestive of orbital cellulitis then treatment should be initiated and an urgent ophthalmology review requested. Children with orbital cellulitis are at risk of significant morbidity. In practice, it can be difficult to examine an eye that is swollen to the

point of being difficult to open. In these children, it is prudent to treat as suspected orbital cellulitis until proven otherwise.[10]

Furthermore it is important to differentiate periorbital cellulitis from allergic reactions and trauma without cellulitis. Consider severe bacterial conjunctivitis if inflammation started with yellow discharge and sticky eyelids or bilateral involvement and a history of contact with other people of conjunctivitis.

Investigations:

- A child with preseptal cellulitis who is systemically well may not require any investigations.
- If there is a high suspicion of orbital cellulitis or no improvement of symptoms after 24-48 hours of antibiotics, or in case of deteriorating clinical picture at any time, a contrast-enhanced CT orbits and sinuses should be performed [11] (as guided by the ENT and ophthalmology team). If the diagnosis is still unclear after a CT, patients should be treated as orbital cellulitis.
- Inability to force eyelids open by examiner (usually in severe eyelid swelling or marked proptosis) or previous episode of periorbital or orbital cellulitis are indications of early scan.
- For a child with orbital cellulitis and neurological deficit, MRI brain and orbits would be the gold standard,[1] as soft tissue disease including intracranial abscess and cavernous sinus thrombosis would be two key differentials; in practice, urgent MRI may be limited by availability and the need for sedation or general anaesthesia for scanning in children. CT brain, in addition to orbits and sinuses, would be appropriate in such instances.
- If there is a suspicion of sepsis or meningitis, then standard protocols for sepsis can be followed,[13] and investigations such as blood cultures, full blood count, C-reactive protein and lumbar puncture should be performed (see https://www. nice. org. uk/ guidance/ ng51/resources[14]). A full blood count will show elevated white cell count with left shift, but this does not distinguish orbital from preseptal cellulitis.
- Swabs for microscopy culture and sensitivity from conjunctiva, existing external or surgical wounds, nasopharynx or at surgery may subsequently guide antibiotic therapy.

Treatment:

The guideline assumes that patients will be seen by a paediatric doctor in the first instance. It therefore aims to give assistance in helping staff to determine which patients need admission, which teams to involve and when, and in making the difficult decision of when to, or not to, perform a CT scan.

- Children over 1 year of age with minimal swelling/erythema around eye, with absence of fever and no signs suggestive of orbital cellulitis (i.e. mild swelling with no ophthalmoplegia, no painful eye movements, absence of chemosis and conjunctival injection, no proptosis, normal vision and normal pupillary reflexes) could be treated with oral co-amoxiclav (clarithromycin for penicillin allergic patients) for 7 days. If in doubt or a complete examination is not feasible, please have a low threshold to admit the child and/or seek ophthalmology opinion.
- These children treated with oral antibiotics should be given open access to CAU for a week and parents should be advised to seek urgent medical attention in case of

lack of or no response (after 24 hours), pyrexia or worsening of symptoms (suggestive of orbital cellulitis) at any time.

- Children less than 1 year old, or any age group with any signs/symptoms of orbital cellulitis (ophthalmoplegia, painful eye movements, chemosis and conjunctival injection, proptosis, abnormal vision and abnormal pupillary reflexes, pyrexia), should be admitted and started on IV Ceftriaxone.(vancomycin, gentamicin and metronidazole in penicillin anaphylaxis)
- All these children should be reviewed by ophthalmology and ENT teams at the earliest possible. If the admission is out of hours and the clinical suspicion of orbital cellulitis is high, please update on-call team members of ophthalmology and ENT teams.
- Any child with moderate to extensive erythema/swelling around eyelids or if there is doubt as to severity of pre-spetal cellulitis, should also be admitted and treated as presumed orbital cellulitis with IV ceftriaxone (vancomycin, gentamicin and metronidazole in penicillin anaphylaxis).
- Metronidazole should be added in cases of orbital cellulitis or severe symptoms with sinusitis, or no response after 24 hours.
- IV Vancomycin should be considered where MRSA is suspected (previous MRSA, history of boils- discuss with microbiology if there is any doubt).
- In patients with inadequate Haemophilus influenzae type B (Hib) vaccination, treat as orbital cellulitis.

Obtain FBC, CRP and blood culture before starting IV antibiotics in all these cases.

Duration of antibiotics:

- A week for periorbital cellulitis.
- Children on IV antibiotics should be regularly reviewed by ENT and ophthalmology team. Consider ambulatory intravenous antibiotics as guided by the ophthalmology and ENT teams.[15] Once a joint decision is made to discharge, they should be sent home with oral co-amoxiclav (or clarithromycin and metronidazole for penicillin allergic patients) to finish a total of 10 days of antibiotics (including the IV course). Follow up to be arranged in eye clinic in 1-2 weeks (by ophthalmology team).

Children requiring parenteral antibiotics will initially require admission under the joint care of paediatrics and ophthalmology (plus ENT if there is orbital cellulitis).

Monitoring Compliance

To ensure that this document is compliant with the above standards any adverse outcomes will be entered onto Datix and reviewed by the Departmental Governance Team who will ensure that these are investigated and are discussed at relevant governance meetings to review the results and make recommendations for further action.

Summary of development and consultation process undertaken before registration and dissemination

This guideline was drafted by the authors listed above on behalf of the Department of Paediatrics following a review of the literature. It has been circulated in draft form to a

Consultant Ophthalmologists, ENT Surgeons, Microbiologist and Radiologists, as well as to the Consultant Paediatricians, for comments.

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