

MANAGEMENT OF ORBITAL CELLULITIS AND ORBITAL ABSCESS IN CHILDREN (including management of pre-septal cellulitis)

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Approving body	Relevant Directorate Governance Group Paediatric Infectious Diseases Group Drugs and Therapeutic Committee
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<p>Overall purpose of the guideline To provide recommendations to assist in the management of orbital cellulitis in children</p> <p>Principal target audience ENT, Ophthalmology, Paediatrics (for children), Imaging and Microbiology for optimal care for patients.</p> <p>Application The guideline applies to child patients.</p> <p>Scope The guideline applies to child patients.</p> <p>National Guidance incorporated n/a</p>
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DOCUMENT CONTROL AND HISTORY

Version No	Date Approved	Date of implementation	Next Review Date	Reason for change (e.g. full rewrite, amendment to reflect new legislation, updated flowchart, etc.)
1	November 2009	November 2009	November 2012	
2	July 2014	July 2014	July 2016	No changes, new format
3	November 2014	November 2014	November 2017	Amended to reflect management to children only.

Drugs marked in **red** contain penicillin and are contra-indicated in penicillin allergy; drugs marked in **orange** should be used with caution in penicillin allergy and avoided if there is any history of anaphylaxis to penicillin; drugs marked in **green** are safe in penicillin allergy

1.0 Introduction

Pre-septal cellulitis refers to soft tissue infection around the orbit. Orbital cellulitis refers to infection within the orbit, behind the orbital septum. It is potentially very dangerous as it can progress to form an abscess or cause cavernous sinus thrombosis.

Bacterial orbital cellulitis is a medical emergency that, if not treated urgently, may lead to blindness and even death. Acute sinusitis is the most common source of infection but trauma, lid infections or endogenous spread may also contribute.

An integrated multi-disciplinary strategy is key to successfully managing this disease. Close coordination between ENT, Ophthalmology, Paediatrics, Imaging and Microbiology is needed to ensure optimal care for these patients.

Any patient with suspected orbital cellulitis should receive the first dose of antibiotic intravenously at the earliest opportunity (before sending for scans etc.) and an ophthalmic assessment should be arranged as soon as practically possible.

2.0 Aim/Purpose

The aim of the guideline is to provide recommendations to assist in the management of pre-septal and orbital cellulitis in children.

3.0 Definitions

Orbital septum	This is a dense fibrous membrane that originates from the periosteum of the orbital rim peripherally fuses with the tarsal plates centrally and separates the orbital contents from the eyelids.
Orbital cellulitis	Orbital cellulitis is an extremely serious infectious process that directly or indirectly affects orbital contents behind the orbital septum.
Pre-septal cellulitis	This is a more common but less serious infection of the skin and soft tissues of the eyelids anterior to the orbital septum. Occasionally pre-septal cellulitis can progress to orbital cellulitis.

4.0 Pathophysiology

Three main mechanisms are recognised:

- 4.1 Spread from surrounding sinuses. Ethmoid sinuses are the most common source of infection followed by frontal sinus.
- 4.2 Direct injury to orbit
- 4.3 Endogenous spread in immuno-compromised patients

5.0 History and features of infection

5.1 History

Upper respiratory infection
Sinus disease/acute sinusitis
Recent orbital/periocular surgery or trauma
Infection in surrounding area
Dental extraction
Gum infection in infants

5.2 Features

5.2.1 Systemic features

Pyrexia (spiking)
Malaise

5.2.2 Ophthalmic features of orbital cellulitis

Eyelid swelling and redness plus two additional signs:
Conjunctival injection and chemosis (jelly like swelling)
Pain
Proptosis
Restricted eye movement
Reduced vision
Relative afferent papillary defect (RAPD)
Tense orbit

6.0 Criteria for admission

6.1 Indications for admission

- The majority of patients with periorbital swelling (see section 6.2 below)
- Diplopia
- Ophthalmoplegia
- Proptosis
- Reduced visual acuity
- Reduced light reflexes or swinging light test
- Patients in whom it is not possible to examine the eye
- CNS signs or symptoms
- Patients who are septic or systemically unwell

All children with a clinical diagnosis of orbital cellulitis **MUST** be admitted and an ophthalmic opinion sought as soon as possible.

If orbital cellulitis cannot be ruled out in patients who are difficult to examine (e.g. young children), admit and start intravenous antibiotics immediately.

Children are admitted under the joint care of paediatrics / ENT / ophthalmology. The role of the paediatrician is to co-ordinate care, monitor the general health of the patient and prescribe and administer antibiotics. For antibiotic doses, please refer to the most recent version of the BNF for Children.

6.2 Patients who may be suitable for discharge (those with pre-septal cellulitis only)

The only patient suitable for discharge is someone with minimal upper lid oedema, normal eye examination and with none of the above.

Co-amoxiclav has a suitable spectrum of activity for these patients and an oral course should be for 10 days.

If penicillin allergic give oral **clindamycin**.

The parents of such children should be provided with following information:

- Child has been diagnosed as having peri-orbital cellulitis, an infection around the eye.
- Mild infections can be safely treated at home with antibiotics given by mouth.
- Infections can get worse and potentially become very serious or threaten vision
- **If antibiotics by mouth do not start to improve the swelling within 24 hours, the child will need to come into hospital for intravenous antibiotics.**
- It is important that he / she completes the course of antibiotics provided by the doctor.
- If he / she becomes more unwell with headache, vomiting, increased
- drowsiness, worsening swelling or eye closing over, then the child should be brought to the Emergency Department immediately.
- GP review in 48 hours if improvement continues at home.

7.0 Management

7.1 Immediate Management

- IV access, FBC, CRP
- Consider microbiological investigations if clinically appropriate.
- All patients should be cannulated and given a first dose of intravenous antibiotics immediately (see section 7.3 for further details)
 - If peri-orbital cellulitis only then first-line antibiotic treatment is with intravenous **co-amoxiclav** or **clindamycin** if penicillin allergic)
 - If evidence of intracranial extension, give **ceftriaxone** plus **metronidazole** intravenously; give **clindamycin** intravenously if penicillin allergic (metronidazole not required).
- Urgent ophthalmology review
- Monitor optic nerve function
- CT scan with contrast to be arranged after discussion/review by ophthalmology team (indications below)
- ENT review may be required after CT scan performed

7.2 CT Scan

A majority of very young children respond to conservative management and do not need sinus or abscess drainage unless vision is threatened. A CT scan may be delayed for 18 - 24 hours to observe response to therapy when optic nerve is not compromised.

Indications for CT

- CNS symptoms/signs, drowsiness, seizure, cranial nerve lesion,
- headache and vomiting
- Diplopia
- Ophthalmoplegia
- Deteriorating acuity or colour vision
- Abnormal pupillary reflexes
- Proptosis
- Unable to evaluate vision
- Unable to open eye
- Bilateral pre-septal oedema (? Cavernous sinus thrombosis)
- No improvement or deterioration at 24-36 hours of IV antibiotic management
- Swinging pyrexia **not** resolving within 36 hours

7.3 Antibiotic therapy

The majority of children (under the age of 9) develop orbital cellulitis secondary to ethmoidal sinusitis/sub-periosteal abscess following an upper respiratory infection. The infection tends to be due to a single aerobic organism e.g. *Streptococcus pneumoniae*, *Moraxella catarrhalis* and *Haemophilus influenzae* (under the age of 5). Therefore metronidazole should only be given based on culture results or if polymicrobial infection is suspected (history of chronic sinus disease, trauma etc.).

Children who are admitted require **co-amoxiclav** intravenously or **clindamycin** if penicillin allergic (maximum dose as per BNFC). Once they are fit for discharge home a total of 10 days of antibiotics should be completed (inclusive of intravenous course length). The appropriate choice would be **co-amoxiclav**, or **clindamycin** if penicillin allergic (maximum dose as per BNFC)

Orbital cellulitis

Ceftriaxone (maximum dose as per BNF for children) +/- **metronidazole** intravenously.

Penicillin allergic: **clindamycin** intravenously (clindamycin has good anaerobic activity, metronidazole is unnecessary).

IV to oral switch

Antibiotics can be switched to oral once the patient is improving and has been afebrile for 24 hours. Switch to **co-amoxiclav** by mouth for 5-7 days.

Penicillin allergic: **clindamycin** orally.

8. Choice of surgery

Drainage of a sub-periosteal abscess is urgently required except in very young children, where response to intravenous antibiotic therapy can be monitored for 24 hours.

The main surgical objective is to drain the pus adequately, reduce intra-orbital tension and obtain samples for culture. Send samples of pus rather than pus swabs to microbiology.

9. Subsequent management

If the patient improves, remains afebrile and with a reduction in orbital inflammation, antibiotics may be switched to oral after 24 hours.

If there is no improvement, consider the need for a repeat CT scan. Discuss the patient with microbiology in case the antibiotic regimen needs to be modified. Consider an oculoplastic/orbit opinion. Consider surgical exploration or biopsy.

10. Implementation

A copy of the guidelines will be made available on the intranet and the Microguide App.

11. References

McKiniley SH, Yen MT, Miller AM, Yen KG. Microbiology of Pediatric orbital cellulitis. *Am J Ophthalmol.* 2007;144:479-501

Starkey CR, Steel RW. Management of orbital cellulitis. *Pediatr Infect Dis J.* 2001;20:1002-5

Ryan JT, Preciado DA, Bauman N et al. Management of pediatric orbital cellulitis in patients with radiographic findings of subperiosteal abscess. *Otolaryngol Head Neck Surg.* 2009;140:907-11

Brook I, Friedman E M, Rodriguez W J, Controni G. Complications of Sinusitis in Children. *Paediatrics* 1980; 66: 568-572

Chandler JR, Langenbrunner DJ, Stevens ER. The Pathogenesis of Orbital Complications in Acute Sinusitis. *Laryngoscope* 1970; 80: 1414-1428

Davis J P, Stearns M P. Orbital Complications of Sinusitis: Avoid Delays in Diagnosis. *Postgraduate Med J* 1994; 70: 108-110.

Howe L, Jones NS. Guidelines for the management of pre-septal cellulitis/abscess. *Clin Otolaryngol* 2004; 29:725-8.

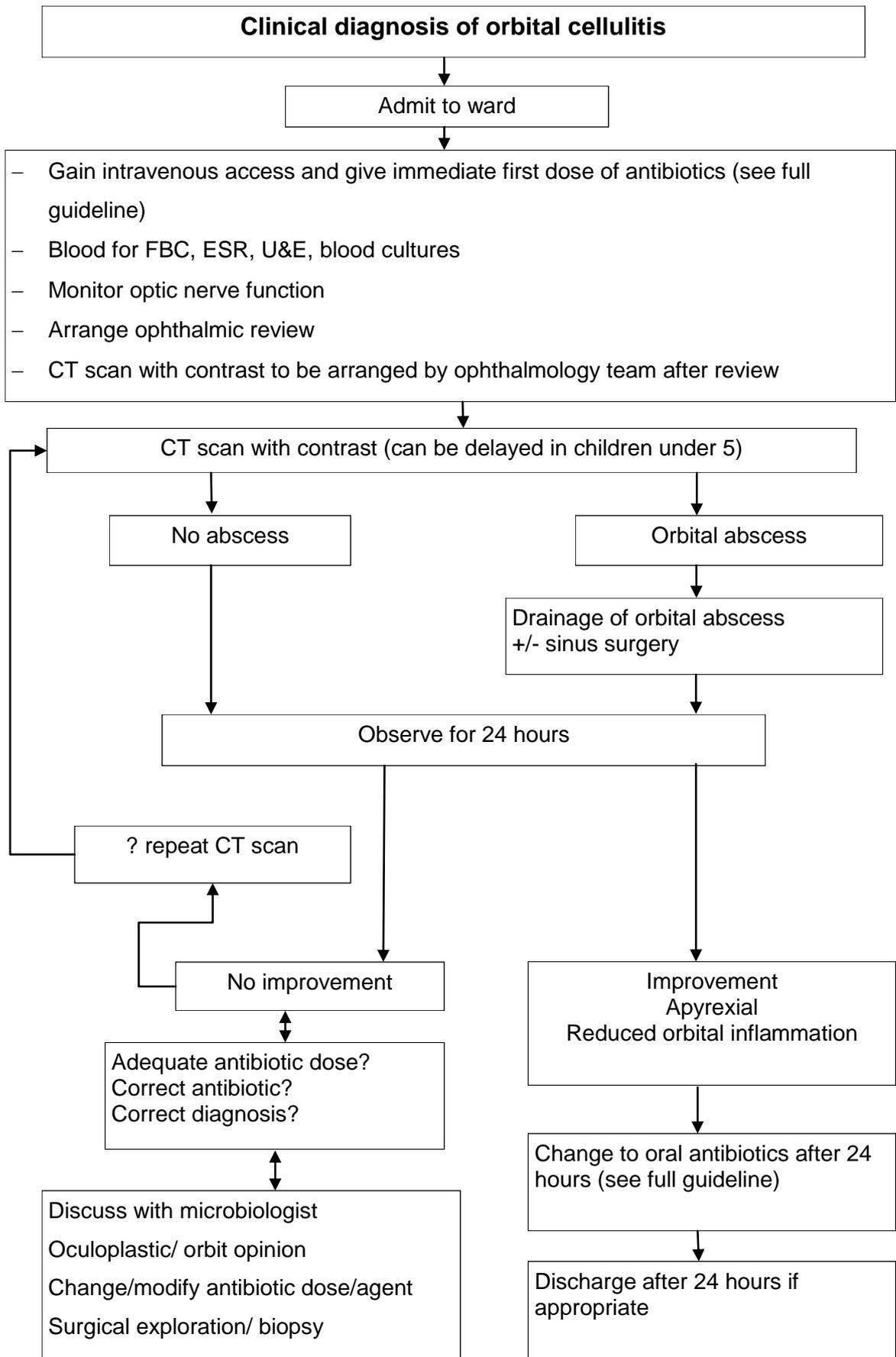
Rubin S E, Rubin L G, Zito J, Goldstein M N, Eng C. Medical Management of Subperiosteal Abscess in Children. *J Pediatr Ophthalmol Strabismus* 1989; 26: 21-26.

Schramm Jr V L, Curtin H D. Evaluation of Orbital Cellulitis and Results of Treatment. *Laryngoscope* 1982; 92: 732-738.

Uzcategui N, Warman R, Simth A, Howard C W. Clinical Practice Guidelines for the Management of Orbital Cellulitis. *J Pediatr Ophthalmol Strabismus* 1998; 35: 73-79

Wagenmann M, Naclerio R. Complications of Sinusitis. *J Allergy Clin Immunol* 1992; 90: 552-4.

Wald E R, Pang D, Milmore G J, Schramm V L. Sinusitis and its Complications in a Paediatric Patient. *Paed Clin N Am* 1981; 28(4):777-796.



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