A Swollen Eye: Differentiating Periorbital from Orbital Cellulitis

A Guided Clinical Encounter Through Diagnosis and Management

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Two Diagnoses, One Presentation. A Critical Distinction.

Periorbital Cellulitis

An infection of the eyelids and surrounding skin, anterior to the orbital septum (preseptal).

Prognosis
A common paediatric condition that can often be treated with oral antibiotics in a well child if follow-up is assured.

Orbital Cellulitis

An infection within the orbit itself, posterior to the orbital septum (postseptal).

Prognosis
A surgical emergency with serious complications, including vision loss, cavernous sinus thrombosis, and intracranial infection.

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The Case Begins: A 12-Year-Old with a Swollen Eye

Patient Profile

Patient: 12-year-old girl.
History: One-day history of left-sided periorbital swelling.
Background: Six weeks of intermittent cough, coryzal symptoms, and left frontal headache.

Awaiting otolaryngologist review.

Initial Findings (Emergency Department)

Appeared well, afebrile.
Moderate left periorbital swelling.
Crucially: No ophthalmoplegia, no proptosis, **and no pain** on eye movement.

Initial Labs

White Cell Count (WCC): 25.1 x 10^9/L (raised).
C-reactive Protein (CRP): 59 mg/L (elevated).

Initial Diagnosis: Periorbital Cellulitis.
Initial Plan: Admit to ward, commence intravenous antibiotics.

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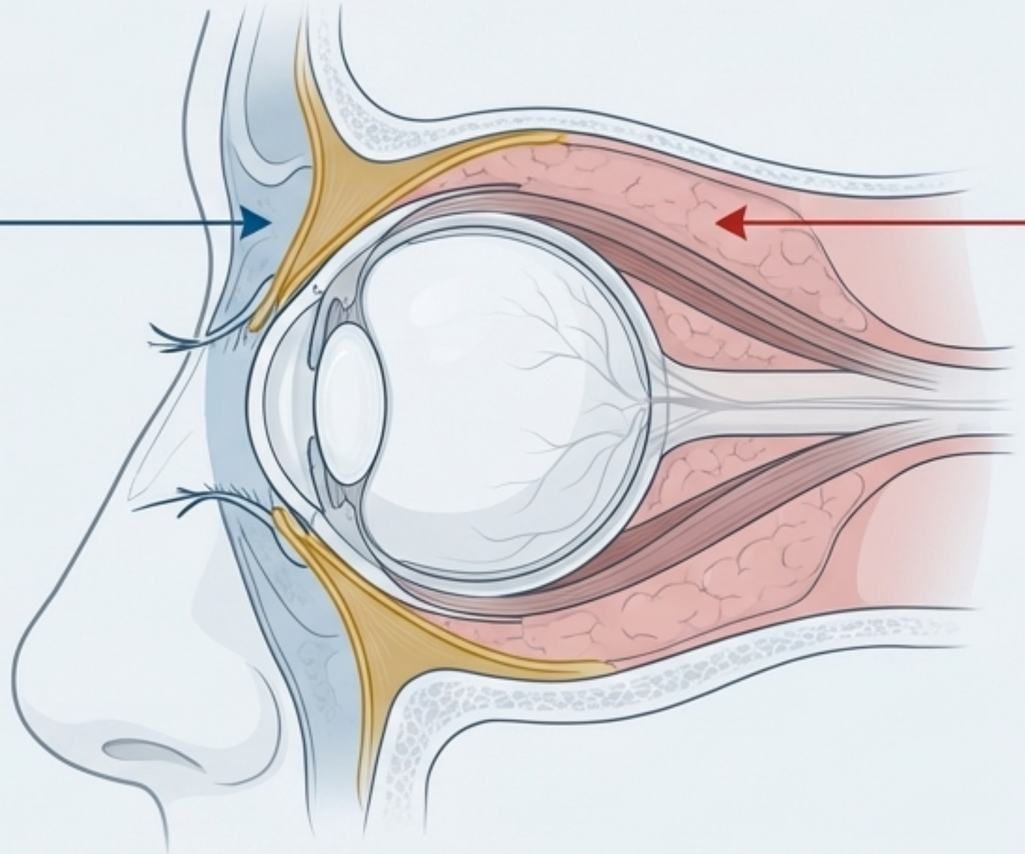
CLINICAL DEEP DIVE: The Anatomical Divide

Everything Depends on the Orbital Septum



Preseptal Space

This is the location of Periorbital Cellulitis. Includes the eyelids and surrounding skin.

Postseptal Space (The Orbit)

This is the location of Orbital Cellulitis. Includes the globe, extraocular muscles, and optic nerve.

Periorbital and orbital cellulitis are distinct clinical diseases. The orbital septum, a membranous sheet, is the key anatomical landmark separating the superficial eyelid structures from the orbit itself

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Understanding the Initial Diagnosis: Periorbital Cellulitis

Definition:** An infection of the eyelid and other tissues anterior to the orbital septum.

Common Origins


Sinusitis


Local trauma


Facial or dental procedures


Insect bites


Impetigo


Conjunctivitis and chalazion

Common Causative Organisms

Streptococcus pneumoniae

Staphylococcus aureus

Streptococcus pyogenes

Staphylococcus epidermidis

Haemophilus species

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The Management Spectrum for Periorbital Cellulitis

Mild

Criteria	Age >3 months, afebrile, can fully open eye, normal vision and eye movements.
Action	Can be managed in the community with oral antibiotics (e.g., Cefalexin).
Follow-up	Essential medical review within 24 hours to ensure no progression.

Moderate

Criteria	Patient does not meet all 'mild' criteria but lacks red flags for orbital cellulitis.
Action	Inpatient management (or Hospital In The Home) with IV antibiotics (e.g., Cefazolin or Ceftriaxone).
Follow-up	Switch to oral antibiotics once improving (usually 1—2 days).

Severe

Criteria	Significant illness or concern for progression.
Action	Manage as per orbital cellulitis *(see later slides)*.

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The Following Morning: The Clinical Picture Changes

Patient Status Update

- Periorbital swelling and erythema: **Unchanged**.

New, Alarming Signs

- **Ophthalmoplegia**: Impaired eye movement ability.
- **Pain on left lateral gaze**.

Reassuring (but not sufficient) Signs

- No diplopia (double vision).
- No proptosis.
- Visual acuity and red colour perception remain normal.

Is this still just periorbital cellulitis?

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Recognizing the Red Flags of Orbital Cellulitis

Key Indicators Demanding Urgent Reassessment:

- **Painful or restricted eye movements** (Ophthalmoplegia)
- **Proptosis** (Globe is pushed forward)
- **Visual Impairment:**
  - Reduced acuity
  - Diplopia (double vision)
  - Relative afferent pupil defect
  - Impaired colour perception (especially red)
- Severe **headache** or features of intracranial involvement

Case Connection: Our patient has now developed two key red flags: painful and restricted eye movements.

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The Definitive Comparison: Periorbital vs. Orbital Cellulitis

Feature	Periorbital Cellulitis (Preseptal)	Orbital Cellulitis (Postseptal)
Location	Eyelid & skin	Within the orbit
Eyelid Swelling & Redness	✔ Present	✔ Present
Proptosis	✘ Absent	✔ Often Present
Eye Movements	✔ Normal & Painless	✘ Painful & Restricted
Visual Acuity	✔ Normal	✘ May be Reduced
Pupillary Response	✔ Normal	✘ May have RAPD
Systemic Signs	May have low-grade fever	Often high fever, appears more unwell
Urgency	Treat promptly	SURGICAL EMERGENCY

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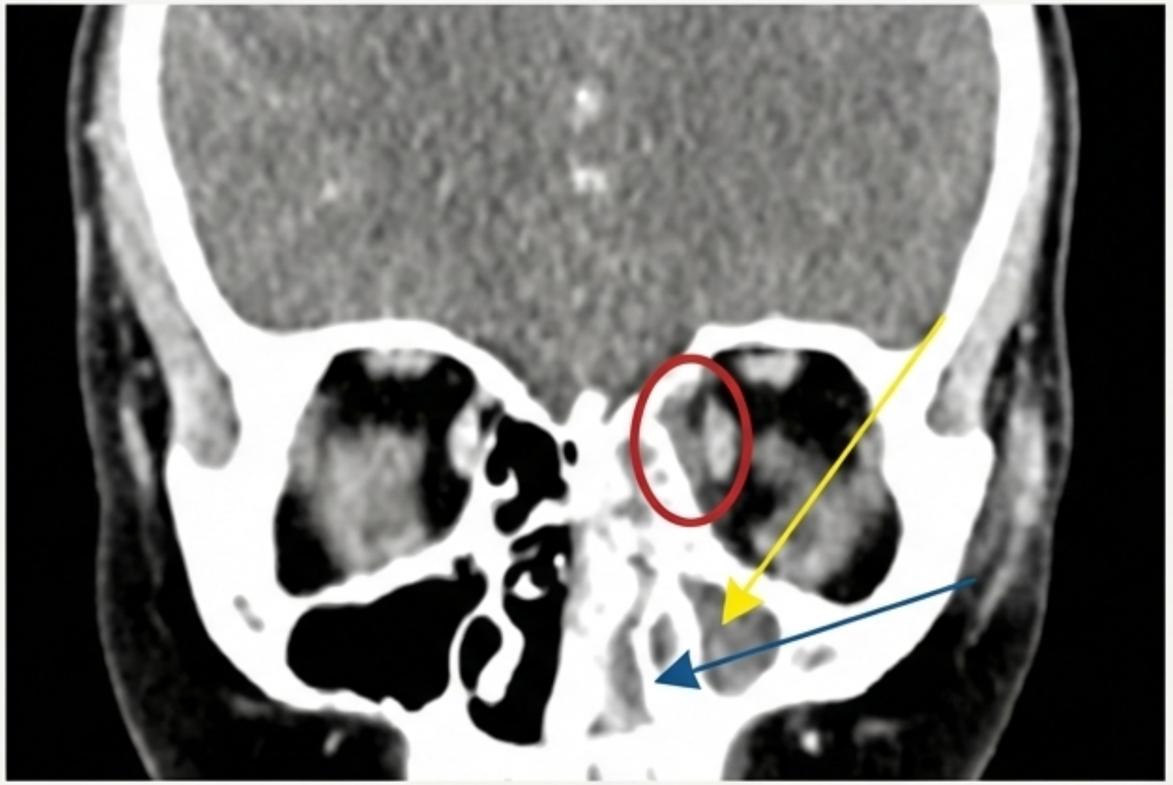
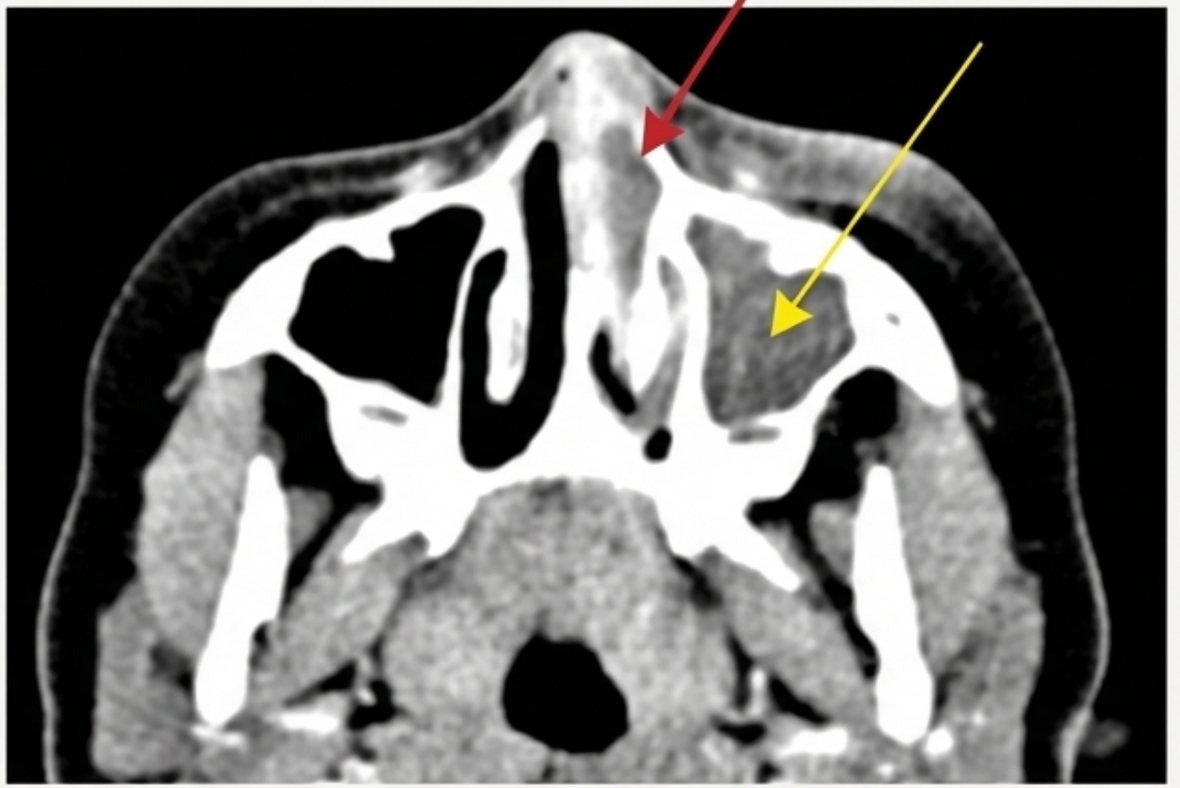
The CT Scan Confirms Orbital Cellulitis



Coronal View: Post-septal stranding with thickening adjacent to the lamina papyracea (early abscess; circled) with maxillary sinus (yellow arrow) and ethmoid sinus (blue arrow) opacification.



Axial View: Subperiosteal abscess in the anterior left nasal canal (red arrow) and opacification of maxillary sinus (yellow arrow).

Summary of Findings

The scan revealed orbital cellulitis, a left nasal canal subperiosteal abscess, and complete opacification of the left maxillary, ethmoid, and frontal sinuses.

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Emergency Protocol: Managing Confirmed Orbital Cellulitis

1. Admission

Patient requires immediate hospital admission.

2. Fasting

Keep patient fasted until the need for surgery is clarified.

3. Urgent Consultation

Seek ENT and Ophthalmology advice urgently.

4. Imaging

(Already performed) Urgent contrast-enhanced CT of orbits, sinuses +/- brain is the standard.

5. Investigations

- Full Blood Examination (FBE) & Blood Culture.

⚠ **Contraindication:** Lumbar puncture is contraindicated due to risk of raised intracranial pressure.

6. Antibiotics

Commence broad-spectrum IV antibiotics immediately.

7. Underlying Cause

Treat underlying sinus disease (e.g., nasal decongestants), guided by ENT.

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The Antimicrobial Strategy

Condition	Recommended IV Therapy	Typical Oral Switch	Total Duration
Orbital Cellulitis	**3rd Gen Cephalosporin:** • Cefotaxime 50 mg/kg IV 6-hourly OR • **Ceftriaxone** 100 mg/kg IV daily *(Add Vancomycin if MRSA suspected)*	**Amoxicillin with clavulanic acid**	**10–14 days**
Severe Periorbital Cellulitis	(As per Orbital Cellulitis)	(As per Orbital Cellulitis)	**7–10 days**
Moderate Periorbital Cellulitis	**Cefazolin** 50 mg/kg IV 8-hourly OR **Ceftriaxone** 50 mg/kg IV daily (for HITH)	**Cefalexin** OR **Cefuroxime**	**7–10 days**
Mild Periorbital Cellulitis	*Not Applicable*	**Cefalexin** 20 mg/kg oral TDS OR **Cefuroxime** (age-based dose)	**7–10 days**

Recommendations may vary. Always refer to local antimicrobial susceptibility patterns and guidelines.

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Case Resolution: From Diagnosis to Discharge

Transfer & IV Therapy

Patient transferred and continued on IV antibiotics.

Culture Results

Blood cultures identify Streptococcus milleri. Antibiotics are rationalized.

Conservative Management

Managed conservatively for two days with no improvement.

Surgical Intervention

The decision is made to operate. The patient undergoes drainage of the left nasal and orbital subperiosteal abscesses.

Outcome

Marked improvement in symptoms post-operatively.

Discharge

Discharged from hospital on Day 6 post-op with a three-week course of oral amoxicillin.

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When to Consult, When to Transfer

Consider Consultation with Paediatric Team When...

- Orbital cellulitis is suspected.
- Moderate-severe periorbital cellulitis is present.
- There is no improvement or deterioration after 24–48 hours of therapy.

Consider Transfer to a Tertiary Centre When...

- Severe periorbital cellulitis or confirmed orbital cellulitis is present.
- You suspect intracranial involvement (altered conscious state, seizures, focal neurological signs).
- The child requires care above the level of comfort of the local hospital.

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Three Core Principles in Practice

1 

Assess for the Red Flags

A swollen eye is not enough. Systematically check for proptosis, painful/restricted eye movements, and changes in vision. These are the signs that separate the urgent from the routine.

2 

Differentiate Preseptal from Postseptal

Use the orbital septum as your mental landmark. Mild periorbital cellulitis can often be managed with oral antibiotics and close follow-up. Any suspicion of postseptal involvement changes the entire management pathway.

3 

Escalate Immediately

Orbital cellulitis is a vision- and life-threatening emergency. Do not delay. Suspected cases require immediate hospital referral, urgent specialist consultation (ENT & Ophthalmology), and imaging.

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