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NOT JUST ANOTHER SWOLLEN EYE: UNMASKING FRONTAL SINUSITIS IN AN ADOLESCENT WITH ORBITAL CELLULITIS

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ABSTRACT

Background: Orbital cellulitis is a serious ophthalmic condition commonly linked to contiguous ethmoid sinus infections. In adolescents, frontal sinusitis is a less recognized source due to delayed development. This case report highlights the diagnostic challenge posed by incomplete resolution of orbital symptoms in a teenager and the importance of early imaging. **Case Presentation:** A 17-year-old girl presented with acute, painless right upper eyelid swelling resulting in complete eye closure. At this stage, ocular examination could not be performed due to the lid edema. She had a history of nasal congestion and mild cold approximately 1.5 months ago, which had resolved, but a persistent dull occipital headache continued over the past month. She was treated empirically for orbital cellulitis with oral antibiotics and anti-inflammatory agents. Although swelling reduced, ptosis persisted. Imaging revealed frontal sinusitis with mild ethmoid and maxillary involvement. A revised multidisciplinary approach, including corticosteroids and ENT-guided treatment, led to complete resolution. **Conclusion:** Persistent ptosis following partial improvement in orbital cellulitis should raise suspicion of atypical sinus involvement. Frontal sinusitis, although rare in adolescents, must be considered. Early imaging and ENT collaboration play a key role in successful recovery.

KEYWORDS : Orbital Cellulitis, Frontal Sinusitis, Adolescent, Ptosis, Paranasal Sinus Imaging

INTRODUCTION

Orbital cellulitis is a potentially sight-threatening condition characterized by infection of the tissues posterior to the orbital septum. It commonly presents with signs such as eyelid swelling, pain, proptosis, impaired ocular motility, and in severe cases, visual loss. In children and adolescents, it is most frequently a complication of adjacent sinusitis, particularly involving the ethmoid sinus, due to the thin lamina papyracea that forms a natural anatomical passage for infection .[1]

While ethmoid sinusitis accounts for the majority of cases in the pediatric age group, involvement of other sinuses such as the frontal or maxillary sinuses is less common. This is especially true for the frontal sinus, which is typically underdeveloped until the later teenage years. [2] As a result, frontal sinusitis as an isolated cause of orbital cellulitis is rarely suspected and often underdiagnosed in this population.

Timely diagnosis of orbital cellulitis is essential due to the risk of complications such as subperiosteal abscess, orbital abscess, cavernous sinus thrombosis, meningitis, and even permanent visual impairment. Initial diagnosis is often clinical; however, in cases that fail to respond adequately to standard therapy, cross-sectional imaging (such as CT) plays a critical role in identifying atypical pathology or deeper sinus involvement. [3]

This case describes a 17-year-old female with orbital cellulitis secondary to frontal sinusitis — a rare presentation in adolescence. The case emphasizes the diagnostic value of clinical suspicion, the utility of imaging when the course is atypical, and the need for multidisciplinary collaboration to prevent complications and achieve favorable outcomes.

Case Presentation

A 17-year-old previously healthy female presented to the ophthalmology outpatient department with complaints of sudden, painless swelling of the right upper eyelid for one day, resulting in complete closure of the eye. Due to the severity of edema, ocular examination was not possible at the initial visit. She had a history of nasal congestion and a mild cold approximately 1.5 months prior, which had resolved spontaneously. However, she had been experiencing a persistent, dull occipital headache for the past month. There was no history of fever, trauma, insect bite, or visual disturbances.

Based on clinical findings, a provisional diagnosis of orbital cellulitis was made. Empirical treatment was initiated with oral amoxicillin–clavulanic acid 625 mg twice daily, along with a diclofenac-paracetamol combination and once-daily oral levocetirizine.She was advised to return for follow-up in three days.

At the Day 3 follow-up, the swelling had partially reduced, allowing a complete ocular examination. Visual acuity was 6/6 in both eyes. The right eye showed residual eyelid edema, mechanical ptosis, mild conjunctival congestion, and upper tarsal papillae. There was no proptosis, and extraocular movements were full and painless. Fundus examination revealed a healthy disc and retina. The left eye was unremarkable.

Since the eyelid swelling had not fully resolved and ptosis persisted, oral clindamycin 150 mg twice daily was added to cover anaerobic and resistant gram-positive organisms. For conjunctival inflammation and papillae, topical therapy with moxifloxacin-loteprednol combination, olopatadine, and lubricating drops was prescribed.

Despite compliance with therapy, ptosis remained unchanged after an additional five days. An X-ray of the paranasal sinuses revealed opacification of the right frontal sinus. This was followed by a CT scan of the paranasal sinuses (axial and coronal views), which confirmed frontal sinusitis with associated minimal mucosal thickening in the right ethmoid and maxillary sinuses.

An ENT consultation was sought, following which the patient was started on a revised regimen that included oral corticosteroids (deflazacort), nasal decongestants, and continuation of antibiotics. This multidisciplinary approach led to a complete resolution of the ptosis and remaining symptoms over the subsequent 10 days.

Findings in table 1 are based on examination during Day 3 follow-up, when lid opening was possible.

Ocular Examination Table

Table 1. Ocular Examination Findings on Day 3 Follow-up.

Parameter	Right Eye	Left Eye
Visual acuity	6/6	6/6
Eyelids	Edematous	Normal
Conjunctiva	Congestion with papillae	Clear
Extraocular Movements	Full, pain-free	Full
Proptosis	Absent	Absent
Pupils	Normal, no RAPD	Normal
Fundus	Normal	Normal

Figure 1. Right Eye Showing Mild Ptosis on Day 10 Before ENT Intervention. (Published with Patient Consent.)

DISCUSSION

This case highlights the diagnostic challenges of orbital cellulitis in adolescents when typical sinogenic causes, such as ethmoidal infection, are absent or partially treated. In adolescents, the frontal sinus typically completes development after the age of 15, making it a less frequent source of orbital spread. [4] However, its involvement should not be overlooked in cases where symptoms persist despite appropriate antibiotics.

Persistent ptosis in this case was a key clinical clue indicating unresolved or deeper pathology. The decision to proceed with imaging led to identification of frontal sinusitis, which had not been suspected initially. CT scanning remains the gold standard for evaluating orbital cellulitis and its complications, including subperiosteal abscesses or sinus thromboses. [5]

Oral corticosteroids can be beneficial in non-abscess orbital cellulitis when inflammation is persistent and imaging rules out fungal or suppurative causes. In our patient, systemic steroids combined with ENT-guided sinus therapy played a critical role in achieving full resolution. Similar cases in literature support this multi-pronged approach in sinus-origin orbital inflammation. [6]

A limitation in this case is that a clinical photograph was not obtained during the peak of lid swelling due to complete eye closure and logistical challenges at initial presentation. However, follow-up documentation and resolution outcomes provide important insights into the diagnostic pathway and therapeutic response.

CONCLUSION

Frontal sinusitis, though uncommon in adolescents, can present as orbital cellulitis and may be missed if imaging is delayed. Lack of expected clinical improvement should prompt reconsideration of the underlying source and the need for CT imaging. Early diagnosis and ENT-guided therapy, including corticosteroids and decongestants, can lead to complete recovery and prevent vision-threatening complications.

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