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BEYOND THE EYE: MANAGING A CASE OF PEDIATRIC ORBITAL CELLULITIS

Otorhinolaryngology

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ABSTRACT

Background: Orbital cellulitis is a serious ophthalmologic emergency, most commonly arising from acute bacterial sinusitis in the pediatric population. Prompt diagnosis and a multi-modal management strategy are critical to prevent vision-threatening and life-threatening complications such as orbital abscess, cavernous sinus thrombosis, and meningitis. **Case Presentation:** We present the case of a 4-year-old child who presented with a 2-day history of left periorbital swelling, fever, and nasal discharge. Examination revealed left exophthalmos and restricted ocular movements with preserved vision. Imaging with CT and MRI confirmed left pansinusitis and orbital cellulitis with proptosis. Due to the severity of symptoms and evidence of orbital involvement, the patient underwent emergency Functional Endoscopic Sinus Surgery (FESS) with orbital decompression. Intraoperatively, purulent discharge was noted and evacuated from the ethmoid sinuses and orbit. Culture identified Methicillin-resistant Staphylococcus aureus (MRSA), prompting targeted antibiotic therapy with intravenous Linezolid. The patient showed significant improvement by post-operative day 4, with complete resolution of exophthalmos and restoration of ocular motility by day 10. **Conclusion:** This case underscores the critical role of timely imaging and a low threshold for surgical intervention in pediatric orbital cellulitis with orbital involvement. It highlights the emerging prevalence of MRSA as a pathogen and the importance of culture-directed antibiotic therapy. A collaborative approach between ophthalmology and otorhinolaryngology is essential for optimal outcomes in managing this severe infection.

KEYWORDS

Orbital cellulitis, Pediatrics, Functional Endoscopic Sinus Surgery (FESS), Orbital decompression, Methicillin-resistant Staphylococcus aureus (MRSA), Sinusitis, Complications, Management.

INTRODUCTION

Orbital cellulitis is an infective process involving the tissues located posterior to the orbital septum. It represents a sight- and potentially life-threatening complication, most frequently observed in the pediatric population. The most common etiology is the direct extension of infection from the paranasal sinuses, particularly the ethmoid sinuses, due to their thin medial wall (lamina papyracea) and valveless venous connections [1].

The Chandler classification system stratifies orbital complications of sinusitis into five groups, guiding management decisions: (I) preseptal cellulitis, (II) orbital cellulitis, (III) subperiosteal abscess, (IV) orbital abscess, and (V) cavernous sinus thrombosis [2]. Cases with evidence of abscess formation, significant proptosis, ophthalmoplegia, or vision loss (Chandler III-V) often necessitate urgent surgical intervention alongside broad-spectrum intravenous antibiotics [3].

We report a case of a young child with advanced orbital cellulitis secondary to pansinusitis, successfully managed with emergency surgical drainage and culture-directed medical therapy. This case exemplifies the modern principles of managing this serious condition.

Case Report

A previously healthy 4-year-old male child was brought to the emergency department by his parents with complaints of progressive swelling and redness of the left eyelid, high-grade fever, and purulent left nasal discharge for two days.

On examination, the child was febrile (38.8°C) and irritable. Ocular examination revealed significant left-sided periorbital edema and erythema. Notably, left exophthalmos was present. Visual acuity, assessed via child-friendly methods, was normal. However, examination of ocular movements revealed marked restriction in all gazes of the left eye. The remainder of the systemic examination was unremarkable.

An urgent Computed Tomography (CT) scan of the paranasal sinuses was obtained, which revealed opacification of all left-sided sinuses, consistent with left pansinusitis. Subsequent Magnetic Resonance Imaging (MRI) confirmed the diagnosis of left orbital cellulitis and clearly delineated the degree of proptosis. No discrete orbital abscess was identified, but the inflammatory changes were severe.

Given the presence of exophthalmos, restricted ocular motility, and radiologically confirmed orbital extension, the decision was made to proceed with emergency surgical intervention under general anesthesia. The procedure performed was Left Functional Endoscopic Sinus Surgery (FESS) with Orbital Decompression.

Surgical Findings Included:

- Significant purulent discharge upon uncinectomy.
- Edematous and inflamed ethmoid sinus mucosa.
- Erosion of the lamina papyracea with extension of pus into the orbital cavity.
- A sample of the pus was collected and sent for Gram stain, culture, and sensitivity.

Orbital decompression was achieved by widely opening the lamina papyracea and allowing the orbital contents to expand, relieving pressure. The sinuses were widely drained.

Post-operatively, the patient was started on broad-spectrum intravenous antibiotics (Vancomycin and a third-generation cephalosporin). On post-operative day 3, the pus culture returned positive for Methicillin-resistant Staphylococcus aureus (MRSA). The antibiotic regimen was immediately narrowed to targeted therapy with Intravenous Linezolid for a planned 14-day course.

The clinical response was remarkable. The fever subsided within 48 hours of surgery. A significant reduction in eyelid swelling and exophthalmos was noted by post-operative day 4. The ocular movements began to improve steadily. By post-operative day 10, the exophthalmos had completely resolved, and full ocular motility was restored. The patient was discharged on a completed course of oral antibiotics with full recovery and no sequel

Figure 1:Left Eye Proptosis With Chemosis

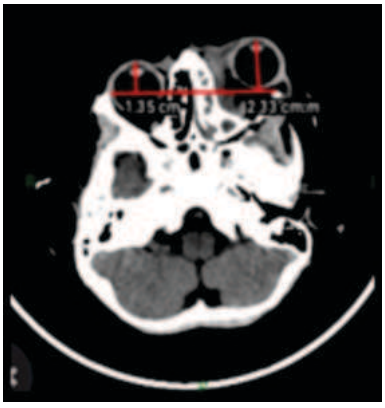

Figure 2:CT Scan Showing Left Eye Proptosis and Left Ethmoid Sinusitis With Left Eye Subperiosteal Abscess

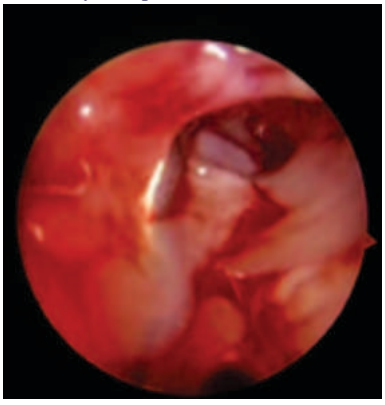

Figure 3:: Intraoperatively, Pus Discharge Seen on Uncinectomy

Figure 4:: Post Operative Improvement in Extraocular Movements and Diplopia

DISCUSSION

This case illustrates a severe presentation of pediatric orbital cellulitis (Chandler class II/III) managed successfully with a combination of urgent surgical intervention and tailored medical therapy. Several key learning points emerge.

First, the primary etiology was unequivocally sinusitis. The CT finding of pansinusitis and the intraoperative finding of pus tracking through the dehiscent lamina papyracea confirm the pathway of infection. This reinforces that any child presenting with orbital signs must have a thorough evaluation of the sinuses [4].

Second, the presence of exophthalmos and ophthalmoplegia are red flags that signify post-septal involvement and increased orbital pressure. These are strong indicators for surgical intervention to prevent permanent optic nerve damage and vision loss [5]. While some cases of small subperiosteal abscesses may be managed medically in selected patients, the degree of proptosis and motility restriction in our case mandated immediate surgical decompression to salvage vision and function.

Third, the microbiological finding of MRSA is of significant clinical importance. The epidemiology of sinusitis and its complications is evolving, with community-acquired MRSA becoming an increasingly common pathogen [6]. This case highlights the critical importance of obtaining intraoperative cultures. Without culture guidance, antibiotic therapy may not have adequately covered MRSA, potentially leading to treatment failure. The excellent response to Linezolid underscores the value of targeted therapy.

The surgical approach, FESS with orbital decompression, is now the gold standard. It is minimally invasive, offers excellent visualization for drainage, and addresses the primary source of infection in the sinuses, all while effectively relieving pressure in the orbit [7].

CONCLUSION

Pediatric orbital cellulitis is a medical and surgical emergency. Management requires a high index of suspicion, rapid imaging with CT/MRI, and a low threshold for surgical intervention in cases with orbital signs. A collaborative team involving pediatrics, ophthalmology, and otorhinolaryngology is crucial. This case highlights the successful outcome achievable with emergency FESS and orbital decompression, and it serves as a reminder of the growing role of MRSA, necessitating the routine collection of cultures for directed antibiotic therapy to ensure optimal patient outcomes.

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