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(CASE REPORT)

# Periorbital Cellulitis: A serious complication of acute sinusitis

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## Abstract

Periorbital cellulitis is considered a serious complication of acute rhinosinusitis especially in pediatric patients that can lead to more severe conditions if left untreated or not treated promptly. We present the case of a 5 years old boy, who came to the emergency with swelling and erythema of the palpebra of the right eye. After physical and radiologic examination, the patient was diagnosed with periorbital cellulitis and immediately was admitted and started on intravenous antibiotic therapy and drainage of the secretions through surgery. The aim of this presentation is to put focus on the importance of complications like periorbital cellulitis and the risks that can follow the condition if it's not treated in time and through the right methods.

**Keywords:** Sinusitis; Maxillary sinus; Periorbital cellulitis; Pediatric

## 1. Introduction

Periorbital cellulitis is a bacterial infection of the eye lids and surrounding skin not involving the orbit.[1] This condition causes redness, swelling and tenderness of the affected area.[2] The most common organisms causing periorbital and orbital cellulitis are Staphylococcus aureus and Streptococcus pneumoniae. [1,3] Periorbital cellulitis is considered a serious complication of acute rhinosinusitis especially in pediatric patients. Furthermore it can lead to more severe conditions if left untreated or not treated right such as vision loss, intracranial extension, and cavernous sinus thrombosis.[4] The most aggressive and complex course of this condition is seen in adults, particularly those with risk factors such as diabetes, immunosuppression, or recent facial trauma.[4] Orbital complications of rhinosinusitis were first classified in the 1970s by Chandler and colleagues.[5] Group I complications include patients with preseptal cellulitis or inflammatory edema superficial to the tarsal plates and orbital septum.[5] Group II patients have orbital or postseptal cellulitis, in which there is edema of the orbital contents without a discrete abscess.[5] Group III patients have a subperiosteal abscess adjacent to the lamina papyracea and under the periosteum of the medial orbit.[5] Group IV patients have an orbital abscess or a discrete collection within the orbital tissue.[5] Lastly, a group V complication is when a patient has a cavernous sinus thrombosis.[5] We present the case of a 5 years old boy, who came to the emergency with swelling and erythema of the palpebra of the right eye and was diagnosed with preseptal cellulitis as a complication of acute rhinosinusitis.

## 2. Case Report

A 5 years old male was presented to our emergency department with main complain swelling and right palpebral erythema. His mother stated that he has had nasal secretions for some days, but within the last 48 hours his palpebra started swelling. She presented immediately at the emergency and the doctor prescribed antibiotic therapy, but with no signs of improvement during the following days. The situation was just getting worst, with high resistant temperature and the swelling becoming more massive.

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**Figure 1** Swelling and erythema of the right eyelids and purulent nasal secretions

**Figure 2** Swelling and erythema of the eyelids

The patient was admitted and a full physical examination was performed on him. Medical history of the patient revealed no trauma, no chronic disease and no immunodeficiency disorder. He couldn't open completely his right eye and thick purulent secretions were found during rhinoscopy. Blood testing revealed leukocytes 24,0 K/uL and neutrophils 19.6 K/uL. Immediately was started intravenous antibiotics and was completed with a CT scan for further investigation. According to the CT scan of the nose and paranasal sinuses there was hypertrophy of the maxillary sinus mucosa, with secretions filling the sinus and periorbital soft tissue edema.

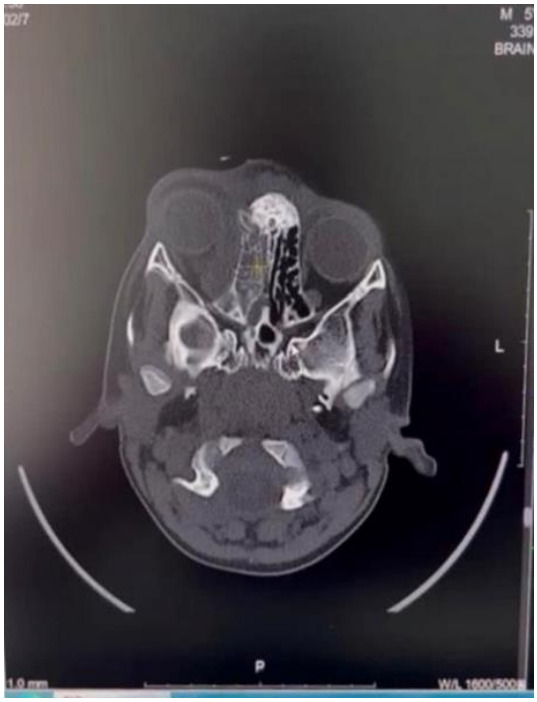

**Figure 3** CT scan: Secretions filling the sinus and periorbital soft tissue edema

**Figure 4** Patient during surgery

**Figure 5** Patient one day after surgery

**Figure 6** Significant improvement seven days after surgery

In the following days the patient underwent a scheduled surgery, where it was made possible the drainage of the thick secretions including uncinectomy, maxillary antrostomy and ethmoidectomy. After surgery the patient continued antibiotic therapy combined with cortisone therapy once a day and gradually his condition improved and he was sent home. During 6 months of post-operative follow-up, there was no recurrency.

## 3. Discussion

Acute periorbital swelling in children represents a potentially serious clinical condition requiring prompt diagnosis and management due to the risk of orbital and intracranial complications. The present case illustrates a pediatric patient with progressive right palpebral edema and erythema secondary to acute rhinosinusitis, with rapid clinical deterioration despite initial antibiotic therapy.

Acute bacterial rhinosinusitis is the most frequent risk factor for preseptal and orbital cellulitis in children, accounting for up to 60–80% of cases.[7,6] The close anatomical relationship between the orbit and the paranasal sinuses, particularly the ethmoid sinuses facilitates the spread of infection through the thin lamina papyracea and via valveless venous channels.[8] In our patient, the presence of purulent nasal secretions, persistent high fever, leukocytosis, and marked neutrophilia strongly supported an invasive bacterial process.

The clinical distinction between preseptal cellulitis and orbital cellulitis is essential, as orbital involvement carries a significantly higher risk of vision impairment and life threatening complications, including subperiosteal abscess, orbital abscess, cavernous sinus thrombosis, meningitis, and brain abscess.[9,10] In accordance with current recommendations a CT scan of the nose and paranasal sinuses was performed to evaluate the extent of disease and to identify possible orbital or intracranial extension.[11]

Failure of oral antibiotic therapy, as observed in this case, has been mostly reported in cases involving resistant organisms. Early initiation of broad-spectrum intravenous antibiotics targeting common pathogens like Streptococcus pneumoniae, Staphylococcus aureus, and Haemophilus influenzae, is strongly recommended in hospitalized patients.[12] Timely escalation of treatment is critical to prevent irreversible complications, particularly visual impairment.

## 4. Conclusion

This case is noteworthy due to the rapid progression of symptoms in a healthy child with no history of trauma, chronic disease, or immunodeficiency. It reinforces evidence from the literature that severe complications of acute sinusitis may occur even in immunocompetent pediatric patients.[13] Early recognition, close monitoring, and multidisciplinary management involving otorhinolaryngology, pediatrics, ophthalmology, and radiology are essential for optimal outcomes.

In conclusion, this case underscores the importance of maintaining a high index of suspicion for orbital complications in children presenting with periorbital swelling and sinusitis symptoms. Radiologic examination and aggressive medical management remain key factors in preventing serious complications and reducing morbidity.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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