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Case Report

From Ethmoiditis to Temporal Abscess: Early Surgical and Medical Management Ensuring Better Outcome

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Abstract

We report the case of a 5-month-old male infant, without notable medical history, who presented with a left temporal and periorbital swelling and exophthalmos, gradually evolving over five days. Clinical and radiological findings revealed an acute ethmoiditis complicated by an extra-orbital extension into the temporal region, forming a subcutaneous abscess.

Surgical drainage combined with intravenous antibiotic therapy led to a favorable outcome. This case highlights a rare complication of acute sinusitis in infants and underlines the importance of early diagnosis and multidisciplinary management.

Keywords: Acute ethmoiditis; Temporal abscess; Orbital cellulitis; Pediatric sinusitis; Early diagnosis; Multidisciplinary management; CT imaging; Surgical drainage

Introduction

Acute ethmoiditis is the most frequent form of pediatric sinusitis due to the early pneumatization of the ethmoid cells, which predisposes to orbital complications [1,2]. Although most cases respond well to antibiotic therapy, complications such as orbital cellulitis, subperiosteal abscesses, and intracranial involvement occur in 3–12% of cases [3,4]. We report a rare case of acute ethmoiditis complicated by a temporal abscess in a 5- month-old infant, emphasizing the importance of early diagnosis and intervention.

Case Presentation

A 5-month-old male infant, born from an uncomplicated full-term pregnancy and vaginal delivery, with no prior medical history, was brought to the emergency department for progressive swelling of the left eyelid and temporal region, evolving over five days.

On examination, the infant was febrile. There was a 7 cm fluctuant, erythematous, and telangiectatic swelling over the left temporal region. There was also swelling of both the upper and lower left eyelids, without fluctuation, associated with exophthalmos of the left eye. Neurological and ophthalmological examinations were unremarkable (Figure 1).

Figure 1: Image on admission: swelling of the palpebral and temporal regions on the left with exophthalmos.

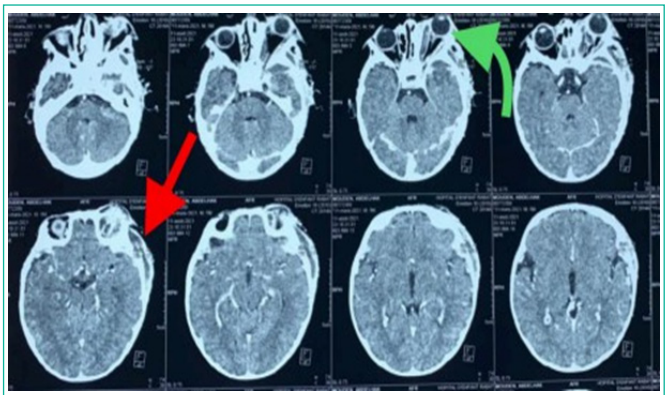

Figure 2: Axial views of a craniofacial CT scan showing a complete opacification and mucosal thickening of the left ethmoidal cells, a well-circumscribed hypodense collection in the left temporal subcutaneous and muscular planes, with features consistent with an organized abscess (red arrow) associated left-sided exophthalmos consistent with Chandler stage III orbital cellulitis (green arrow).

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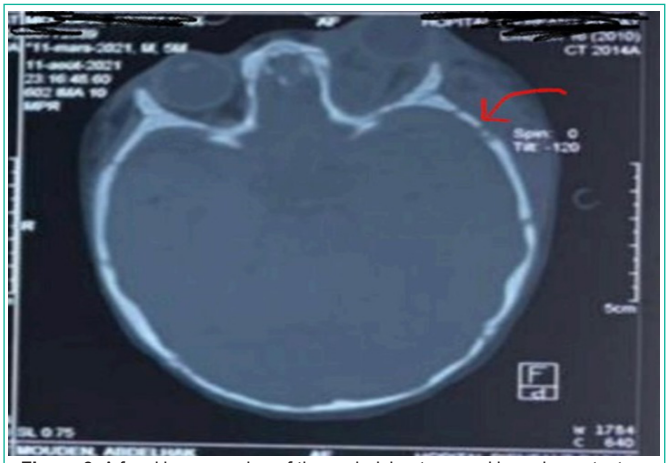

Figure 3: A focal bone erosion of the underlying temporal bone in contact with the abscess, suggesting secondary osteitis.

Figure 4: 1-year check-up after temporal abscess episode.

Laboratory workup revealed a C-reactive protein level of 230 mg/L and a white blood cell count of 13,000/mm^3.

A craniofacial CT scan without and with contrast (axial views) showed:

- Complete opacification and mucosal thickening of the left ethmoidal cells, suggestive of acute ethmoiditis.
- Thinning and partial erosion of the left lamina papyracea, indicating direct extension of inflammation beyond the sinus walls.
- A well-circumscribed hypodense collection in the left temporal subcutaneous and muscular planes, with features consistent with an organized abscess: subcutaneous fat stranding, temporal muscle edema, and displacement of adjacent soft tissues (Figure 2).
- A focal bone erosion of the underlying temporal bone in contact with the abscess, suggesting secondary osteitis (Figure 3).
- Associated left-sided exophthalmos with preseptal soft tissue thickening and a subperiosteal collection, consistent with Chandler stage III orbital cellulitis. -No signs of intracranial extension, empyema, brain abscess, hydrocephalus, or venous thrombosis.
- Cerebral parenchyma, ventricles, and basal cisterns appeared normal for age.

Surgical drainage under general anesthesia was performed through a 2 cm left temporal incision, carefully avoiding the branches of the facial nerve. The temporal muscle was bulging and incised, yielding approximately 20 cc of pus, which was sent for cytobacteriological analysis. Dissection was extended along the tract of spontaneous fistulization up to the lateral orbital wall. The abscess cavity was irrigated thoroughly, and a gauze wick was inserted to maintain drainage.

Postoperative management included intravenous amoxicillin-clavulanate, analgesics, and supportive care. Evolution was very favorable, with a marked reduction in inflammatory markers, fever, swelling, and exophthalmos within one week. The drainage was maintained every other day with wound irrigation and dressing changes.

The patient was referred to a paediatric consultation for regular follow-up, and the 1-year check-up revealed a normal examination with no particularities (Figure 4).

Discussion

Ethmoiditis is the most common form of acute sinusitis in infants and young children due to the early pneumatization of the ethmoid sinuses and their thin bony walls [1]. While generally benign, acute ethmoiditis can rapidly progress and lead to severe complications, especially in young infants whose immune system and sinus drainage are still immature [2]. Orbital complications are the most frequent, occurring in up to 60–80% of complicated pediatric sinusitis cases, with subperiosteal abscesses and orbital cellulitis being the most common [3]. Although most cases respond well to antibiotics, ethmoiditis can progress rapidly, especially in infants, due to immature immune systems and narrower drainage pathways. Complications occur in 3–12% of pediatric sinusitis cases, with orbital involvement being the most common [3].

Chandler's classification remains a practical tool to categorize orbital involvement, from preseptal cellulitis (stage I) to cavernous sinus thrombosis (stage V) [4]. In our case, the patient presented with Chandler stage III, characterized by a subperiosteal abscess with preserved ocular function. Extension beyond the orbit into the temporal region is exceedingly rare, with only a few documented pediatric cases in the literature [5]. The mechanism involves either direct extension through eroded bony structures (lamina papyracea, orbital lateral wall, or temporal bone) or venous spread via valveless facial veins [6]. In our case, the CT showed partial erosion of both the lamina papyracea and temporal bone, supporting a contiguous spread.

The most feared complications of untreated or inadequately treated ethmoiditis include:

- Vision loss occurs in up to 10–15% of patients with untreated orbital abscesses [7].
- Cavernous sinus thrombosis, a potentially fatal condition with mortality rates historically reaching up to 30% [8].
- Intracranial complications such as meningitis, epidural or subdural empyema, and cerebral abscess are seen in up to 5–10% of severe pediatric sinusitis cases [9].

- Sepsis, especially in infants, due to immature immune responses and delayed diagnosis [10].

Early diagnosis using contrast-enhanced CT scan is essential to identify complications promptly and guide surgical planning. A multidisciplinary approach involving pediatrics, radiology, ENT or maxillofacial surgery, and ophthalmology is key to effective management [10]. In our case, early imaging and surgical intervention likely prevented progression to more severe outcomes.

A review of pediatric patients with subperiosteal abscesses found significantly better outcomes with combined medical and surgical intervention compared to antibiotics alone [11]. In our case, early imaging, surgical drainage, and intravenous antibiotic therapy resulted in rapid clinical improvement and resolution of systemic inflammation, preventing further extension and preserving vision.

Conclusion

Temporal abscess is a rare but serious complication of ethmoiditis in infants. This case underscores the importance of early diagnosis and multidisciplinary management involving pediatricians, radiologists, ophthalmologists, and surgeons to prevent severe complications.

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