Transconjunctival Access for Surgical Management of an Orbital Abscess in Pediatric Acute Sinusitis

Abordagem Transorbitária no Tratamento de Complicação Orbitária de Sinusite Aguda Pediátrica

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ABSTRACT

Orbital abscess is a frequent complication of pediatric acute sinusitis requiring surgical drainage combined with FESS. The preseptal transconjunctival approach provides safe orbital access, enabling effective drainage while preserving ocular function and avoiding facial scarring.

We aimed to describe the case of a child with an orbital abscess treated with preseptal transconjunctival drainage combined with ESS.

A 9-year-old boy presented with fever, purulent rhinorrhea, and left periorbital swelling. Computed tomograph showed left maxillary and ethmoidal sinusitis with an 8mm extraconal intraorbital abscess. After no improvement with intravenous antibiotics, he underwent FESS combined with preseptal transconjunctival abscess drainage. By postoperative day 7, complete resolution of infection and full recovery of ocular function were achieved.

This case highlights timely surgical intervention in pediatric orbital complications of acute sinusitis. The combined FESS and preseptal transconjunctival approach achieved infection control, preserved ocular function, and avoided scarring, supporting transorbital approaches in infectious orbital pathology.

KEYWORDS: Child; Orbit; Orbital Diseases; Paranasal Sinuses; Sinusitis/complications

RESUMO

O abcesso orbitário é uma complicação frequente da sinusite aguda pediátrica, necessitando frequentemente de drenagem cirúrgica combinada com CENS. A abordagem transconjuntival pré-septal permite acesso seguro à órbita, com preservação da função ocular e sem cicatrizes faciais.

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O nosso objetivo é descrever o caso de uma criança com abscesso orbitário tratada com drenagem transconjuntival pré-septal associada à CENS.

Rapaz de 9 anos, observado por febre, rinorreia purulenta e edema palpebral esquerdo. A tomografia computorizada revelou sinusite maxilar e etmoidal esquerda com abcesso intra-orbitário extracónico de 8 mm. Sem melhoria sob antibioterapia endovenosa, foi submetido a CENS com drenagem transconjuntival pré-septal do abcesso. Ao 7º dia pós-operatório, verificou-se resolução completa da infeção e recuperação total da função ocular.

A abordagem combinada de CENS e drenagem transconjuntival pré-septal permitiu controlo eficaz da infeção com preservação da função ocular e excelente resultado estético, reforçando o papel das vias transorbitárias nas complicações orbitárias infeciosas.

PALAVRAS-CHAVE: Abcesso; Criança; Doenças Orbitárias; Orbita; Seios Paranasais; Sinusite/complicações

INTRODUCTION

Orbital complications represent the most frequent and potentially severe sequelae of acute sinusitis in children, particularly when the ethmoid sinuses are involved. This predominance is explained by the close anatomical relationship between the orbit and the paranasal sinuses, as well as by the thin and fragile nature of the lamina papyracea, especially in pediatric patients. These anatomical characteristics facilitate the rapid spread of infection from the sinuses into the orbital cavity.[1,2]

Orbital cellulitis and abscess formation may lead to significant morbidity, including temporary or permanent visual impairment, which has been reported in up to 10% of affected children. Less frequent but potentially life-threatening complications include meningitis, frontal osteomyelitis, and intracranial abscesses.[1-4] Consequently, management requires a multidisciplinary approach involving otorhinolaryngologists, ophthalmologists, and pediatricians. Initial treatment is based on high-dose intravenous antibiotics with adequate central nervous system penetration, combined with close monitoring of systemic and ophthalmologic parameters. Radiologic imaging with computed tomography or magnetic resonance imaging becomes mandatory in cases of clinical deterioration, progression of orbital edema, or visual compromise. The identification of an orbital abscess constitutes a clear indication for urgent surgical drainage.[1,3]

Functional endoscopic sinus surgery (FESS) has become the cornerstone of surgical management, allowing effective drainage of the infected sinuses and addressing the primary source of infection. However, when orbital abscess is present, direct orbital drainage is often required. Several surgical approaches to the orbit have been described, including external orbitotomy and transnasal endoscopic techniques. Among them, the transconjunctival approach through the inferior fornix offers direct access to the inferior and medial orbit while avoiding visible facial scars and preserving eyelid anatomy.[5,6]

Although the transconjunctival approach is widely used in orbital floor fracture repair and reconstructive procedures due to its excellent exposure and favorable cosmetic outcomes, its application in the treatment of infectious orbital complications remains less frequently reported.[5,7] In the present article, we describe the successful use of a preseptal transconjunctival approach combined with endoscopic sinus surgery for the management of an orbital abscess secondary to acute sinusitis in a pediatric patient, highlighting its safety, effectiveness, and clinical advantages.

The aim of this article it to describe the case of a child with an orbital abscess treated with preseptal transconjunctival drainage combined with ESS.

CASE REPORT

A 9-year-old boy was admitted to the emergency department with a 5-day history of fever, purulent rhinorrhea, and left upper dental pain, associated with progressive swelling of the left periorbital region. There was no relevant past medical history.

On clinical examination, marked erythema and edema of the left hemiface were observed, resulting in near complete inability to open the left eye (Fig. 1).

Ocular examination was limited by the degree of swelling. There was decreased ocular motility, apparently slight proptosis and no fundoscopic signs of optic nerve involvement. The patient was febrile and appeared systemically unwell.

Contrast-enhanced computed tomography (CT) of the

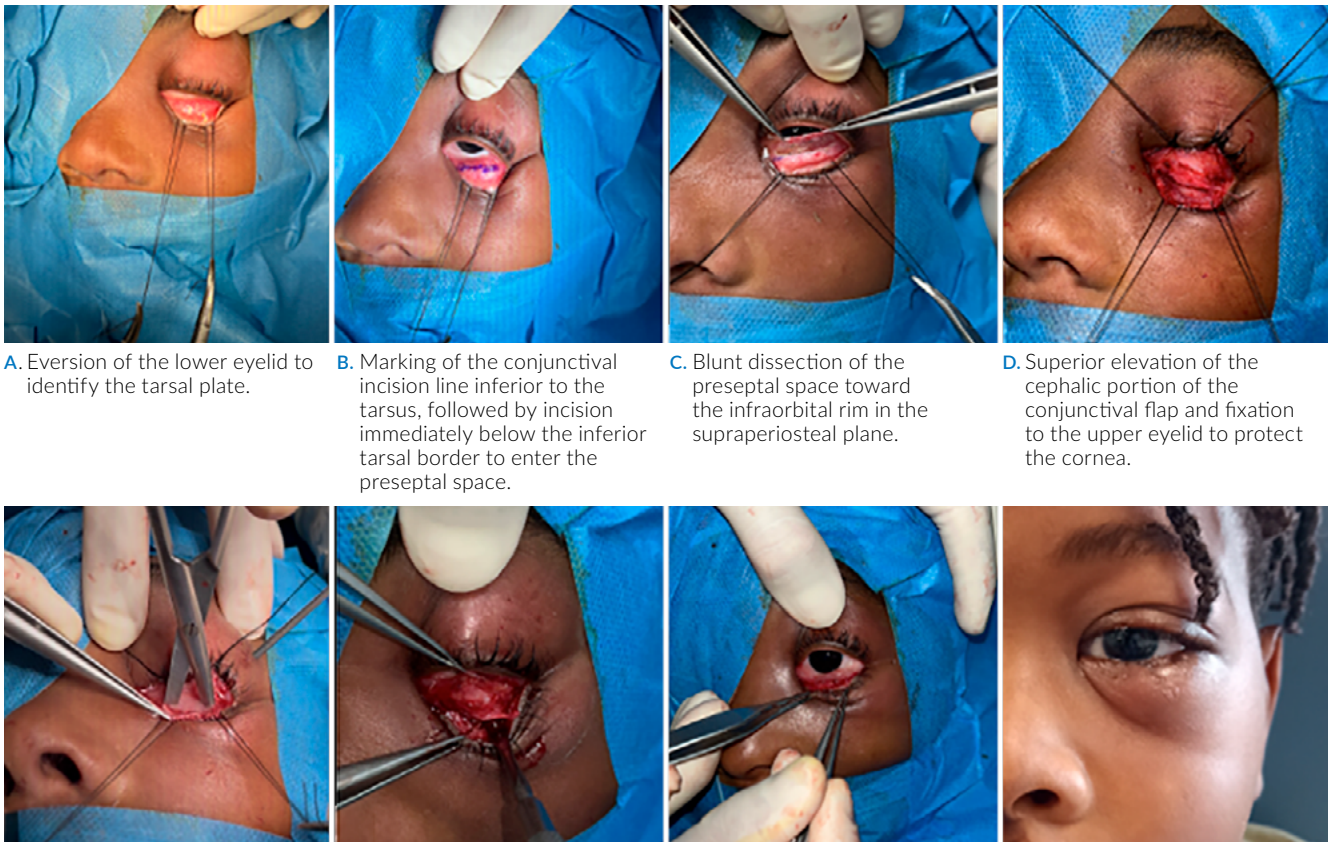
paranasal sinuses and orbits revealed acute left maxillary and ethmoidal sinusitis, complicated by an 8 mm extraconal intraorbital abscess located along the inferolateral orbital wall. There were no signs of intracranial extension (Fig. 2).

Initial management consisted of high-dose intravenous broad-spectrum antibiotics and close clinical and ophthalmological monitoring. However, due to the absence of clinical improvement and persistent orbital signs, surgical intervention was indicated.

The patient underwent functional endoscopic sinus surgery (FESS) combined with preseptal transconjunctival drainage of the orbital abscess under general anesthesia (Fig. 3). A horizontal incision was made in the inferior conjunctiva, just below the tarsal plate, followed by careful preseptal dissection down to the

FIGURA 1. Erythema and edema of the left eye resulting in decreased ocular motility.

FIGURA 2. Coronal CT scan of the paranasal sinuses showing abscess along the inferior wall of the left orbit, in an extraconal location (arrow).



A. Eversion of the lower eyelid to identify the tarsal plate.

B. Marking of the conjunctival incision line inferior to the tarsus, followed by incision immediately below the inferior tarsal border to enter the preseptal space.

C. Blunt dissection of the preseptal space toward the infraorbital rim in the supraperiosteal plane.

D. Superior elevation of the cephalic portion of the conjunctival flap and fixation to the upper eyelid to protect the cornea.

E. Periosteal incision with drainage of abundant purulent material.

F. Subperiosteal dissection enabling complete exploration of the abscess cavity.

G. Closure of the conjunctival incision using 6/0 Vicryl sutures.

H. Postoperative day 7 showing complete resolution of the infection and full recovery of ocular motility.

FIGURA 3. Sequential intraoperative and postoperative images demonstrating the transconjunctival approach for drainage of an orbital abscess.

inferior orbital rim. After periosteal incision, abundant purulent material was drained. Subperiosteal exploration of the abscess cavity was performed to ensure complete evacuation, and the conjunctiva was subsequently closed. The main surgical steps are illustrated in the figures below.

Postoperatively, the patient demonstrated rapid clinical improvement, with progressive reduction of facial edema and restoration of eyelid opening. By postoperative day 7, complete resolution of infection was achieved, with full recovery of ocular function and no evidence of complications.

DISCUSSION

Orbital complications remain among the most severe manifestations of acute sinusitis in the pediatric population. Despite advances in antibiotic therapy and early diagnostic imaging, orbital cellulitis and abscess formation continue to represent potentially sight-threatening and life-threatening conditions. These complications are most frequently associated with ethmoid sinus involvement in younger children, due to the close anatomical relationship between the ethmoid labyrinth and the orbit, as well as the thin and fragile lamina papyracea, which facilitates the spread of infection into the orbital cavity.[1,2]

Visual impairment occurs in up to 10% of pediatric patients with orbital cellulitis, and although less common, intracranial complications such as meningitis, cavernous sinus thrombosis, and intracranial abscesses may also develop, underscoring the importance of early diagnosis and appropriate management.[1,3,4] Initial treatment is based on high-dose intravenous broad-spectrum antibiotics with good central nervous system penetration, combined with close multidisciplinary monitoring. Radiologic imaging with contrast-enhanced computed tomography or magnetic resonance imaging is mandatory in patients presenting with clinical deterioration, progressive orbital edema, proptosis, or visual compromise. The identification of a subperiosteal or intraorbital abscess constitutes a clear indication for urgent surgical drainage.[1,3]

Functional endoscopic sinus surgery (FESS) has become the cornerstone of surgical management in complicated pediatric sinusitis, allowing direct treatment of the primary infectious focus, restoration of sinus ventilation, and drainage of purulent collections. However, in the presence of a true orbital abscess, direct orbital decompression is often required to achieve rapid resolution of infection and prevent permanent visual sequelae. Several surgical approaches to the orbit have been described, including external orbitotomy, transnasal endoscopic drainage, and transorbital routes.[6]

The transconjunctival approach is widely used in oculoplastic and maxillofacial surgery, particularly for orbital floor and medial wall fracture repair, due to its excellent exposure, minimal soft tissue disruption, and superior cosmetic outcomes.[5,7] This approach allows safe access to the inferior, inferomedial, and inferolateral orbital compartments while avoiding visible facial scars and minimizing the risk of eyelid malposition and lacrimal system injury.

In contrast, the application of the transconjunctival approach in infectious orbital pathology has been less frequently reported. Concerns regarding limited surgical exposure, technical difficulty, and potential intraorbital complications may contribute to its underutilization. Nevertheless, recent advances in orbital surgery and improved understanding of transorbital corridors have expanded the role of minimally invasive approaches in managing a wide spectrum of orbital diseases, including abscess drainage.[6,8]

In the present case, the combination of FESS with preseptal transconjunctival drainage allowed simultaneous treatment of the sinonasal source of infection and direct evacuation of the orbital abscess. This strategy resulted in rapid clinical improvement, complete resolution of infection, and full recovery of ocular motility, without postoperative complications or visible scarring.

Compared with traditional external orbitotomy, the transconjunctival route offers significant advantages, particularly in pediatric patients, by avoiding cutaneous incisions and reducing psychological and cosmetic impact. Additionally, this approach preserves eyelid anatomy and function, which is critical in growing children. When combined with endoscopic sinus surgery, it provides a comprehensive and minimally invasive solution for complex sinonasal-orbital infections.

Despite its advantages, the transconjunctival approach requires advanced surgical expertise and meticulous technique, as complications such as retrobulbar hemorrhage, diplopia, corneal injury, and transient visual disturbances have been reported.[6,8] Therefore, careful patient selection and close collaboration between otorhinolaryngologists, ophthalmologists, and pediatric surgeons are essential to optimize outcomes.

CONCLUSION

This case highlights the importance of early diagnosis and timely surgical intervention in pediatric orbital complications of acute sinusitis. The combined use

of functional endoscopic sinus surgery and preseptal transconjunctival drainage achieved effective infection control, complete recovery of ocular function, and excellent cosmetic outcomes, with no external scarring. Furthermore, this experience supports the expanding role of transorbital approaches in the management of orbital infections, demonstrating that, despite their technical learning curve, they represent a safe, effective, and minimally invasive alternative in carefully selected cases.

CONTRIBUTORSHIP STATEMENT/ DECLARAÇÃO DE CONTRIBUIÇÃO

JG - Contribution to patient management, data collection, literature review, and writing of the original draft.

CS, BR - Patience management, data collection, literature review and writing.

LB, RC, FC - Patient management, clinical supervision, critical revision of the manuscript.

PE - Clinical supervision, critical revision of the manuscript and final approval.

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JG - Contribuição para a gestão do doente, recolha de dados, revisão da literatura e redação do rascunho original.

CS, BR - Gestão do doente, recolha de dados, revisão da literatura e redação.

LB, RC, FC - Gestão do doente, supervisão clínica e revisão crítica do manuscrito.

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