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Management of orbital complications of acute bacterial sinusitis: a case report and review of the literature

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Abstract: -

Introduction: Orbital complications of acute rhinosinusitis (ARS) are the most common extra-sinus manifestations, particularly in children and immunocompromised patients.They represent a medico-surgical emergency due to the anatomical proximity between the paranasal sinuses and the orbit, which facilitates infectious spread.

Methods: We report the case of a 46-year-old female with poorly controlled type II diabetes who developed orbital cellulitis complicating an ipsilateral maxillary sinusitis. Clinical, radiological, and therapeutic aspects were analyzed and compared with data from the literature.

Results: The patient presented with stage II Chandler orbital cellulitis. Diagnosis was established through clinical evaluation and computed tomography. Management consisted of broad-spectrum intravenous antibiotics combined with surgical drainage, leading to a favorable outcome without sequelae.

Discussion: Orbital complications of ARS require early recognition and prompt intervention. The Chandler classification remains a valuable tool to stratify severity and guide treatment. Prognosis depends largely on early management, with blindness and intracranial extension being the most serious complications.

Conclusion: This case highlights the importance of rapid diagnosis and appropriate medico-surgical management of orbital complications in ARS to prevent vision-threatening and life-threatening outcomes.

Keywords: Acute rhinosinusitis, orbital complication, Chandler, CT scan, abscess, prognosis.

Introduction:

Acute rhinosinusitis (ARS) is a common condition that is generally benign and resolves spontaneously. However, in some cases, the infection can spread beyond the sinus cavities and lead to severe complications. Among these, orbital involvement is the most common, accounting for approximately 70 to 80% of extra-sinus complications. These complications mainly affect children, due to the thinness of the bone walls and the absence of valves between the sinuses and the orbit. Early diagnosis and appropriate management are essential to avoid irreversible visual sequelae or a life-threatening prognosis.

Patients and methods:

A 46-year-old female patient, being monitored for uncontrolled type II diabetes, presented to the emergency department with severe left frontal-orbital headaches, left eyelid edema developing over the previous 48 hours, and a fever of 39°C.

Clinical examination revealed a general condition of fever with marked asthenia. Orbital inspection revealed swelling of the upper left eyelid with redness and local heat. Examination of oculomotor function was difficult due to the edema (Fig. 1), and assessment of visual acuity was impossible due to the intensity of the pain. The examination of the right eye was normal. The ENT examination

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revealed nasal obstruction and purulent rhinorrhea on the left side, with pain on palpation of the left inner orbital rim.

The patient was then hospitalized for orbital cellulitis. Laboratory tests revealed an inflammatory syndrome: WBC count of 22,000/mm3, CRP of 160 mg/L, and blood glucose of 3.2 g/dL.

An orbital-cerebral CT scan with contrast revealed stage II Chandler's left orbital cellulitis complicated by grade I exophthalmos with lysis of the orbital floor on the same side as the blocked maxillary sinusitis, with no signs of intracranial extension. Treatment was based on emergency hospitalization with administration of probabilistic IV antibiotic therapy: cefotaxime + metronidazole with a bolus of moderate corticosteroid therapy after 48 hours of antibiotic therapy and stabilization of his diabetes, combined with endoscopic surgical drainage via a left middle meatotomy. The patient's condition improved, marked by the gradual disappearance of edema and exophthalmos and improvement in preserved visual acuity. The decision to discharge the patient was made on the 7th day with oral antibiotic therapy.

Discussion:

Orbital complications of acute rhinosinusitis (ARS) are a rare but potentially serious medical and surgical emergency. They occur due to the anatomical proximity of the paranasal sinuses (ethmoid, maxillary, and frontal) to the orbit, as well as the existence of venous networks without valves, facilitating the spread of infection [1,2]. They account for 70 to 80% of extra-sinus complications of ARS and mainly affect children [2,3]. The incidence of these severe forms has decreased thanks to early antibiotic therapy, vaccination, and improved management of upper respiratory tract infections [1,2].

Several factors predispose to orbital dissemination. Anatomical features, such as thin or dehiscent sinus walls, as well as the proximity of the carotid arteries and the optic nerve, promote the spread of infection. Pediatric age is also a risk factor. Immunodeficiency states—diabetes, post-chemotherapy bone marrow aplasia, radiotherapy, local immune disorders, or hypogammaglobulinemia—aggravate the severity of complications [1,3].

Microbiologically, the flora is most often monomicrobial, dominated by aerobic bacteria (Streptococcus pneumoniae, Staphylococcus aureus in adults, Haemophilus influenzae in children). However, polymicrobial associations, particularly aerobic-anaerobic, are possible [2,4]. The relevance of the results depends heavily on the quality of the samples, which should ideally be taken from the pathological sinus[3,4]..

Clinically, it is important to distinguish between reflex eye damage and inflammatory or truly infectious damage. Pain localized to the inner corner of the eye suggests ethmoiditis or frontal sinusitis, while suborbital pain suggests maxillary involvement. The onset of retro-orbital headaches or pain triggered by ocular palpation should raise suspicion of an orbital complication. Fever, on the other hand, is not a discriminating factor [2, 4,5].

In most cases, ophthalmological signs can be used to differentiate between preseptal and retroseptal involvement. Eyelid edema and erythema are characteristic of preseptal cellulitis. Exophthalmos, limited oculomotor function, and decreased visual acuity are suggestive of retroseptal involvement. Deviation of the globe points to a subperiosteal abscess, while extension to the hemiface suggests orbitofacial cellulitis[4 ,5,6].

Nasal endoscopy to check for pus in the middle meatus or sphenoid ostium completes the ophthalmological examination (ocular mobility, visual acuity, exophthalmometry, fundus examination) [4,6]. Imaging plays an essential role. Cranio-orbito-sinus computed tomography with contrast injection is the gold standard examination. It allows the extent of the infection to be determined, subperiosteal or intraorbital collection to be detected, and intracranial involvement to be assessed [5]. The Chandler classification, based on imaging, remains the gold standard for assessing severity: it distinguishes five stages, ranging from preseptal cellulitis to cavernous sinus thrombosis [4]. MRI, which is more sensitive than CT for examining soft tissue and intracranial spread, is indicated in atypical or pseudotumoral forms. Orbital ultrasound, which is of little use for the apex, remains useful for monitoring progression [6,7].

Treatment is based on emergency intravenous antibiotic therapy targeting the most common bacteria (Streptococcus pneumoniae, Haemophilus influenzae, Staphylococcus aureus, anaerobes) [6]. Uncomplicated preseptal or orbital forms may respond favorably to medical treatment alone, subject to close clinical and ophthalmological monitoring. However, the presence of a large subperiosteal abscess, an orbital abscess, or no improvement after 48 hours requires surgical drainage, preferably by endoscopic endonasal approach [7]. The duration of treatment varies from 7 to 14 days in simple forms, but may extend to 4 to 6 weeks in advanced stages. Oral medication is considered after apyrexia and clinical improvement [7,8].

Corticosteroid therapy remains controversial; some authors recommend it in cases of suspected optic nerve involvement. Adjuvant measures include analgesics, local eye care, nasal irrigation, decongestants, and even anticonvulsant or anticoagulant therapy, depending on the case [1,3]. Drainage of the sinus cavity is routine in order to restore ventilation and obtain reliable bacteriological samples[7,9].

The prognosis depends largely on early diagnosis and treatment. Preseptal cellulitis and subperiosteal abscesses generally have a favorable outcome with no sequelae. However, advanced forms carry a risk of serious visual sequelae, including blindness due to compressive or ischemic optic neuropathy. General complications, although rare, can occur: septic shock, intracranial empyema, cerebral abscess, or cerebral thrombophlebitis, with a mortality rate of up to 20% [5,8,9].

The main factors associated with a poor prognosis are adult age, delayed consultation, advanced Chandler stages (IV and V), and the presence of complicated corneal involvement [4]. Prevention therefore relies on rapid recognition of warning signs, particularly in febrile children with eyelid edema or suggestive ophthalmological signs[5,7,9].

Conclusion:

Although orbital complications of acute rhinosinusitis have become rare, they remain serious medical and surgical emergencies due to their potential for visual sequelae and intracranial complications. Diagnosis is based on early clinical evaluation supported by imaging, and treatment combines intravenous

antibiotic therapy and surgical drainage when necessary. The prognosis depends mainly on the speed of diagnosis and treatment, highlighting the importance of increased vigilance for warning signs, particularly in immunocompromised patients and children.

Conflict of interest:

The authors declare no conflict of interest.

Authors' contributions:

All authors contributed equally to this article.

Figure 1: Inflammatory eyelid edema on left orbital cellulitis.

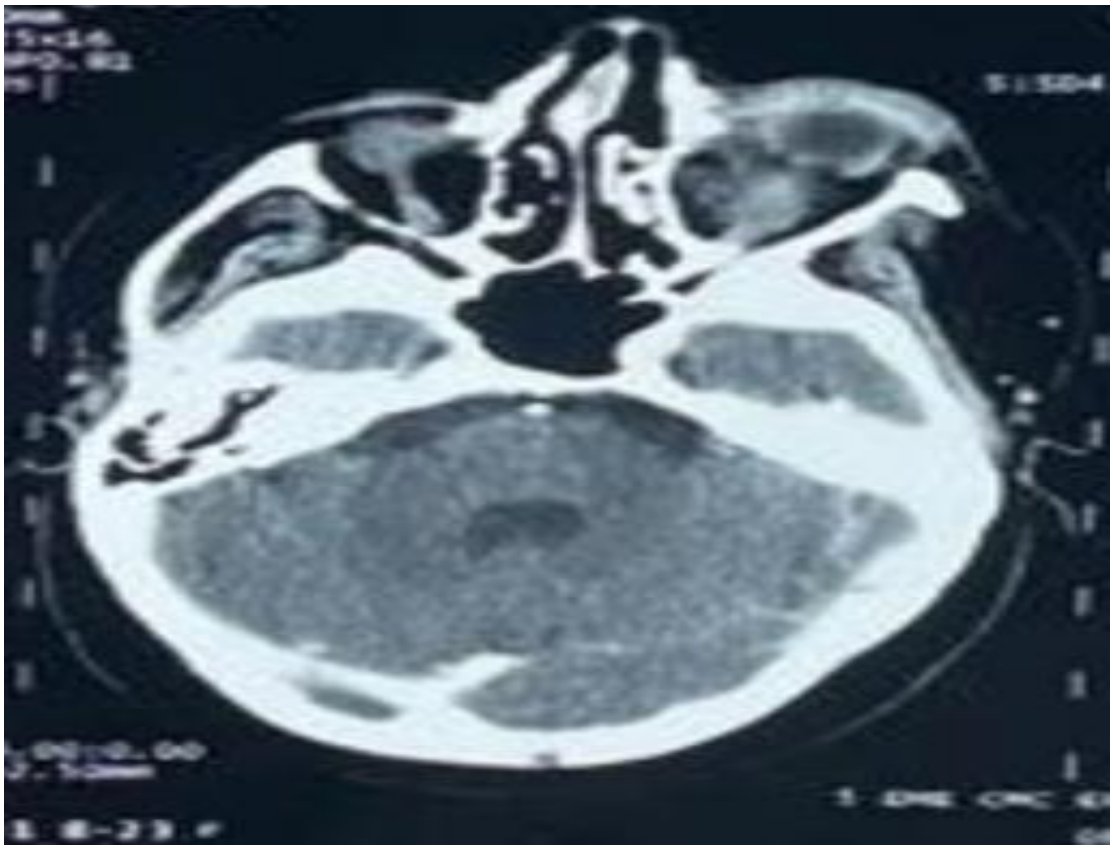

Figure2: Axial cranioorbital CT scan showing eyelid infiltration with left exophthalmos.

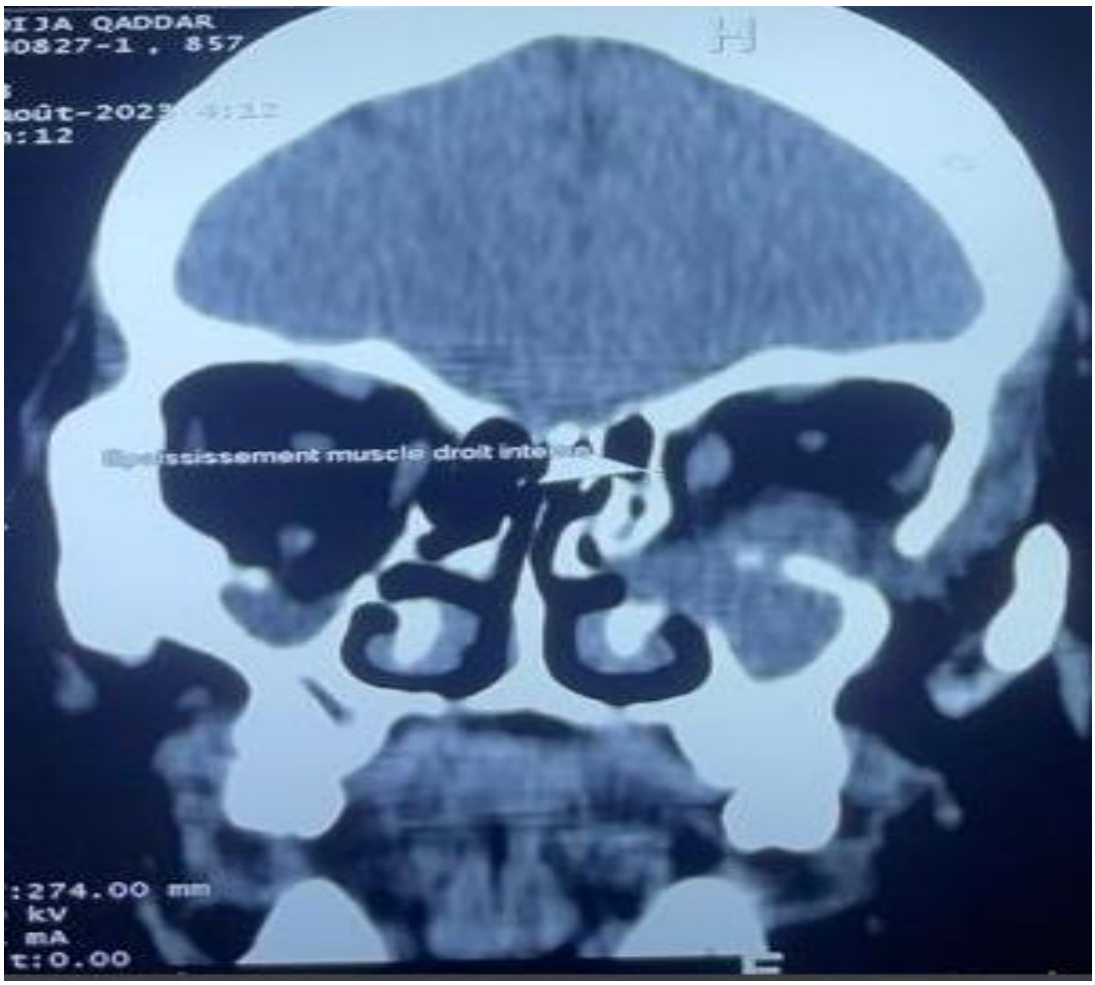

Figure 3: Coronal cranio-orbital CT scan showing blocked left maxillary sinusitis.

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