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Case Report

Exophthalmos Revealing a Voluminous Frontal Mucocoele with Orbital Extension: A Case Report

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Abstract

Exophthalmos can result from a variety of orbital and sinus pathologies, including frontal mucoceles, which, although rare, can cause significant ocular displacement when they extend into the orbit. We report the case of a 70-year-old male patient with a history of repeated sinusitis who developed right exophthalmos. Imaging revealed a large frontal mucocele with orbital extension, confirmed via external surgical approach and histopathological analysis. This report highlights the importance of early diagnosis of frontal mucoceles with orbital extension and explores appropriate surgical treatment options to prevent complications and improve both functional and aesthetic outcomes.

Keywords: *Mucocele; Frontal Sinus; Unilateral Non-Axial Exophthalmos; Medical Imaging; Case Report*

Introduction

Exophthalmos, or protrusion of the eye, can be caused by a variety of orbital and sinus pathologies, including frontal mucoceles, which are slowly progressive, expansive pseudocystic formations that develop within the sinus cavities [1]. These mucoceles typically result from obstruction of the sinus ostium, leading to mucous secretion accumulation [2].

Although histologically benign, they have an aggressive potential with regard to the orbit, which can lead to serious complications, such as reduced visual acuity or even blindness, as well as aesthetic problems linked to the displacement of the eyeball and facial deformation [3].

In this case report, we report on a 70-year-old male patient with a large frontal mucocele with orbital extension, focusing on the aesthetic and functional impact of this extension, radiological findings and surgical treatment.

Case Report

A 70-year-old man, with a history of recurrent sinusitis and no other general history of orbitofacial trauma. He had been suffering from recurrent headaches of low intensity for one year, initially presenting with frontal swelling, followed by medial canthal distortion on the right side, with progressive globe displacement and no diplopia or loss of visual acuity. Ophthalmological examination revealed ptosis with unilateral exophthalmos of the right eye, non-pulsatile, without inflammatory signs and non-axial: the eye was pushed down and out

(Figure 1). Visual acuity was 7/10 in the right eye and 9/10 in the left eye without correction. Oculomotor examination revealed a slight upward gaze limitation in the right eye, the photomotor reflex was present, bilateral and symmetrical, and sensitivity was preserved in the trigeminal nerve territory. The confrontation visual field did not reveal any amputation of the trigeminal nerve. Palpation revealed a mass in the superior-internal part of the right orbit. Slit lamp examination revealed a clear cornea with no fluorescein and a senile cataract on the lens. The fundus was unremarkable and ocular tone was normal in both eyes. The Lancaster test was normal. The rest of the examination was unremarkable. A CT scan of the orbit and brain was performed and revealed a well-limited oval formation measuring 50 × 36 × 32 mm (anteroposterior × height × length) in the right frontal sinus; homogeneous isodense with no enhancement after the injection of contrast medium. This formation is responsible for bone lysis of the frontal wall with right intraorbital extension and also revealed discrete filling of the two maxillary sinuses and the right anterior ethmoidal cells. The CT scan was therefore consistent with a right frontal mucocele with intraorbital extension (Figure 2).

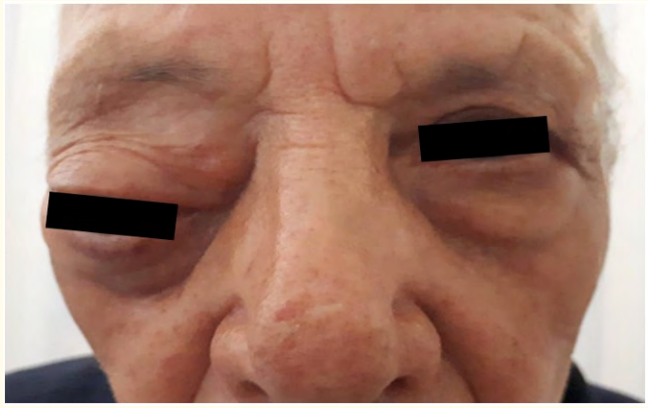

Figure 1: *Clinical appearance of right non-axial exophthalmos, with downward and outward displacement of the globe.*

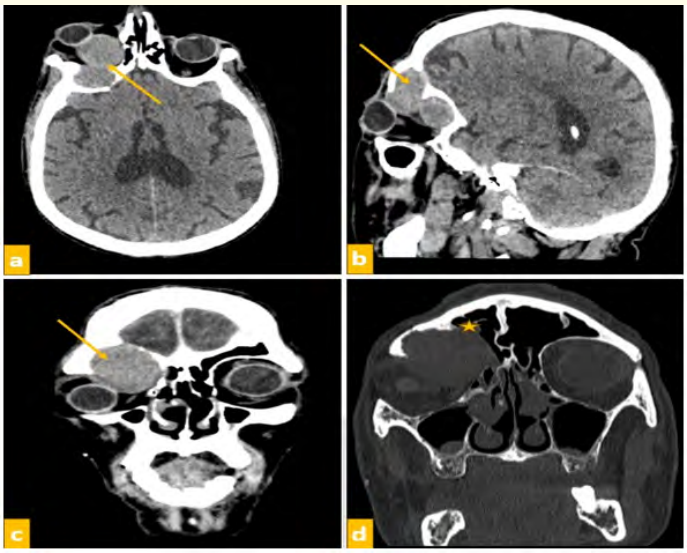

Figure 2: *CT scan in parenchymal window (axial [a], sagittal [b], coronal [c]) and bone window (d) showing a right frontal mucocele (arrow) causing bone lysis of the frontal sinus wall (star) with intra-orbital extension.*

The indication for surgery was given, an external approach was performed, and exploration revealed a cystic sac filled with yellowish fluid, with complete erosion of the frontal sinus walls.

Anatomopathological examination confirmed the diagnosis of a mucocele and found a cystic lesion with inflammatory changes and no areas suspected of malignancy (Figure 3).

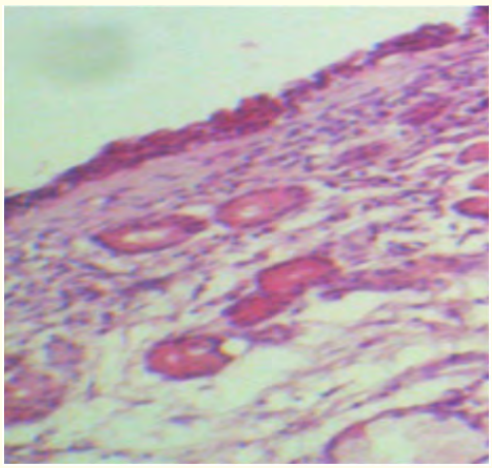

Figure 3: *Microscopic view showing a respiratory-type epithelial lining with subepithelial oedematous stroma and mucous glands, accompanied by mixed inflammatory infiltrates, consistent with a sinus mucocele.*

The post-operative course was marked by the disappearance of exophthalmos and ptosis, and the 6-month follow-up was satisfactory, with no recurrence.

Discussion

Giant mucoceles of the facial sinuses are rare entities [3], which can occur at any age, but are most frequently observed between the fourth and seventh decades of life, and generally have no gender predilection [2]. They correspond to slow-growing benign pseudocystic tumours arising from the sinus mucosa [1].

They are due to the accumulation and retention of mucoid secretions in the sinus, these secretions will be trapped following obstruction of the sinus ostium. This is caused either by chronic inflammation, allergy, post-surgical injury, trauma, fibrous dysplasia or tumour lesion [2].

The majority of authors have classified mucoceles as primary mucoceles, which represent 40% of cases in patients with no history of trauma or surgery to the sinus, as in our patient, and secondary when such history is present [4].

Despite their benign nature, these tumours have a powerful lytic potential on the bony walls of the sinuses and therefore progressively spread to adjacent areas, especially the brain and the orbit, which can be responsible for complications that threaten the visual prognosis [5]. This bone erosion effect can be explained by two mechanisms, the first being the mechanical effect of the expansion of the mucocele on the bone and the second being chronic inflammation responsible for the release of certain chemical mediators (prostaglandin, cytokines and collagenase), that contribute to bone resorption [6].

The sinuses most frequently affected are: the frontal sinus followed by the ethmoidal sinus (over 80%) and rarely the sphenoidal or maxillary sinus [7].

Mucoceles classically evolve in two phases encompassing an initial asymptomatic phase and a phase of externalisation or complication with clinical expression [9]. The time between the first symptoms and diagnosis is often long, ranging from 10 months to 5 years [4]. In our case, the delay was one year.

The clinical presentation of mucoceles varies according to the sinus involved, the size, local extension and involvement of adjacent tissues, as well as the complications caused [10,11]. The most common symptoms are headache, periorbital pain, diplopia and exophthalmos. Frontal mucoceles, as in our patient, often result in exophthalmos with downward and outward displacement of the eyeball, and are often associated with filling of the supratarsal fossa. They can cause mechanical ptosis and limitation of eye movements, sometimes leading to binocular diplopia, periorbital pain or even headaches [12]. Exophthalmos appears to be the most common ocular manifestation of fronto-ethmoidal mucoceles. Posterior sinus mucoceles are often diagnosed in the presence of visual disturbances. Retrobulbar optic neuropathy, resulting from eyeball compression, may damage the optic nerve, the evolution is often slow but can worsen rapidly and jeopardise the visual prognosis [13].

Diagnosis relies on imaging studies

Computed tomography (CT) is the key diagnostic test, assessing the hypo- or isodense nature of the mass and the absence of enhancement after injection of contrast medium. It is used to rule out other differential diagnoses, to assess local endocranial or orbital extension and to find the cause of obstruction of the sinus ostium (e.g. benign or malignant nasosinus tumour, nasosinus polyposis) and to carry out a nasosinus morphological assessment by looking for anatomical variants. The landmarks that are usually constant and well known are often altered by the mucocele, hence the importance of careful intraoperative analysis of the CT scan, which provides the roadmap needed to avoid intraoperative incidents [14,15].

Magnetic resonance imaging (MRI) is not essential for the diagnosis of mucocele if the CT scan is unequivocal [16]. It was not routinely performed in the literature. However, MRI remains highly valuable in cases of extra-sinus extension, as it studies the relationship of the mucocele with adjacent soft tissues, particularly the eye, meninges, pituitary gland and optic nerve, as well as the vascular and neural elements and the cavernous sinus. The lesion initially appears as iso- or hypointense on T1-weighted images and hyperintense on T2-weighted images. As it progresses to chronicity, it presents as hyperintensities on both T1- and T2-weighted images, which is similar in appearance to a mucopyocele or tumor lesion [17].

Surgical intervention remains the standard treatment for mucoceles [18]. Two approaches are used: external surgery and endonasal or endoscopic surgery, with adequate resection of the sinus wall to ensure effective drainage of the mucocele pocket and avoid recurrence, which can occur after an average of 3.8 years and where intra-orbital extension is considered to be the most frequent risk factor [8]. The endonasal route cannot be used for large mucoceles with a significant bone defect, hence the interest in the external route, which is also indicated in complicated infectious forms [19]. Surgical treatment is necessary, especially when compression threatens visual function, urgent treatment is required [20]. In the case of our patient, we opted for an external approach, which enabled us to approach the expansive process of the frontal sinus with satisfactory control of the various procedures, and with fewer post-operative complications.

Conclusion

Frontal mucoceles, although rare, should be considered in the diagnosis of orbital masses, particularly in patients with a history of chronic sinusitis. CT scanning is crucial for diagnosis and assessment of extension, while surgery remains the main treatment. Early diagnosis and appropriate management generally ensure a favourable prognosis, as demonstrated in this case.

Conflict of Interest Statement

The authors declare that there is no conflict of interest.

All authors confirm that they have obtained written consent from the patient for publication of the article.

Author Contributions

All authors contributed equally to this work.

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Ethical Approval

No ethical approval is required for de-identified single case reports based on our institutional policies.

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