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INTRACRANIAL AND ORBITAL EXTENSION OF ETHMOID MUCOCELE

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ABSTRACT

This study is a case report of a 60-year-old man presented with chronic headaches. He had left orbital pain for about six months and left exophthalmos. Otherwise, he had no significant medical or surgical history. Physical examination revealed left exophthalmos and a palpable mass in the left medial canthus, which prompted a computed tomography (CT) scan and MRI of the orbits/sinuses.

Keywords: Ethmoid, Endoscopic Marsupialization, Mucopyocele, Proptosis, Exophthalmos, Intracranial

INTRODUCTION

A mucocele is an epithelial-lined, mucus-containing sac that is the most common cause of paranasal sinus expansion. Accumulation of mucoid secretions behind an obstructed paranasal sinus ostium is the primary etiology **[1]**.

This accumulation expands the sinus cavity and produces thinning or erosion and remodeling of the bony wall. The obstruction of the sinus cavity can be due to many causes, such as chronic sinusitis, nasal polyposis, neoplasia, postsurgical changes, or any other abnormality or trauma **[2]**.

They occur most frequently in the fronto-ethmoidal region. The frontal sinuses are involved approximately in 60% of cases, the ethmoidal complex in 30%, the maxillary in 10%, and the sphenoid sinuses are involved only rarely. There is an increased incidence in patients with cystic fibrosis **[2]**.

Mucoceles are usually observed during adulthood. In most cases, patients have a

clinical history of chronic nasal polyposis or panasinusitis. The leading symptoms are unilateral proptosis with ophthalmalgia, double vision or decreased acuity, a palpable mass in the superior medial aspect of the orbit or medial canthus with the fronto-ethmoidal mucoceles, and headaches **[3]**.

On plain X-ray films, a soft-tissue density mass may be seen obliterating the sinus with associated expansion of the involved sinus. Bony changes, such as erosion or thinning, may also be seen, especially with frontal mucoceles. These findings are better visualized on CT. Surrounding zone of bone thickening due to chronic infection is another manifestation. After intravenous contrast administration, there is uniform lack of enhancement with only a rim of enhancement from the infected mucosal membrane. Macroscopic evidence of calcifications may suggest superimposed fungal infection as seen in 5% of the cases **[4]**.

On magnetic resonance imaging (MRI), mucoceles are of low signal intensity on T1-weighted and of high signal intensity on T2weighted images. But a mixed type of signal may also be seen based on the presence of blood or inspissated secretions. Postgadolinium-enhanced MRI shows no enhancement of the mucocele **[4]**.

Sinus cavity expansion differentiates mucoceles from uncomplicated chronic sinusitis (a finding never seen with sinusitis) **[5]**. It may be impossible to separate a long-standing mucocele producing bony erosions or remodeling from a sinus malignancy or aggressive infection, without the benefit of postcontrast images. A benign rim of enhancement is identified in the case of a mucocele and a nodular or solid enhancement in the case of malignancy **[5]**.

Mucoceles may protrude into the orbits and cause vision problems and proptosis. Intracranial extension may produce optic nerve damage and blindness, involvement of the cavernous sinus with neurological symptoms, or hormonal changes in case of involvement of the sellar turcica/pituitary gland **[6]**.

Superimposed infections may also occur leading to pyoceles **[7]**. Surgical complete removal of the sinus mucocele lining is the traditional treatment. However, in recent years, there has been a trend toward transnasal endoscopic management because of its low morbidity rates and recurrence rates at or close to 0%. **[8]**.

Case Report History

A 65 years old man was referred from the ophthalmology clinic complaining of

deviation of the left eye to the left side for six months associated with headache and bulging mass on the medial side of the same eye. There was no history of diplopia or decreased vision. No history of nasal obstruction or discharge. There was no other significant medical or surgical history.

On Examination

There was a significant displacement of the left eye to the left side and bulging on the region of the medial canthus of the same eye **(Figure 1)**.

His vision was Normal and no diplopia. Nasal examination revealed a mass on the region of the left middle meatus.

Radiological Evaluation

CT scan revealed a smooth rounded mass 4x4 cm in the region of the left ethmoid region. With fluid consistency, suggestive of a mucocele extending to the left intracranial and orbital regions with bone defects and remodeling in the cripriform plate of the skull base and lamina paperecia

of the left orbit **(Figure 2)**.

The patient refused to undergo MRI because of cluster phobia. A diagnosis of left ethmoid mucocele with intracranial and orbital extension was made and the patient was advised to undergo endoscopic sinus surgery and removal of the mucocele.

Endoscopic sinus surgery was performed and marsupialization of the left ethmoid mucocele was done with complete evacuation of the contents and removal of the walls of the mucocele **(Figure 3)**.

Identification of the left anterior ethmoid artery was done and preserved, the left orbit retained to its normal position and shape intraoperatively **(Figure 4)**.

The patient recovered completely without complications and discharged next day. The patient

was followed up for one year with repeated CT scan and revealed no recurrence **(Figure 5)**.

RESULTS

Using endoscopic sinus surgery, complete evacuation of the etnmoid mucocle was achieved and intra operative reduction of the protruded orbit was done with identification and preservation of the anterior ethmoid artery.

DISCUSSION

Most mucoceles arise in the frontal and ethmoidal sinuses, they are mainly found in adults aged 30 to 60 **[5]**. They rarely extend into the intracranial cavity or orbit and much less intradural (less than 1% of cases) **[6]**.

The cause of mucocele formation (accumulation of mucous secretion) is the

occlusion of the natural pathways of the sinuses due to inflammation, fibrosis, trauma, previous surgery, anatomical abnormality or by a mass lesion **[7]**.

The cranial base destruction is reported to be 10% - 20%. The mucocele, that involves the orbit or visual pathways may cause restrictive ophthalmoplegia, proptosis, exophthalmos, and reduce visual acuity **[8]**.

On MRI, the lesion is usually hyperintensive on T2-weighted images without internal enhancement and calcification, and on CT scans isodense to brain, depending on the water content **[9]**.

Cerebrospinal fluid (CSF) rhinorrhea, neuro - opthalmological disturbances, pneumocephalus, intracranial infection, and convulsion are the most often clinical symptoms at the time of diagnosis **[10]**. In our patient the lesion was associated with left exophthalmos.

The treatment of choice is the total endoscopic removal of the mucocele together with the sinus mucosa to prevent recurrence **[11]**. Also a transnasal drainage and curretage with the help of an endoscope are applied with success **[4]**. The most often postoperative complications are CSF rhinorrhea, pneumocephalus, infection. The differential diagnoses are meningioma, glioma, epidermoid tumor, and posttraumatic porencephaly **[12]**.

Theories of pathogenesis of mucocele formation:

1. Pressure erosion
2. Cystic degeneration of glandular tissue
3. Active bone resorption and regeneration **[13]**.

Advantages of endoscopic sinus decompression: Endoscopic approach has the following advantages:

1. Morbidity and mortality are less
2. No incision is involved
3. Endoscopic examination can be performed for regular follow up of these patients **[14]**.

CONCLUSION

Mucoceles are benign lesions of expansive characteristic that may cause severe complications at orbital and intracranial levels and for this reason they should be diagnosed and treated early. Marsupialization with drainage through endoscopic sinus surgery approach proved to be a safe and efficient procedure in therapeutic approaches of frontoethmoidal mucoceles.

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Figure 1: Preoperative Orbital Displacement

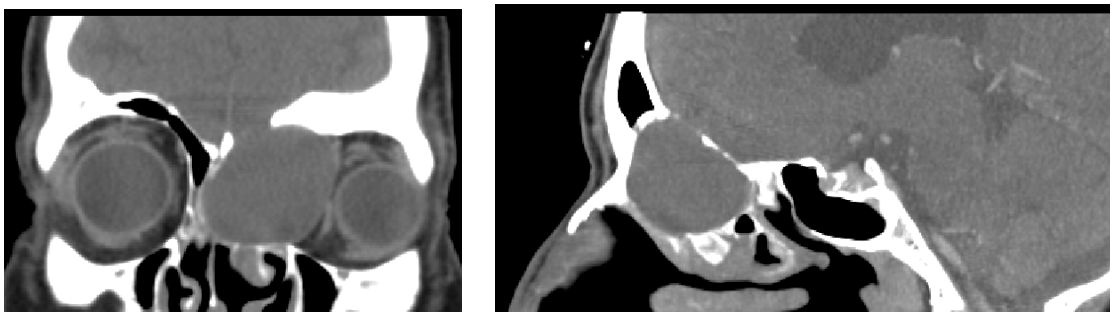

Figure 2: Preoperative CT Scan

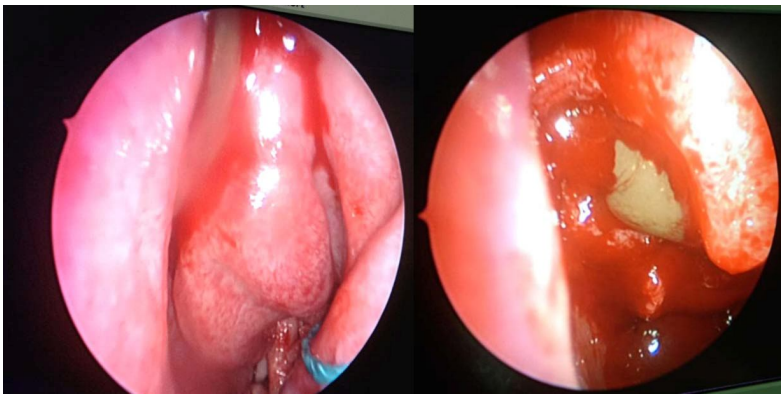

Figure 3: Endoscopic Appearance of the Mucocele

Figure 4: Identification of the Anterior Ethmoid Artery and Medial Wall of the Orbit

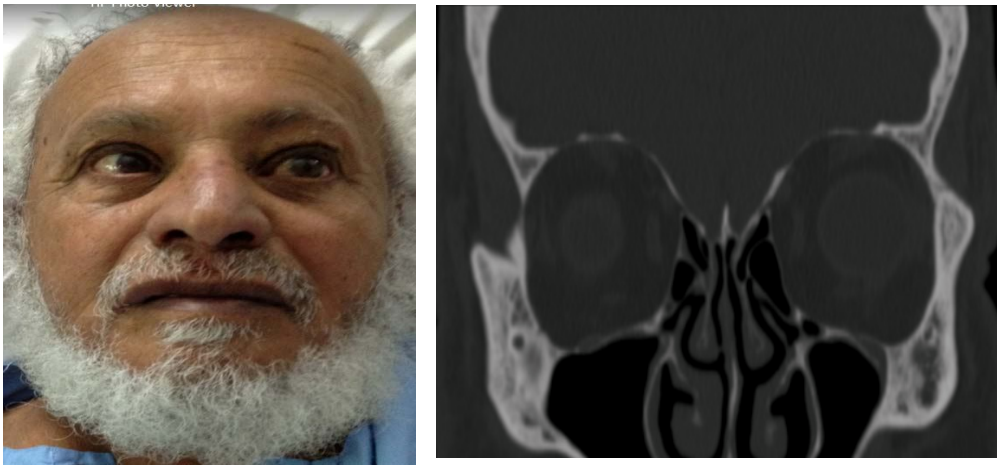

Figure 5: Normal Appearance, a Year Later