

## Frontal Mucocele Mimicking a Frontal Subcutaneous Tumor

### Abstract

Mucocele is a chronic, expanding, mucosa-lined pathology of the paranasal sinuses. Frontal mucocele usually presents with the visual complaints such as diplopia, diminution of vision, visual field defect, ptosis, orbital swelling, retro-orbital pain, displacement of eye globe, and proptosis. Very rarely, it can be present as a subcutaneous swelling. This article presents a 58-year-old male patient presenting with an asymptomatic periorbital swelling and a painless forehead mass of 3 years duration. There was a partial ptosis, and an elongated, soft, subcutaneous mass over the forehead. Surgical excision of the mass confirmed the diagnosis of a mucocele. Postoperatively, the patient was asymptomatic. A subcutaneous soft-tissue mass may be the presenting complaint of a frontal mucocele. Careful examination of the surrounding skin may suggest the diagnosis of sinus-related disease and thus direct appropriate investigations.

**Keywords:** Frontal, intracranial extension, mucocele, orbital extension, and subcutaneous mass

### Introduction

Mucocele is a slowly expanding mucus-containing benign cystic lesion lined with pseudo-stratified respiratory epithelial lining, which usually develops after chronic obstruction of the ostia of paranasal sinuses (Tan CS *et al.*, 1960). Mucoceles usually occur in the fronto-ethmoidal region, possibly because of the complexity of this region's anatomy and drainage.<sup>[1]</sup> They may expand and exert pressure on the bony boundaries invading nearby the vital structures such as the skull base and orbit, causing intracranial and/or orbital complications.

### Case Report

A 54-year-old male patient came to our outpatient department with swelling on the right forehead of 3 years duration [Figure 1]. The swelling was insidious, developed as a small nodule which progressively increased to the present size and has remained unchanged since past 3 years. There is no h/o chronic nasal obstruction, headache, diplopia or loss of smell. The patient has not reported any episode of seizures or neurologic symptoms. There is no h/o trauma, chronic symptomatic sinusitis, or previous ENT surgery. The patient is diabetic under oral hypoglycemic agents with no other co-morbidities.

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Physical examination of the patient on admission revealed no abnormalities. On neurological examination, his visual acuity was normal in both eyes. The right eye globe was pushed downward and outward. The eyeball movements were restricted in upward and medial gaze. He also had mild conjunctival chemosis and ptosis in the right eye. The rest of the neurological examination was within the normal limits. Local examination revealed a swelling in the right supraorbital and adjoining forehead region that was nontender, nonpulsatile, and free from the overlying normal skin, extending into the right orbit. There was no ulceration or discharging sinus. However, a definite bony defect was palpable around the superior and lateral aspects of the swelling. Hematological and biochemical parameters were normal. Contrast-enhanced computed tomography (CT) scan of the head revealed a nonenhancing, iso-dense lesion in the right frontal sinus, extending into the right orbit and intracranially leading to the displacement of the anterior cranial fossa dura. It also revealed the destruction of the orbital roof and posterior wall of the left frontal sinus [Figure 2].

The surgery was planned. Forehead eyebrow incision was used, and the mucocele was completely excised along with the removal of the inflamed thickened mucosa of the ethmoid sinuses. The sinuses were obliterated with abdominal fat. Exteriorization of

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sinuses was carried out with the help of vascularized pericranium graft and biological glue. The postoperative period was uneventful, and the patient was discharged with good cosmetic results [Figure 3]. The follow-up period was uneventful up to 6 months.

## Discussion

The sites of occurrence of mucocoeles are the maxillary sinus, frontal sinus, anterior ethmoidal sinus, and rarely the posterior ethmoidal sinus and the sphenoidal sinus.<sup>[2-4]</sup> Frontal sinuses are the most common site for mucocoeles, and these can be frontoethmoidal or frontal only, but bilateral frontal involvement is rare. The pathophysiology of frontoethmoid mucocoeles has been lightened in experimental studies and by clinical observations that the trapped mucosa in the frontal and ethmoidal sinuses after obstruction of sinus ostia becomes inflamed leading to the accumulation of mucus. Earlier mucocoele was thought of as a retention cyst due to the cystic degeneration of seromucinous gland. It is now proposed that the infection of frontal sinus following the obstruction of frontal recess leads to the stimulation of lymphocytes and monocytes leading to the production of cytokines by the lining fibroblasts which in turn promote the bone reabsorption and mucocoele expansion (Lund *et al.*, 1988). Since mucocoele expands in the direction of least resistance, frontal mucocoele tends to erode the thin bone of the superior orbital wall extending into the orbit and displacing the globe inferiorly.

The etiology of mucocoeles is multifactorial, which involves inflammation, allergy, trauma,<sup>[5]</sup> anatomic abnormality, previous surgery, fibrous dysplasia, osteoma, or ossifying fibroma. Nasal polyposis is associated with the chronic inflammation and causes obstruction, and hence, is related to the occurrence of spontaneous or nonsurgical-related mucocoeles.

They may occur at any age, but most of them are seen between the fourth and seventh decades. They are seen similarly in both sexes. Gradual distension, thinning, and erosion of the bony wall of the sinus are caused by the progressive accumulation of mucoid material. The mucocoele can extend into the orbit or intracranial compartment by eroding the bony limits and producing bony defects. Frontoethmoid mucocoeles cause outward and downward displacement of the globe and are often associated with a palpable mass in the superonasal and medial canthal region. The expanding mass lesion may cause proptosis, restriction of eye movements, diplopia, visual loss, retro-orbital pain, or a headache. Destruction of the posterior frontal sinus results in a direct connection between the mucocoele and the epidural space. Although, the dura can resist against the pressure exerted by the mucocoele and a possible infection, intra-dural growth or a ruptured intracranial mucocoele can present with meningitis, meningoencephalitis, brain abscess, seizures, or cerebrospinal fluid fistula (Koeke *et al.* 1996).



Figure 1: Clinical appearance as a frontal swelling

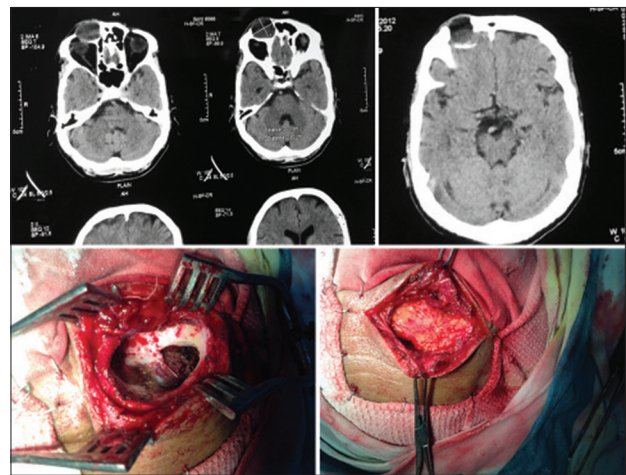


Figure 2: Computed tomography scan images showing bony erosion; Intra operative images showing intracranial extra dural extension, the defect being filled with fat



Figure 3: Final post operative image

The mucocoeles of the frontal sinus may disrupt the medial canthal ligament and the orbital roof in which the surgical interventions should include the reconstruction of these anatomic structures.

The diagnosis of mucocoele is based on a clinical investigation conducted with the aid of CT and magnetic resonance (MR) imaging. CT is used in determining the regional anatomy and extent of the lesion, specifically the intracranial extension and the bony erosion. MR imaging is useful in differentiating mucocoeles from neoplasms via the contrast enhancement.<sup>[6,7]</sup> Management of mucocoeles is done mainly by surgery, which ranges from functional endoscopic sinus surgery (FESS) to craniotomy, and craniofacial exposure, with or without the obliteration of the sinus.<sup>[8]</sup>

Many surgical approaches to frontal mucoceleles have been defined. The choice of treatment depends on the localization and extension of the mucocele. Smaller lesions can be treated endoscopically or by microscopic marsupialization using FESS. Larger lesions can be managed via procedures such as Killian or Lynch-Howarth and obliteration of the naso-lacrimal duct to prevent the ascending infections, as well as the displacement of the transplanted material into the nose, is prevented.<sup>[9]</sup> Cranialization by complete removal of the posterior frontal wall is done, and dead space is obliterated. Fat is the most commonly used material.<sup>[10]</sup>

## Conclusion

Fronto-orbital mucoceleles are commonly encountered pathologies which remain clinically silent for a long-time and often involve both the orbit and the anterior cranial fossa extensively. These lesions are benign and curable, but early diagnosis and treatment is very important. Open surgeries remain valid for large lesions with intracranial or orbital extensions and in cases where the local anatomy is unfavorable for less invasive procedures.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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