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Bilateral frontal sinus mucocele: Histopathological and clinical review of a case

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Abstract

Paranasal sinus mucoceles are cystic lesions that occur as a result of accumulation of mucoid secretion and desquamated epithelium, leading to distension by growing in an expansile and destructive manner within the sinus wall. The frontal sinus is most commonly involved, whereas sphenoid, ethmoid, and maxillary mucoceles are rare. However, bilateral frontal sinus involvement is more rare. If the cyst invades the adjacent orbit and continues to expand within the orbital cavity, the mass may mimic the behaviour of many benign growths primary in the orbit. Here, we present a case with frontal mucocele involving bilateral sinuses. It was manifested with proptosis and exophthalmia of the left eye in a forty years-old male patient. Paranasal computed tomography scan and magnetic resonance imaging revealed an image consistent with mucocele. We performed intranasal frontal sinusectomy via endoscopic approach. No orbital and intranasal complication developed at the end of the surgery. We report here that endoscopic drainage, performed by experienced hands, could be preferred surgical approach in rare case of bilateral frontal mucocele case.

Key words: Mucocele, Paranasal Sinuses, Proptosis, Exophthalmos

Introduction

Mucoceles are benign lesions, covered by pseudostratified epithelium, that affect paranasal sinuses (1, 2). Mucoceles of the paranasal sinuses were first described by Langenbeck (1820) under the name of hydatids. Rollet (1909) was the first author who used the term mucocele (3). Mucoceles are most commonly located in the frontal sinuses (60%), whereas sphenoid, ethmoid, and maxillary sinus involvement is rare (1, 2, 3). Frontal sinus mucoceles can develop due to obstruction of ostium by chronic sinusitis, polyp, tumor, trauma or surgical intervention. Mucoceles are formed as a result of accumulation of mucus and desquamated epithelium that lead to erosion due to increased pressure on the sinus wall. Mucoceles can lead to various complications with expansions in orbita, nasal cavity and intra cranium due to proximity (3, 4).

Both computed tomography (CT) and (MRI) are used in differential diagnosis and evaluation of mucoceles. CT is used for both assessment of regional anatomy and detection of particularly intracranial and intra orbital expansion, and bone erosion. MRI is helpful in differentiating mucoceles from neoplasms (3, 5). Treatment of mucoceles is achieved by craniotomy or functional endoscopic sinus surgery. Sinus obliteration may or may not accompany these surgical techniques. (3, 5).

Case

A 40 years-old male patient presented to the ophthalmology outpatient clinic with a complaint of rolling of the left eye to left and down for the past 3 months (Image 1). Paranasal CT revealed bilateral frontal mass image, and patient was referred to our clinic (Image 2). There was not any head trauma or previous nasal surgery in patient's medical history. He did not report any complaints regarding nasal pathology. Nose examination did not reveal any pathology. There was a shift to the left and exophthalmos in the left eye. No pathology was detected in bilateral light, and cornea reflexes and visual field examination was normal. There was not any finding in examination of the eye suggesting intra orbital pathology. Paranasal CT revealed a large, expansile cystic lesion filling both frontal sinuses. Frontal sinus anterior and posterior walls were intact, whereas medial wall of the left orbita was eroded by the mass (Image 2). A lesion consistent with mucocele, eroding left orbital medial wall and filling both frontal sinuses was found. Frontal sinus posterior wall was not destructed. Mass was isointense on T1 and hyper intense on T2 in MRI scans (Image 3). The patient underwent endoscopic bilateral frontal ethmoid sinusectomy. Both frontal recesses were widened by shaving and mucocele content was drained (Image 4). During six month of follow up controls, no finding of recurrence was found.

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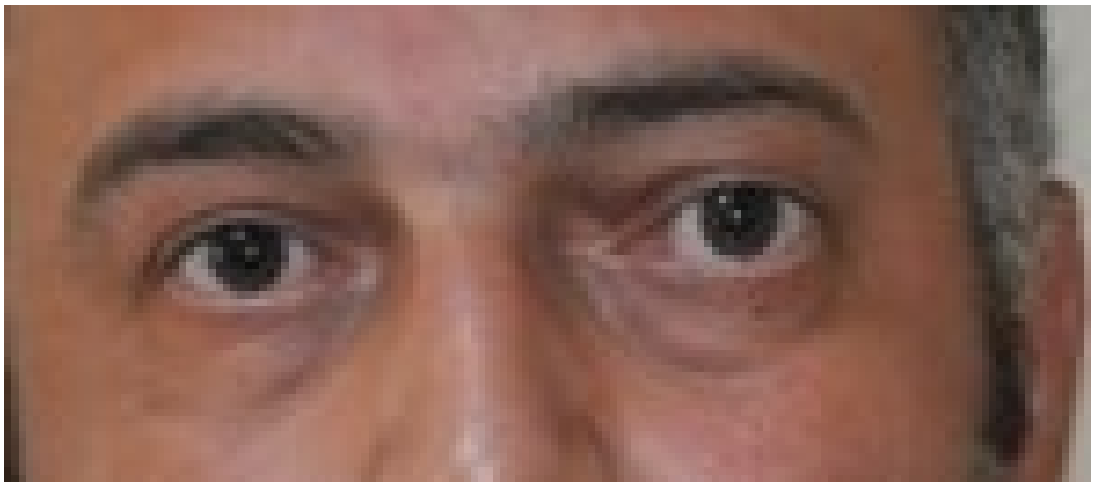

Image 1: Exophthalmia on the leftside.

Image 2: Paranasal CT section of bilateral frontal mucocele.

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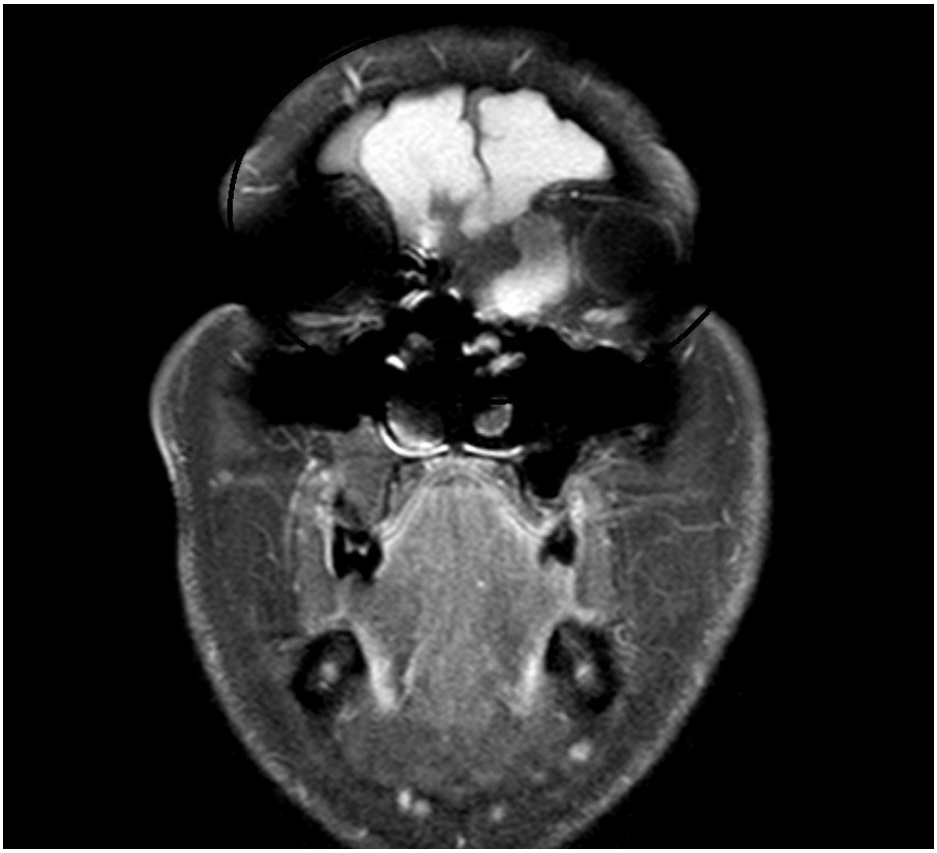

Image 3: MRI image of bilateral frontal mucocele (T1 weighted coronal section)

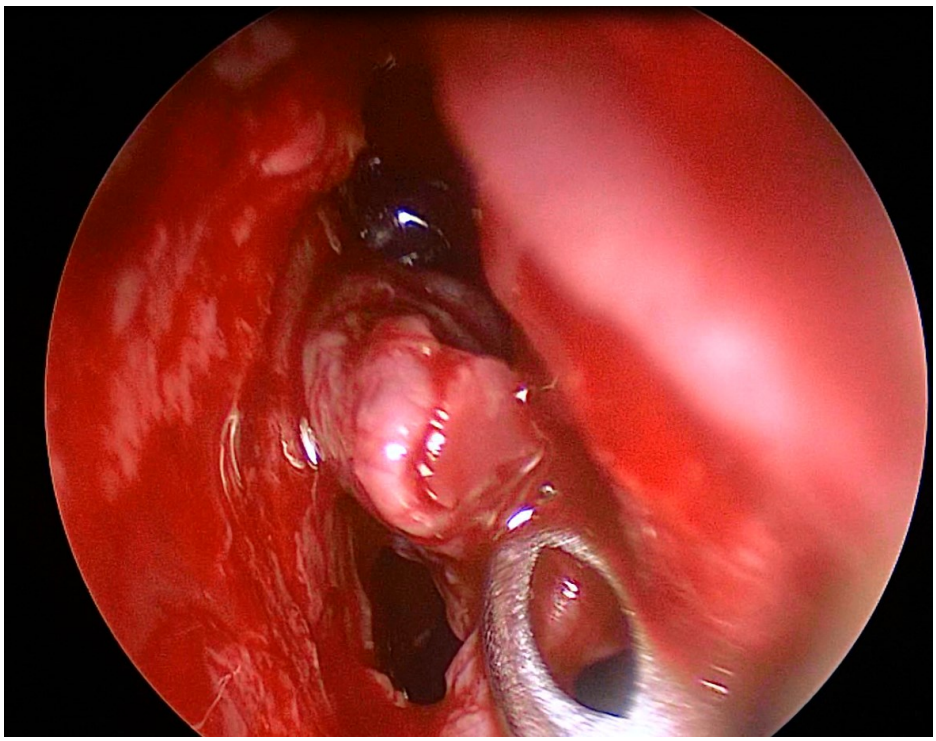

Image 4: Endoscopic examination image of mucocele.

Discussion

Mucoceles are benign lesions that occur following obstruction of sinus drainage ostium and enlarge rather subtly by eroding the surrounding bone structures within the sinus (1, 3). In literature, etiology was attributed to inflammatory process, neoplasm (e.g. osteoma, ossifying fibroma), postoperative complication, allergy, anatomic anomaly, fibrous dysplasia and posttraumatic sequel formation (2, 3, 6, 7). In our case, however, there was not any pathology except for partial stenosis in the frontal recess.

Although mucoceles involve frontal sinuses is common, bilateral involvement is very rare (2, 3). To our knowledge, only 6 cases were reported in the literature. Mucoceles can be seen in any age, but the majority are diagnosed in patients 40 to 60 years-old. This kind of mucocele affects Both Male and female are equally (3).

Microbiologic studies demonstrated that the most common isolated Bacteria were *Staphylococcus Aureus, Alpha-Haemolytic Streptococcus, Haemophilus Species,* and *gram-negative Bacillus*. The anaerobic bacteria species such as *Propionibacterium Acnes, Peptostreptococcus, Prevotella,* and *Fusobacterium* were also isolated (3, 9).

In detailed histopathologic studies, it was shown that a sustained infection develops following obstruction of the frontal recess. Continued stimulation of lymphocytes and monocytes leads to the production of cytokines by the lining fibroblasts in the sinus. These cytokines, in turn, initiate a cycle of resorption and re-modelling in the bone, resulting in expansion of the mucocele (10). Cultured fibroblasts have been shown to have significantly elevated levels of prostaglandin E2 and collagenase. Studies have found that high levels of prostaglandin E2 plays a role in the osteolytic process (3, 11, 12).

Diagnosis is mainly based on the history, physical examination and radiologic imaging. Patients usually complain of frontal headache, facial asymmetry and visual pathologies (impaired visual acuity, restricted eye movements, proptosis) (3,6). Only complaint of our patient was rolling of left eye towards left and down. Proptosis and diplopia are the most common complaints (3, 7).

Mucocele is seen as a homogenous isodense mass showing a regular contrast uptake, if not infected, and leading to irregularity in sinus contours in CT (Image 1). Same mass is seen as an isointense lesion on T1 scan and hyper intense on T2 scan, and thus findings are typical for mucocele (Image 2) (2, 3, 7).

Current treatment technique of mucoceles is surgical drainage with endoscopy. Low morbidity, complication rate and rare recurrences were reported via this treatment modality (2). In our case, we performed fronto ethmoidal sinusectomy and we did not encounter any recurrence during following 6 month.

Mucoceles are important clinic entity because of their proximity to the vital organs such as eyes and brain; moreover they could destruct the close tissues by local invasion. Endoscopic drainage method was performed as the most convenient treatment modality in protecting the vital organs and in avoiding recurrences.

Conflict of interest: The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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