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Case Report

Endoscopic sinus surgery for removal of maxillary sinus fungal ball: a case report

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ABSTRACT

The incidence of fungal rhinosinusitis (FRS) has been increasing over the past decade. FRS is categorized into invasive and non-invasive based on the histopathological evidence of tissue invasion by fungi. According to Hardik Shah, among FRS, 48% were non-invasive, and 52% were invasive. Fungal ball is the most frequent cause of non-invasive FRS, and the most commonly involved sinus is the maxillary sinus, and most cases are unilateral. Nowadays, Endoscopic sinus surgery (ESS) has become the gold standard in treatment of non-invasive FRS, due to its low morbidity and the easy access to the affected paranasal sinus. However, removal of maxillary sinus fungal ball (MSFB) may be long and difficult. Therefore, it is important to keep a sufficient field of view in order to remove the fungal debris completely. Good handling of endoscopic is needed, and furthermore, although the risk of complication of ESS for FRS is low, it is important to understand the potential complications.

Keywords: FRS, MSFB, ESS

INTRODUCTION

The frequency of FRS, although to be uncommon, it has increased in last the two decades. In patients with chronic rhinosinusitis (CRS), 6% to 12% will go to present fungus in the culture or in histopathological study.[1] FRS is classified as invasive or noninvasive; the latter includes a fungal ball, which is defined as a fungal growth in any nasal sinus without invasion of the mucosa. The most commonly involved sinus is the maxillary sinus, and most cases are unilateral.[2]

A fungal ball is a non-invasive collection of fungal debris. Recent studies indicate that anatomic variants are not major contributors to their formation, which in the maxillary sinus is more often related to dental intervensions.[3]

FRS is typically asymptomatic in the early stages and signs and symptoms may take several years to appear. Moreover, its clinical manifestation is often nonspecific and variable and includes nasal congestion, purulent or blood-stained nasal discharge, headache, craniofacial pain, and/or an impaired sense of smell.[4]

Computed tomography (CT) is the gold standard in paranasal sinus imaging and is complemented magnetic resonance imaging (MRI) as it is superior in the evaluation of intracranial and intra-orbital extension.[5]

ESS has become the gold standard of treatment of CRS, including non-invasive fungal sinusitis. It is considered as an effectiveness and safe procedure, and the recurrence rate is about 5%.[6] We reported a case of huge MSFB and the ESS approach was performed.

CASE REPORT

A 41-year-old woman, referred to the neurosurgery policlinic with complaint of unilateral facial pain and headache at the left side. Cranial CT incidentally revealed a round heterogenic opacity with calcifications in the left maxillary sinus and the patient redirected to the otorhinolaryngology policlinic (Figure 1).

Figure 1: The patient with left facial pain and nasal obstruction.

Nasal obstruction, head and left face pain were the main complaints in the anamnesis. Nasal endoscopy revealed edema at the nasal mucosa, obstruction of the ostiomeatal complex, polyp from the medial meatus, left uncinated process was medially protruded (Figure 2). Paranasal CT scan revealed a round metallic density with calcifications in the left maxillary sinus (Figure 3).

Figure 2: Nasal endoscopy revealed edema at the nasal mucosa and obstruction of the ostiomeatal complex.

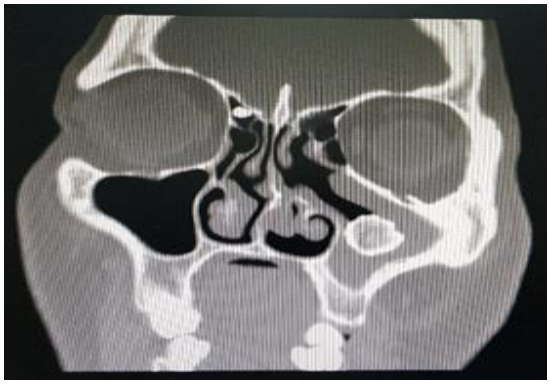

Figure 3: Coronal CT revealed metallic density with calcifications in the left maxillary sinus.

In 6th January 2021, the patient was taken into the operating room with the pre-diagnosis of fungus ball (FB) in the left maxillary sinus and under general anesthesia EES was performed. It was intraoperatively observed that left uncinated process was protruded medially and ostium of left maxillary sinus was enlarged (Figure 4).

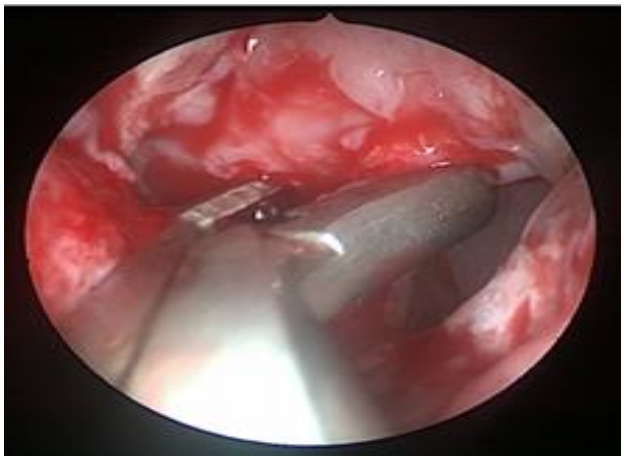

Figure 4: The ostium of left maxillary sinus was enlarged.

We extended left maxillary sinus ostium towards anterior. Green, cheese like material was extracted from left maxillary sinus. To extract the residual fungus material, anterior side of left maxillary sinus was washed with pressurized saline solution using curved aspirator. The 30-degree angled endoscope used in this process (Figure 5).

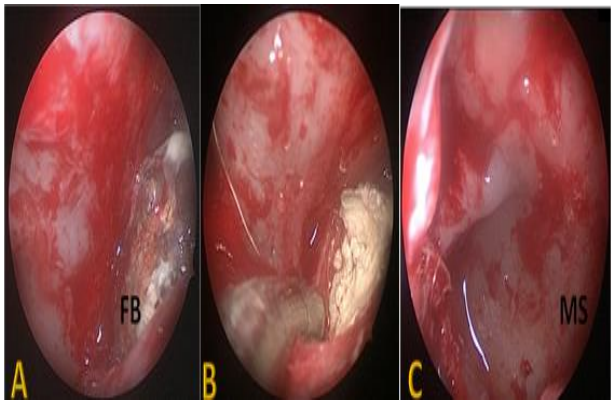

Figure 5: Intra-operative endoscopic view of the fungal ball in left maxillary sinus.
Note: FB- fungal ball; MS- maxillary sinus.

At the histopathologic examination, fungus hyphae were observed and reported as aspergilloma. (Figure 6) There were no post-operative complications. At the follow-up, all symptoms were improved. Paranasal CT scan three months after surgery unrevealed a round metallic density with calcifications in the left maxillary sinus and the left maxillary sinus was clearly seen in endoscopic view (Figure 7).

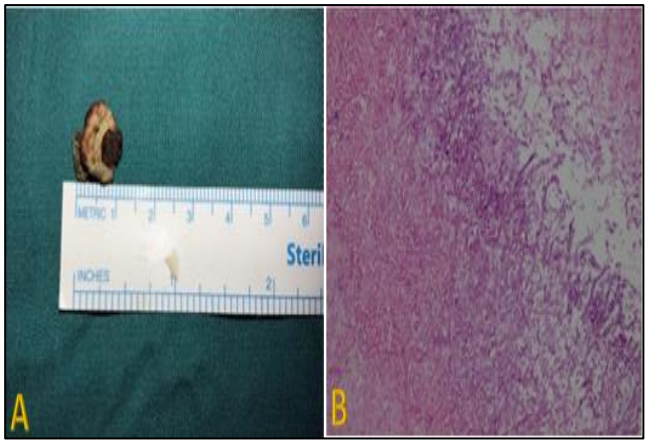

Figure 6: The 1 cm fungal ball; H and E 100X candida of pseudo hyphae-fungal ball.

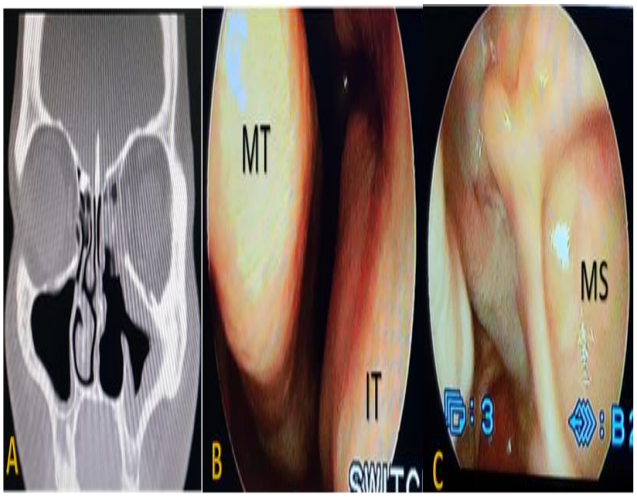

Figure 7: Coronal CT unrevealed metallic density with calcifications in the left maxillary sinus (3 months after surgery). Endoscopic view 3 month after surgery revealed left maxillary sinus was clearly seen and the inferior turbinate still intact.

Note: IT- inferior turbinate; MT- middle turbinate; MS- maxillary sinus.

DISCUSSION

FRS is classified into non-invasive and invasive. Non-invasive FRS constituted fungal colonization, fungal ball, and allergic FRS. Invasive FRS is again divided into acute invasive, chronic invasive, and chronic granulomatous forms.[7] This case belonged to non-invasive FRS.

Fungal ball (FB) is a chronic non-invasive and extra-mucosal FRS, which usually occurs in immunocompetent individuals as a unilateral lesion. The incidence, prevalence and risks factors of FB are not yet fully studied. According to recent studies, the condition was identified in 0.29-5.4% of all cases of inflammatory CRS, subjected to surgery, and 25% of FRS cases.[8] Females were predominant in many studies (60.1%). The pathophysiology of FB remains unknown despite previous report suggesting the overfilling of dental cavities as a risk factor.[9]

Most commonly, FB involves and maxillary sinus (in approximately 75-98.2% of cases). Less commonly affected are the sphenoid sinuses (4-25%), ethmoid sinuses (2.8-3.4%), frontal sinuses (1.1-2%) and, much less often, both maxillary sinuses (1.3-7.6%) or any two sinuses (0.6-4.6%).[8] In this case, the left maxillary sinus was affected.

The most common symptoms in patients with MSFB are: purulent nasal secretion (15.1-75%), nasal obstruction (31.2-76.9%), facial pain (10.9-61.5%), cephalgia (10.1-56.5%), cacosmia-hyposmia (20.9-26.7%) and eyelid edema (1.5%).[8] The diagnosis of MSFB was established based on clinical manifestations, endoscopic and imaging examinations, allowing to suspect the condition, but the definitive diagnosis was confirmed by histopathological study.[1,8,10] Surgery is the mainstay of management of FB.[1,6,11] Two forms of surgical procedures for removal of the MSFB are describes in medical literature: the historical procedure of Caldwell-Luc, who consists of the opening of canine pit for attainment of access to the maxillary sinus; beyond the surgery for it saw endoscopy, standard-gold actually.[1]

To treat MSFB, all of the fungus must be completely removed. To verify complete removal of the FB, it is important to achieve sufficient visualization of the sinus. In addition, the use of not only a 0° endoscope but also angled endoscopes (30°, 45° and 70°) are required to achieve this. How to ensure the sufficient visualization? It is sometimes difficult to see the anterior inferior or medial inferior wall of the maxillary sinus even when a 70° endoscope is used, when the maxillary sinus is observed from a middle meatus window.

If 70° endoscopes don't allow sufficient visualization afterwards, then a flexible scope deployed into the maxillary sinus may avoid any unnecessary surgery. Although the surgery involves a large opening of the sinus, including removal of part of the inferior turbinate in some cases, the surgery should also prevent damage of the nasal cavity structures. There are three approaches of EES to treat MSFB: middle meatus approach (uncinectomy and middle meatal antrostomy/standard procedure of EES); Combined approach (both middle and inferior meatal antrostomy with preserved inferior turbinate); and endoscopic modified medial maxillectomy/EMMM (medial maxillectomy with preserved inferior turbinate and nasolacrimal duct).[6]

In this case, we performed EMMM. It was describing that the lateral part of inferior turbinate is cut once using turbinate scissors up to the middle meatal antrostomy. After sifting the preserved inferior turbinate to the posterior midline position, the medial maxillectomy is performed from the middle meatal antrostomy using the

backbiter cutting forceps. After the removal of FB, the turbinate is repositioned in its original position. The 30° endoscope was used to achieve sufficient visualization, but it was difficult to see the anterior inferior or medial inferior wall of the maxillary sinus. So, we had tried to maneuver our hand-wrist, and it was succeeded.

CONCLUSION

ESS is the best choice for removal MSFB. All the fungus must be completely removed. To verify complete removal of MSFB, it is important that there is sufficient visualization of the sinus. We have performed endoscopic modified medial maxillectomy for this case. Good handling of endoscopic is needed, and furthermore, we must understand the risks of this procedure to avoid the complication.

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