



Maxillary fungus ball in a diabetic patient. An odontogenic origin



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Maxillary fungus ball in a diabetic patient. An odontogenic origin

INTRODUCTION: *Fungus ball (FB) represents a granulomatous mass due to a fungal colonization which may disseminate and potentially lead to a systemic infection. Maxillary fungus ball is considered to be a complication of dental treatment and, according to relevant literature, it often stems from improper endodontic therapies.*

MATERIAL AND METHODS: *The authors report the case of a 69-year-old caucasian woman with nasal respiratory distress and frequent sinusitis symptoms. According to clinical and radiological evidence, FESS surgery was planned, thus validating FB diagnostic hypothesis.*

CONCLUSIONS: *Fungal infection should always be considered in patients with sinusitis and previous root canal therapy. Misdiagnosis can lead to severe complications. Surgical removal seems to be effective and resolute.*

KEY WORDS: Endoscopic surgery, Fungus Ball, Maxillary sinusitis

Introduction

Fungus ball (FB) is defined as a tumorlike granulomatous mass formed by the colonization of fungi in a body cavity, which may disseminate throughout the bloodstream to the entire body ¹. Paranasal sinuses, especially maxillary sinus, represent elective sites of infection. Complications from maxillary FB appear to be serious ². Risk factors can include severe chronic neutropenia, systemic corticosteroid therapy, diabetic ketoacidosis or uncontrolled diabetes and prior exposure to voriconazole ³.

Clinical features are vague, whereby diagnosis is frequently delayed; it occurs when fungal vegetation fills the entire maxillary sinus, so that surgery becomes the only viable option. In advanced stages, patients may report cacosmia, purulent rhinorrhea and maxillary pain ⁴. In some cases, symptomatology can be widely exacerbated by concurrent bacterial infections, which can result in extra sinus complications.

In CT, FB appears as a hyperdense region due to the high content of heavy metals and calcium: these microcalcifications often represent pathognomonic signs ⁵.

Case Report

The authors report the case of a 69-year-old woman with nasal respiratory distress and frequent sinusitis symptoms, unremitting, despite medical treatment consisting in the employment of antibiotics such as amoxicillin and clavulanic acid, along with cortisone. The patient underwent

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ABBREVIATIONS

FB: fungus ball
 FESS: functional endoscopic sinus surgery
 CT: computed scan
 PCR: polymerase chain reaction
 MRSA: methicillin-resistant *Staphylococcus aureus*

CT scan examination which showed hyperdense material occupying the whole right maxillary sinus (Fig. 1). Anamnesis revealed a history of uncontrolled diabetes (glycated hemoglobin 9%) and previous root canal therapy on dental elements 1.5, 1.6, with the employment of zinc oxide (Fig. 2). Therefore, according to clinical and radiological findings, FESS surgery was planned. Through nasal endoscopic approach maxillary sinus ostium was opened and the removal of the fungal material (3x3 cm diameter) from the sinus cavity was performed (Figs. 3, 4). The patient was discharged the day after surgery. Nasal swab was also performed and showed MRSA superinfection for which intravenous Vancomycin therapy for 10 days was administrated. Extracted material was examined and identification of *Aspergillus Flavus* was made through PCR, a sensitive procedure useful to detect viable as well as nonviable fungal pathogens, thus validating a FB diagnostic hypothesis⁶.

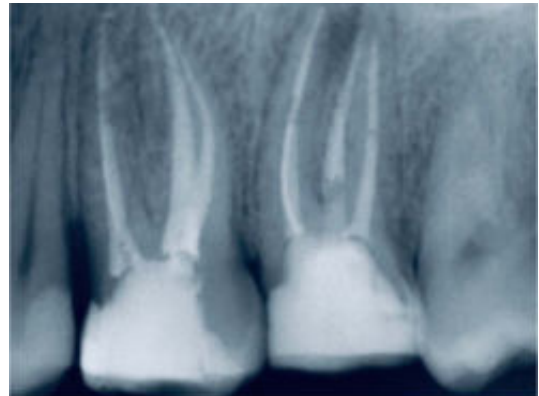


Fig. 2: Periapical radiography showing elements 1.5 and 1.6 treated endodontically.

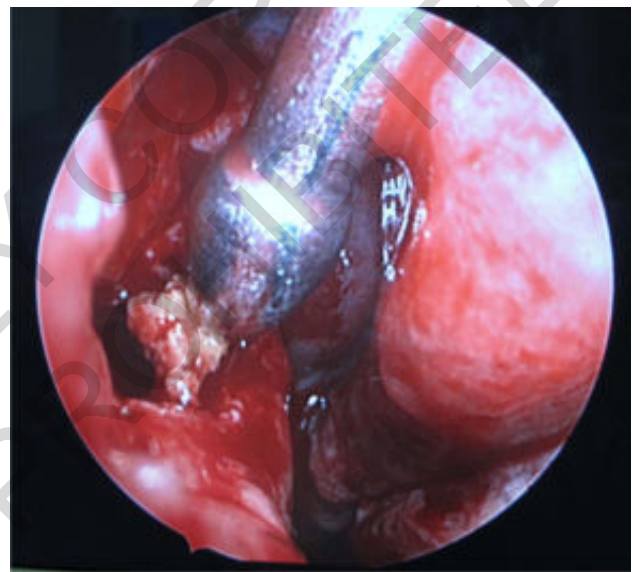


Fig. 3: Intraoperative picture: vegetation occupying the maxillary sinus is visible.

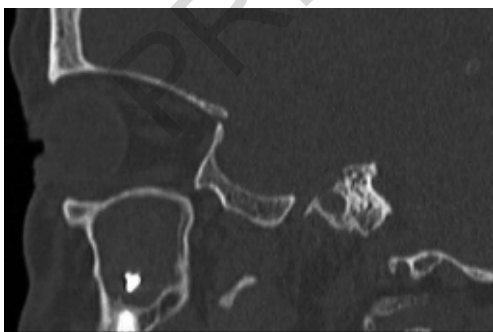
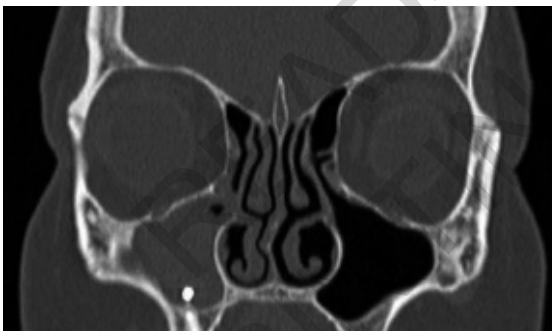


Fig. 1: Preoperative CT scan demonstrating the complete obliteration of maxillary sinus and hyperintense material in the inside.

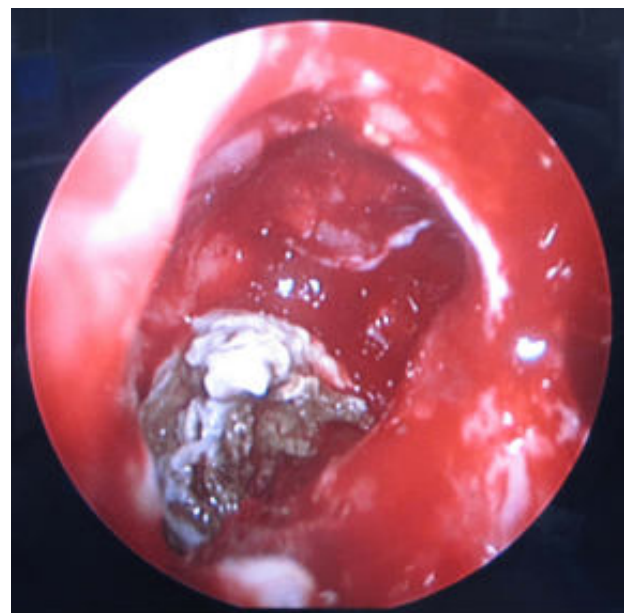


Fig. 4: Intraoperative picture showing mycotic vegetation.

One month after the surgical procedure, significant improvement of clinical picture was observed, with disappearance of sinusitis symptomatology. One year later, CT scan showed no reprise of the disease, and the patient did not report further symptoms.

Discussion

According to present literature, maxillary fungus ball can be considered to be a complication of endodontic therapies of the upper antral premolar or molar. The contiguity of root foramina along the maxillary sinus floor may induce the spread of odontogenic inflammatory processes to the sinus cavity⁷. The hypothesis of the aforesaid etiological correlation mainly relies on the chemical composition of endodontic sealers, especially those made of zinc oxide, which promotes the survival and proliferation of fungi such as *Aspergillus Fumigatus* and *Flavus*. What makes FB potentially dangerous is the lack of precocious symptomatology, which leads to a delay in the discovery of the disease⁸. Diabetes also appears to be a risk factor. In the presented case, anamnestic record of the patient showed both previous endodontic therapies and diabetes. Surgery appeared to be the only therapeutic choice to prevent further complications. In order to deepen knowledge and understanding of FB etiopathogenesis, the authors propose that data on zinc oxide use for endodontic therapies should be gathered in suspected cases. It is therefore advisable to execute root canal therapies on antral teeth with utmost attention to the work length, performing techniques such as warm canal obturation, and utilizing low amounts of endodontic sealers, possibly avoiding zinc oxide⁹. Follow-up should include radiological check-ups and evaluation of symptomatology after one year¹⁰. Differential diagnosis should exclude bacterial sinusitis, trigeminal schwannomas and palatal fistulas^{11,12}.

Conclusions

Maxillary fungal infection should always be considered in patients with maxillary sinusitis symptoms and previous endodontic treatments in the upper molar or premolar area. Surgical removal represents the treatment of choice. Moreover, endoscopic surgery appears to be an effective strategy with minimally invasive approach and low risk of complications for many conditions in the cranio-maxillofacial district^{13,14}.

Riassunto

Una massa granulomatosa sviluppatasi da una colonia fungina viene indicata come "palla di fungo" (FB), che

può diffondersi e potenzialmente portare a un'infezione sistemica.

La palla fungina mascellare è considerata una complicazione di un trattamento odontoiatrico e, secondo la letteratura di riferimento, spesso trae origine da trattamenti endodontici impropri.

Gli autori riportano il caso di una donna caucasica di 69 anni con difficoltà respiratoria nasale e frequenti sintomi di sinusite. Dopo analisi cliniche e radiologiche, è stata trattata con FESS (Functional Endoscopic Sinus Surgery), convalidando così l'ipotesi diagnostica di FB.

In conclusione l'infezione fungina deve essere sempre presa in considerazione nei pazienti con sinusite e precedente terapia del canale radicolare. La diagnosi errata può portare a gravi complicazioni.

La rimozione chirurgica sembra essere efficace e risolutiva.

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