

Mycosis of the Maxillary Sinus as an Occupational Disease: Report of Two Cases

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Abstract

Fungal infections of the paranasal sinuses may occur in patients with chronic sinusitis, who usually have a predisposing cause such as neutropenia, prolonged use of corticosteroids, uncontrolled diabetes mellitus, HIV infection. Occasionally it may also be seen in immunocompetent patients. The patient's medical report and occupation seem to be very important information. The duration of the symptoms and the negative response to other medical treatment for sinusitis, show the fungal infection as the more likely diagnosis.

Keywords: *Aspergillus terreus*; *Candida albicans*; Maxillary sinus; Occupational disease; Fungal sinusitis

Introduction

Mycosis of the maxillary sinuses usually affects immunocompromised patients, with hematologic malignancies and rarely other with uncontrolled diabetes mellitus.

Fungal infections of the paranasal sinuses may occur in patients with chronic sinusitis, who usually have a predisposing cause such as neutropenia, prolonged use of corticosteroids, uncontrolled diabetes mellitus, HIV infection. Occasionally it may also be seen in immunocompetent patients.

We have two types of fungal sinusitis, invasive and non-invasive type. The most dangerous is the invasive one, where we have a destruction of the adjacent structures of the maxillary antrum, such as orbit. The non-invasive type is the commonest one. It is of utmost importance that physicians suspect the possibility of fungal sinusitis in these patients, especially if they do not respond to medical treatment or when they present complication of sinusitis [1-3]. We present two cases of non-invasive maxillary sinusitis in immunocompetent patients related to their occupation. It is unusual to have such an etiology and we note the importance of completeness of medical history, during the patient's examination.

Cases

Case 1

A 42-year-old male, Caucasian patient, was presented in the outpatients clinic with purulent nasal discharge, obstruction, headache, facial pain - pressure and fullness in the right side of the face. Based on previous culture of pus swab (following transnasal drainage), in ENT department, which showed *Staphylococcus epidermidis*, the patient was under antibiotic treatment for three weeks without any clinical improvement.

No medical history was reported. The patient responding to our questions on the potential occupational hazards disclosed that two months ago he was involved in disinfection/deactivation procedures of activated sludge to eradicate microorganisms using fungal toxins without taking any prophylactic measures as recommended by Public Health guidelines. The symptoms began following this activity.

Water's view X-ray showed a fluid level in the right maxillary sinus. A computerized tomography (CT) scan of the maxillary sinuses was ordered and demonstrated mucoperiosteal thickening, expansion and opacification of the right maxillary sinus (Figure 1). Based on the social history and the clinical and radiological signs, mycosis of the maxillary sinus was included in the differential diagnosis as a possible occupational disease.

After three days, under general anesthesia, the maxillary sinus was drained and the whole pathological mucosa was removed, through a Caldwell-Luc approach. Cultures of the maxillary sinus mucosa, two



Figure 1: Pre operation CT – *Candida Albicans* - Case 1.

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Figure 2: Post operation CT – Case 1.



Figure 3: Pre operation CT – *Aspergillus Terreus* - Case 2.

days later, grew *Candida albicans*, even though the pus swab was positive for *Candida* and *Staphylococcus epidermis*. Whole blood Polymerase Chain Reaction (PCR) for *Candida* DNA was negative.

Low voriconazole MIC, <0.06 µg/ml, caspofungin 0.19 µg/ml, itraconazole 0.064 µg/ml and resistance to posaconazole were recorded by the CLSI micro dilution method. After two days, voriconazole was administered per-os for 2 months at 200 mg twice a day. The histopathological examination showed inflammation of the mucosa without any sign of malignancy.

The patient remains free of symptoms since the first month of the treatment, in all follow up period, three years after the surgical procedure. A new CT scan, at the end of the treatment period, showed good ventilation of the maxillary sinus (Figure 2).

Case 2

A 38 year-old male, Nigerian patient, was referred in the clinic, with nasal discharge, obstruction and headache. The patient had

three courses of antibiotics for maxillary sinusitis by his family doctor without any clinical improvement. No medical history was reported. The patient responding to our questions on his occupation reported that he was a merchant of clothes looking like used.

According to our personal research, these clothes undergo a special process with fungal toxins, before taking their final characteristic colors. The patient also mentioned that the merchandise was kept in a dark and damp basement, and he was the only one who made all the collection for months, being many hours in this site, without any prophylaxis. There was high suspicion that the maxillary sinusitis was a result of mycosis of the sinus, as a possible occupational disease.

Water's view X-ray and computerized tomography (CT) scan of the maxillary sinuses demonstrated opacification and calcified sites with expansion of the right maxillary sinus (Figure 3).

Two days later, the maxillary sinus was drained, the mucosa with the calcified pieces were removed through a Caldwell-Luc approach. Cultures of the maxillary sinus mucosa, 48 hours later, grew *Aspergillus terreus*. The pus swab was negative for any other pathogen. Whole blood PCR for *Aspergillus* DNA was also negative. Low voriconazole MIC 0.094 µg/ml, caspofungin 0.5 µg/ml, itraconazole 0.25 µg/ml and posaconazole 0.064 were recorded by the CLSI micro dilution method.

Five days postoperative, voriconazole was administered as a therapy, but the patient had complained of dizziness, within the first two days of therapy in the hospital. Finally, posaconazole was administered per-os for 3 months at 200 mg twice a day. The histopathological examination showed signs of inflammation, without any sign of malignancy.

The patient remains free of symptoms since the second month of his therapy, and during all the follow up period, which lasted two years. A new CT scan, at the end of the treatment period, showed good ventilation of the maxillary sinus (Figure 4).

Discussion

Mycotic chronic rhinosinusitis is a clinical entity produced by several kinds of fungi. It can be classified as an invasive and non-invasive disease. The invasive type can be divided in acute and chronic forms depending of the illness progress and granulomatous and non-granulomatous depending on histological features. The non invasive type is divided into: mycetoma form (fungus ball), saprophytic colonization and the allergic fungal rhinosinusitis [1,2,4].

A variety of different causative organisms could be responsible for fungal sinusitis. The commonest are *Aspergillus* species, whereas *Candida* spp. has been described than less common etiologies.



Figure 4: Post operation CT – Case 2.

Aspergillus fumigatus is the most common etiological fungal agent producing rhinosinusitis [5,6].

Diagnosis of oral and paranasal mycosis is a combination of clinical, microbiological, and histologic characteristics. Unfortunately, this may be difficult because concomitant bacterial, viral or other fungal infections may confuse or hinder prompt diagnosis as may the associated complex medical status of the immunocompromised patient. The histopathologic studies are considered by some, to be the golden standard but can be slow, and blood cultures have little utility. However the non culture-based diagnostic methods, such as serodiagnosis and polymerase chain reaction (PCR), are very promising for the early diagnosis. In addition, the detection of galactomannan, a component of the cell wall of *Aspergillus* species, has the potential to be clinically useful marker for early diagnosis [7-10].

Immediate and often aggressive surgical debridement and antifungal drug therapy are the right measures for the satisfactory management of the mycosis, which is depending on the fungi specie. Early diagnosis of the mycosis is also difficult to be established.

Records of the occupation of the patients oriented us towards a mycotic disease and this led us to the correct diagnosis and to the right therapy.

The Caldwell - Luc approach and the antifungal therapy were successfully used in our patients, with *Candida* and *Aspergillus* mycosis, as they fully treated.

In our view these cases indicate the value of accurately recording a complete medical history including occupational incidents, can play a really important role in the timely diagnosis and effective management of fungal-related maxillary sinusitis.

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