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Facial cutaneous and paranasal sinuses Mucormycosis: a case report and review of literature

Tarek A. Fotouhy[1] and Mahmoud R.A. Hussein[2, *]

[1]Departments of Maxillofacial Surgery (Sohag University) and [2]Pathology (Assuit University)

Corresponding author*: Dr. Mahmoud Rezk Abdelwahed Hussein, Department of Pathology, Faculty of Medicine, Assuit University, Assuit, Egypt. Email address: frcpath17@gmail.com

Abstract:

Background: Mucormycosis, a medical emergency, is a necrotizing disease caused by fungi of the Zygomycetes class and Mucorales order. **Case report:** A 32 years-old female patient presented with skin ulcer in the left infraoribial region associated with progressive left proptosis. Nasal endoscopy revealed a mass lesion in the maxillary sinus. Computed tomography revealed maxillary sinus mass, extending to the ethimoid sinus with bone erosion suggesting malignancy. The findings of Magnetic Resonance Imaging suggest granulomatous inflammatory lesion. Biopsies were obtained from the cutaneous and maxillary sinus lesions revealing granulomatous reaction, dense infiltrate of eosinophils and fungal structures. Accordingly, the diagnosis of Mucormycosis was established on histolological ground. To our knowledge, we report the first case of concomitant facial cutaneous and paranasal sinus Mucormycosis. **Conclusions:** Our report emphasizes several notions: i) paranasal sinus mucormucosis is often misdiagnosed as cancer, ii) its recognition requires high index of suspicion and increased awareness, iii) diagnosis of Mucormucosis can be established on histological ground and vi) surgical debridement and antifungal therapy are required.

Keywords: Mucormycosis, fungal, skin, nasal sinuses.

1 Introduction:

The Zygomycosis (phycomycosis) is a condition characterized by tissue invasion with broad, non-septate, hyphae of several fungal genus including Rhizopus, Rhizomucor, Absidia, Conidiobolus, Basidiobolus and Mucorales [1]. Fungi belonging to the order Mucorales include six families, all of which can produce cutaneous and deep fungal infections [2]. Species belonging to the family Mucoraceaeare are isolated more frequently from patients with Mucormycosis than any other family. Among the Mucoraceae, Rhizopus oryzae (Rhizopus arrhizus) is the most common causative agent [2]. The host defense against the development of mucormysosis includes iron sequestration, and killing of the Mucorales by the generation of oxidative metabolites and the cationic peptides defensins by the polymorphs and histiocytes. The pathogenetic mechanisms involved in the development of Mucormycosis include scavenging sufficient iron for growth from the

host, and securing access to the vasculature for dissimination of the fungi [3, 4].

Mucormycosis is one of the most rapidly progressive lethal forms of fungal infections in human beings. It has a disseminated, cutaneous, pulmonary, gastrointestinal and rhino-orbitocerebral forms. The treatment modalities of Mucormycosis include aggressive surgical debridement and administration of antifungal therapy. However, despite the proper therapy, the mortality rate can reach 40% of the cases. Here we report a case of paranasal sinuses and cutaneous Mucormycosis [1, 4].

Here we report a case of fascial and paranasal sinus Mucormycosis. To the best of our knowledge, Mucormycosis concomitantly involving the fascial skin and the paranasal sinuses has not been reported. The relevant literature was discussed.

2 Case Report:

A 32 years-old female patient presented with skin lesion in the left check of 1 year duration with progressive left proptosis of 6 months duration. Clinical complaints included double vision (diplopia) with left sided facial pain. With examination, there was a left maxillary swelling. Nasal endoscopy revealed a mass lesion in the maxillary sinus.
Computed tomography described a mass in left maxillary sinus with intraorbital extension with bone erosion suggesting malignancy. The findings of Magnetic Resonance Imaging included diffuse thickening of the left maxillary sinus with opacification of the sinus cavity with intraorbital extension (Figure 1).

Laboratory data were as follows: WBC 8,000/mm^3 with 78% neutrophils, 4% eosinophils; hemoglobin 10.8/dL, platelets 220/mm^3. Liver and kidney function tests were normal. Immunological work-up was free. HIV test was negative. Surgical intervention included coldluck incision of the left maxilla and debridement with biopsy from the left maxillary lesion. Biopsies were obtained also from the cutaneous lesions. Sections from the maxillary sinus mass and skin lesion show essentially similar features. Sections from the maxillary mass show unremarkable respiratory epithelium.

There is subepithelial fibrosis, infiltrate of chronic inflammatory cells (lymphocytes, histiocytes, plasma cells and eosinophils), and aggregates of epithelioid cells with parasitized multinucleate giant cells containing fungal elements. Sections from the skin lesion show focal epidermal hyperplasia. Within the dermis, there is a dense infiltrate of chronic inflammatory cells with parasitized multinucleate giant cells containing fungal elements and aggregates of epithelioid cells. PAS stains were performed on the both specimens and revealed fungal elements in the form of predominantly nonseptate (cenocytic), broad, thin-walled, pleomorphic hyphea, with irregular, non- parallel contours and occasional haphazard branching.

The diagnosis of mucomycosis was established (Figures 2 and 3). The patient was started on antifungal therapy with a good clinical response. Repeated CBC showed decreased WBC 5000 /mm^3 with 60% neutrophils, 5% eosinophils; hemoglobin 11/dL, platelets 280/mm^3. Liver and kidney function tests were normal. The patient did not respond well to Follow-up.

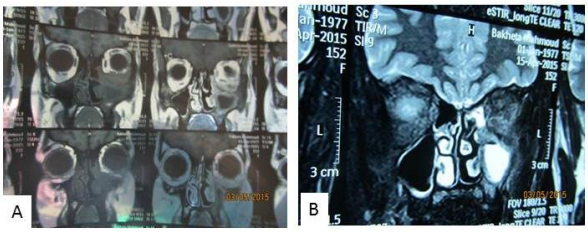

Figure 1: Radiological features of paranasal sinus Mucormycosis. Computarized tomography and magnetic resonance imaging findings of the paranasal sinus showing diffuse thickening of the left maxillary sinus with opacificayion of the sinus cavity with intraraorbital extension.

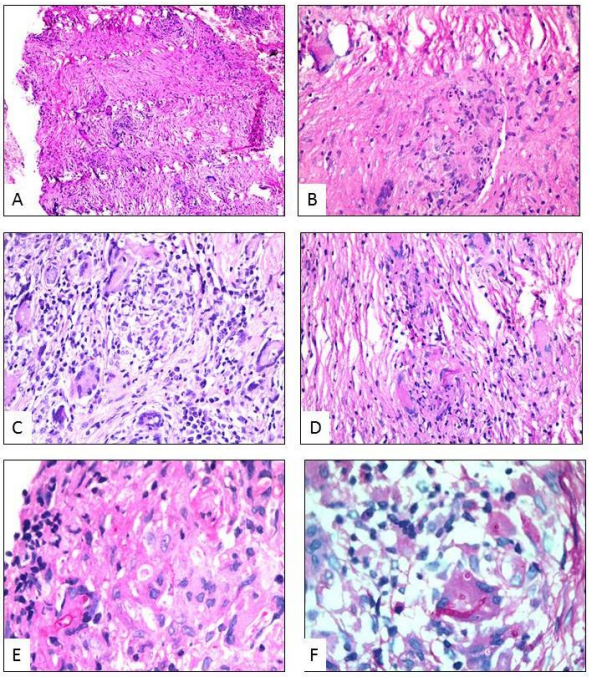

Figure 2: Histological features of paranasal sinus mucomycosis. Sections from the maxillary sinus mass and skin lesion show essentially similar features. Sections from the maxillary mass show unremarkable respiratory epithelium. There is subepithelial fibrosis, infiltrate of chronic inflammatory cells (lymphocytes, histiocytes, plasma cells and eosinophils), aggregates of epithelioid cells with parasitized multinucleate giant cells containing fungal elements. PAS stains revealed fungal elements in the form of predominantly nonseptate (cenocytic), broad, thin-walled, pleomorphic hyphea, with irregular, non-parallel contours and occasional haphazard branching.

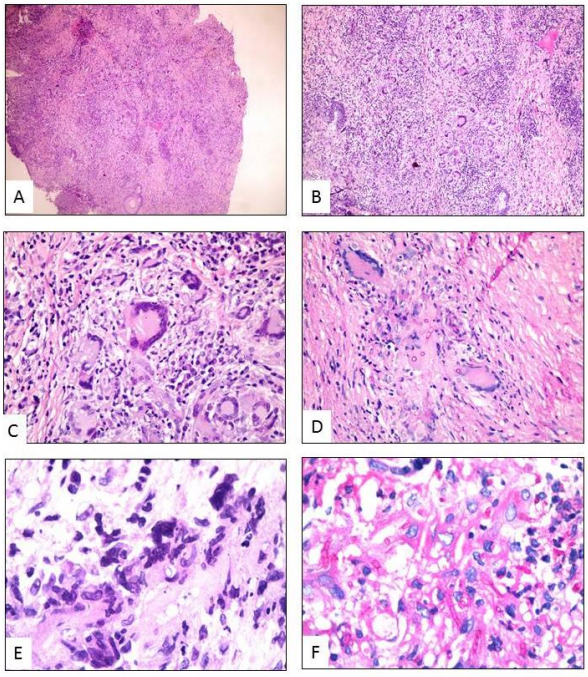

Figure 3: Histological features of cutaneous mucomycosis. Sections from the skin lesion show focal epidermal hyperplasia. Within the dermis, there is a dense infiltrate of chronic inflammatory cells with parasitized multinucleate giant cells containing fungal elements and aggregates of epithelioid cells. PAS stains revealed fungal elements in the form of predominantly nonseptate (cenocytic), broad, thin-walled, pleomorphic hyphea, with irregular, non- parallel contours and occasional haphazard branching.

3 Discussion:

Here we report a case of facial cutaneous and paranasal sinuses Mucormycosis. In this case, the diagnosis of Mucormycosis was based on the distinctive histological features (granulomatous reaction) and on the presence of PAS-positive hyphal structures with characteristic morphology of Mucoraceae within the parasitized giant cells.

In our case report, we assume that the initial infection was in the form of cutaneous lesions (facial skin lesion) with subsequent spread to the paranasal sinuses. The Mucoraceae (agents of cutaneous Mucormycosis) are usually incapable of penetrating intact skin. However, disruption of the skin by burns, trauma, maceration allows implantation of the organisms from soil, plant materials, contaminated surgical dressings, injection sites, endotracheal tube, surgical taps, or infected catheters, and their penetration into deeper tissues. The clinical manifestations include cutanteous papules, ulcers or swellings.The organisms can invade deeply into the subcutis, fascia, muscle, bone and blood vessels leading to hematogenous dissemination [5, 6] [4, 7].

Rhinocerebral (sometimes called craniofacial) Mucormycosis represents

between one-third and one-half of all cases of Mucormycosis. Most cases are found in diabetic or organ transplant patients[4]. Clinical manifestations include fever, sinusitis, periorbital cellulitis, eye or facial pain, facial numbness, conjunctival suffusion, blurry vision, and soft tissue swelling [8, 9] [10]. Visual inspection of the nose and paranasal region may reveal normal, erythematous, thickened mucosa, necrotic areas, ulcerations, or mass lesions. The disease may spread from the sinonasal areas to the orbit, resulting in loss of extraocular muscle function and proptosis, chemosis, visual loss, and ophthalmoplegia. Rhinocerebral Mucormycosis can spread to the mouth or to the palate with necrosis and ulcerations. The spread of infection to the brain leads to bloody nasal discharge, cavernous sinus thrombosis and involvement of the optic nerve. These complications may result in visual loss or death [11] [12].

Radiological, culture and molecular studies have a limited role in the definitive diagnosis of mucormycosis. Early in the disease, both computarized tomography (CT) and magnetic resonance imaging (MRI) usually have a normal appearance. As the disease progresses, the most common findings on CT scanning of the head or sinuses include: sinus mucosal thickening, thickening of the extraocular muscles, bony erosions or destruction, and retroorbital mass [13, 14]. The causative agent of Mucormycosis is relatively frequent laboratory contaminants and therefore culturing organisms from skin or sinonasal regions is rarely sufficient to establish the diagnosis of Mucormycosis [11]. Moreover, the fungal organisms may be killed during culturing and therefore a sterile culture does not rule out the mucor infection [9]. Also, there are no reliable serologic, PCR-based, or skin tests for definitive diagnosis of Mucormycosis. Taken together, with the limitations of imaging (CT and MRI), culture and molecular (PCR) ancillary studies, the definitive diagnosis of cutaneous and craniofascial Mucormycosis rests mainly on histopathological examination and detection of the fungal elements (special stains as PAS). It should be emphasized that once cutaneous and rhincerebral mucormycosis is suspected, surgical intervention with biopsy of the suspected areas should be immediately instituted. Initial empirical therapy with antifungal therapy should be started while the diagnosis is being confirmed, rather than waiting for a lengthy series of diagnostic tests to be completed[4].

To conclude, here we report a case of cutaneous and paranasal sinuses Mucormycosis. Diagnosis requires a high index of suspicion, increased awareness and inclusion of this rare condition in the differential diagnosis of patients with cutaneous and craniofascial lesions. Definitive diagnosis requires tissue biopsy for evaluation of the characteristic morphology with the use of special fungal. Early institution of surgical debridement and prompt antifungal treatment are critical to avoid serious complications.

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