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Case Report

Mucormycosis and COVID-19: A Case Report

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Abstract

The presence of co-infections in individuals with coronavirus disease 2019 (COVID-19) makes the management of these patients more challenging. The following is a case report of a patient with a history of untreated diabetes mellitus who was diagnosed in March 2021 with severe acute respiratory syndrome due to COVID-19, consequently developing rhino–orbital mucormycosis. Despite the severity of the condition, the patient demonstrated an excellent recovery course following surgical intervention and clinical treatment with isavuconazole.

Keywords: Case Report; Co-infection; Covid-19; Mucormycosis

Abbreviations

ROCM–CA: COVID-19-associated rhino–orbital–cerebral Mucormycosis; DM: Diabetes Mellitus; CT: Computed Tomography; MRI: Magnetic Resonance Image

Introduction

The coronavirus disease 2019 (COVID-19) is a current pandemic caused by variants of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and can present with a wide spectrum of clinical manifestations. The presence of co-infections in patients with COVID-19 often enhances the challenge of managing these patients. Since the beginning of the pandemic, several cases of bacterial and fungal co-infections in COVID-19 cases have been reported in the literature, an example being co-infection with the fungi of the order Mucorales, which cause mucormycosis. It is a serious disease, which is frequently associated with an unfavorable outcome, and whose incidence has increased worldwide in recent months.

Case Report

A 37-year-old woman complained of cough and dyspnea in March 2021, which progressed to severe acute respiratory syndrome requiring invasive ventilation in the intensive care unit. The nasopharyngeal swab real time polymerase chain reaction tested positive for SARS-CoV-2.

An associated condition of diabetic ketoacidosis was observed during hospitalization, with glycosylated hemoglobin of 14%, and insulin treatment was initiated. The patient had a previous history of untreated diabetes mellitus (DM) and received corticosteroids during the COVID-19 treatment.

After the improvement of the respiratory condition, the patient developed infraorbital edema on the right, associated with local pain and paresthesia, diplopia, nasal obstruction, and posterior mucopurulent rhinorrhea. Cranial computed tomography (CT) detected a destructive process in the maxillary and sphenoid bones

on the right, associated with the opacification of the corresponding ipsilateral paranasal sinuses; there were also collections inside the right orbit (Figure 1).

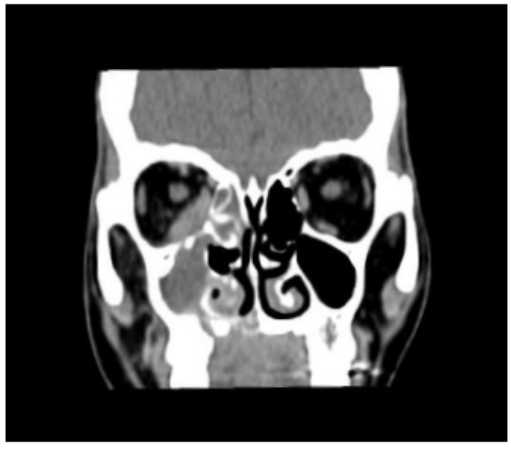

Figure 1: CT scan showing destructive process in the maxillary bones on the right associated with the opacification total of right maxillary and collection inside the right orbit.

The patient was transferred to the otorhinolaryngology department and evaluated by fibro naso-laryngoscopy, which detected a large amount of mucopurulent secretion in the right nasal cavity and a blackish crust adhered to the right middle turbinate. We requested nuclear magnetic resonance (MRI) imaging of the brain, which demonstrated right orbital cellulitis extending from the intraconal space and projecting from the homolateral middle cranial fossa to the posterolateral border of the maxillary bone on the right (Figure 2).

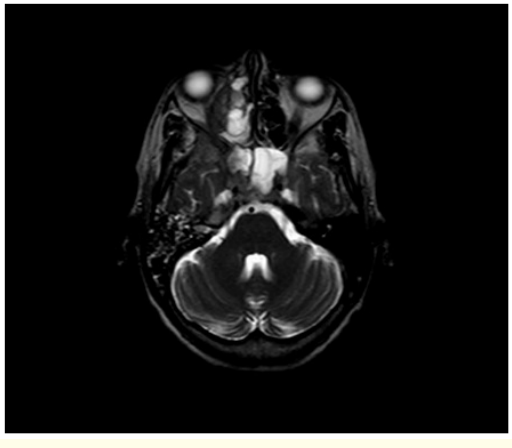

Figure 2: MRI scan showing right orbital cellulitis extending from the intraconal space.

In view of the clinical findings and alterations from the imaging exams, we opted for the nasal endoscopic surgical approach. During the procedure, necrotic lesions were observed in the middle turbinate, middle meatus, and tail of the inferior turbinate on the right. We performed surgical debridement of the entire lesion, which also affected the pterygoid processes, pterygopalatine fossa, and clivus, as well as the right middle turbinectomy. Chronic inflammatory infiltrate and fungal elements characteristic of mucormycosis were detected in the material sent for histopathological examination.

Treatment with intravenous amphotericin B was initiated in the immediate postoperative period. Once the histopathological result confirmed mucormycosis, we switched the antifungal drug to oral isavuconazole, under the guidance of the institution's infectious disease team. The antifungal drug (single daily dose) was maintained for three months following discharge from the hospital.

The patient's postoperative course was excellent, with no signs of recurrence after four months and total improvement of visual acuity and periorbital edema on the right, in addition to appropriate blood glucose control. The patient is being followed up on an outpatient basis by the otorhinolaryngology team.

This case report was reviewed and approved by the institutional review board (IRB) of Santa Casa de Belo Horizonte Hospital. ID: 52474121.1.0000.5138

Results and Discussion

Mucormycosis is a serious fungal infection with an overall prevalence ranging from 0.005 to 1.7 cases per million inhabitants [2]. However, recently there has been a notable increase in the incidence of cases, especially in India, as shown by an Indian multicenter study conducted in the period between January 2020 and May 2021, which identified 2826 cases of COVID-19-associated rhino–orbital–cerebral mucormycosis (ROCM–CA) [1].

In general, mucormycosis affects patients with diabetes, transplantations, and autoimmune diseases and hematological neoplasms. The patient in the reported case presented with hyperglycemia as the main risk factor. A review of 101 cases of ROCM–CA reported in the literature found that hyperglycemia was present in 83.3% of the patients and 80% of all cases had pre-existing DM. The use of corticosteroids (in 76.3% of cases) during COVID-19 treatment was also identified as an important risk factor [2].

The most common clinical form of the disease is ROCM–CA. Symptoms related with ocular involvement usually appear at an early stage and are often those that raise diagnostic suspicion, as in the case reported herein. A recent prospective observational study conducted with patients who had ROCM–CA showed that 43.5% of patients presented ocular manifestations, while the Indian study that identified 2826 cases of ROCM–CA showed a higher percentage, with cumulative incidence of decreased visual acuity, periocular/facial edema, and ptosis of 63%, 61%, and 54%, respectively [1,3].

With regard to the treatment of ROCM–CA, which is essentially performed using surgical debridement of the affected areas and systemic antifungal drugs, a review of the literature shows that the most used potent antifungal agent is amphotericin B [1,4]. However, in the case reported herein, oral isavuconazole was started once the histopathological result confirmed mucormycosis because the institution's infectious disease team has recurrently used this antifungal agent with excellent results in patients diagnosed with mucormycosis. Although isavuconazole is not yet mentioned in the main guidelines as first-line treatment, it has been shown to be effective for invasive mucormycosis. Its advantages include the possibility of oral administration, single dose administration, and lower nephrotoxicity compared with amphotericin B, thereby representing a novel and promising antifungal option for cases of invasive mucormycosis [5].

Conclusion

Despite the severity of the condition, the patient's recovery course was excellent following nasal endoscopic surgery and the isovuconazole administration. Further studies are needed to understand the potential factors of good and poor prognosis of ROCM–CA cases, as well as the best therapeutic options.

Conflict of Interest

The authors have no funding, financial relationships, or conflicts of interest to disclose.

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