

CASE REPORT

Immunosuppression is a Double-Edged Sword in COVID-19 Treatment: a Case Report of Rhino-Orbito-Cerebral Mucormycosis

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SUMMARY

Background: Mucormycosis is a life-threatening fungal infection mostly occurring in immunosuppressed patients such as organ transplant or diabetic patients. In this paper, we described a case of COVID-19 with rhino-orbito-cerebral mucormycosis.

Methods: The nucleic acid amplification test (NAAT) from a nasopharyngeal sample for SARS-CoV-2 was done. Demographic data, biochemical tests, paranasal sinuses (PNS) CT scan, brain CT scan, chest CT scan, and palate biopsy were performed.

Results: The NAAT was positive for SARS-CoV-2. PNS CT scan revealed mucosal thickening of all paranasal sinuses, brain CT scan showed hypodense area in antero-inferior cortex, and chest CT scan revealed diffuse ground glass opacity in favor of COVID-19 infection. Palate biopsy revealed fibroconnective tissue with broad pauciseptated ribbon-like hyphae.

Conclusions: In this paper, a case of COVID-19 with rhino-orbito-cerebral mucormycosis was described. The treatment with immunosuppressive drugs predisposed this patient to secondary fungal infection. Immunosuppression is a double-edged sword in COVID-19 treatment and immunosuppressive drugs should be prescribed only in severely ill patients and for a short period.

(Clin. Lab. 2022;68:xx-xx. DOI: 10.7754/Clin.Lab.2021.210850)

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KEY WORDS

COVID-19, dexamethasone, mucormycosis, corticosteroids

INTRODUCTION

COVID-19 (coronavirus disease 2019) was announced as a pandemic disease in 2020. Its prevalence is rapidly increasing but medication options are still limited. This disease is triggered by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2). Dexamethasone is shown to reduce the death rate and save the lives of seriously ill COVID-19 patients. Also, remdesivir, which inhibits RNA polymerase, was recommended as a hopeful option for the treatment of these patients. Dexamethasone has an immunosuppressive effect on COVID-19 patients [1].

Mucormycosis is a life-threatening fungal infection

mostly occurring in immunosuppressed patients such as organ transplant or diabetic patients. Mucormycosis is characterized by vasculature invasion and host tissue infarction and necrosis. This fungal infection most commonly affects rhino-orbito-cerebral and pulmonary tissue. Rhino-cerebral mucormycosis is most common in diabetes patients and pulmonary involvement occurs most often in hematological malignancies [2].

In this paper, a man with COVID-19 was described, who presented with pain, proptosis and conjunctivitis of right eye, nasal congestion, and necrotic ulcer in palate. Biopsy of palate lesion confirmed mucormycosis.

CASE REPORT

A 64-year-old man presented to emergency ward with history of dyspnea and cough. The nucleic acid amplification test (NAAT) from the nasopharyngeal sample was positive for SARS-CoV-2. He also had a history of chronic lymphocytic leukemia (CLL). In another hospital the patient received dexamethasone, remdesivir, meropenem, and IVIG (intravenous immunoglobulin) for COVID-19 treatment and after 16 days of hospital stay the patient was discharged with oxygen saturation of 93% and good condition. Two days after hospital discharge the patient developed pain, proptosis and conjunctivitis of right eye, nasal congestion, and necrotic ulcer in palate. He was referred to this hospital for treatment and evaluation of mucormycosis.

On examination, the body temperature, blood pressure, heart rate, respiratory rate, and oxygen saturation were 37°C, 130/75 mm Hg, 100, 28, and 89%, respectively. Physical examination revealed edema and proptosis of right eye and necrotic ulcer in his palate (Figure 1). Lung examination revealed crackle sounds. All other examinations were normal.

The white blood cell count was 44,000 (lymph: 40%, neut: 60%), the hemoglobin 12.2 g/dL, and the platelet count 111,000. The ESR was 50 mm/hr, AST (aspartate aminotransferase) 30 IU/L, ALT (alanine aminotransferase) 93 IU/L, ALP (alkaline phosphatase) 249 IU/L, conjugated bilirubin 1.1 mg/dL, albumin 2.9 g/dL, LDH (lactate dehydrogenase) 541 U/L CPK (creatinine phosphokinase) 93 U/L. Other laboratory tests such as BUN (blood urea nitrogen), creatinine, random and fasting blood sugar, sodium, potassium, partial thromboplastin time, prothrombin time, calcium, phosphorus and magnesium were normal.

PNS (paranasal sinuses) CT (computerized tomography) scan revealed mucosal thickening of all paranasal sinuses with secretion and no sign of any erosion of paraseptal sinus walls (Figure 2A). Brain CT scan showed a hypodense area in the antero-inferior cortex and white matter of the right frontal lobe (Figure 2B). A CT scan of the chest revealed diffuse ground glass opacity in favor of COVID-19 infection (Figure 2C). Palate biopsy revealed fibroconnective tissue with broad pauciseptated ribbon-like hyphae with irregular and var-

iable width branching consistent with mucormycosis (Figure 3).

Treatment with amphotericin B was initiated and the patient underwent sinus and palate surgery and debridement and daily visual acuity measurement. Fortunately, his visual acuity and his symptoms improved with medical and surgical intervention.

DISCUSSION

In December 2019, SARS-CoV-2 was reported in Wuhan, China. Immunosuppressant drugs such as glucocorticoids and tocilizumab were used in severe cases of COVID-19 [3,4]. Low-dose dexamethasone (6 mg once daily) for 10 days reduced deaths in patients with mechanical ventilation and receiving oxygen; however, no benefit was reported in patients with milder symptoms who did not requiring respiratory support [4]. Dexamethasone and other glucocorticoids increase the risk of hyperglycemia and secondary fungal and bacterial infections [5].

Mucormycosis is a rare fungal infection with high mortality and morbidity. Immunocompromised patients are predisposed to this fungal infection, and early diagnosis of mucormycosis leads to improved survival. The recognition of host factors and a high index of suspicion is necessary for the diagnosis of mucormycosis [6].

The list of signs and symptoms that should be considered to be “red flags” in diabetic patients includes diplopia, proptosis, periorbital swelling, cranial nerve palsy, sinus pain, and ulcers of the palate [6,7].

Culture and microscopy (direct and histopathology) of biopsy specimens are the cornerstones of diagnosing mucormycosis. Successful treatment of mucormycosis is based on a multimodal approach, including removal of infected tissues, administration of antifungal agents, treatment of underlying predisposing factors and use of adjunctive therapies [6].

In this paper, we described a case of COVID-19 with rhino-orbito-cerebral mucormycosis. The treatment with immunosuppressive drugs predisposed this patient to secondary fungal infection. Immunosuppression is a double-edged sword in COVID-19 treatment and immunosuppressive drugs should be prescribed only in severely ill patients and for short periods.

Acknowledgment:

We would like to thank Dr. Ali Mousavizadeh and Mohamadreza Bakhshandeh for their cooperation in this study.

Declaration of Interest:

The authors declare no conflicts of interest.

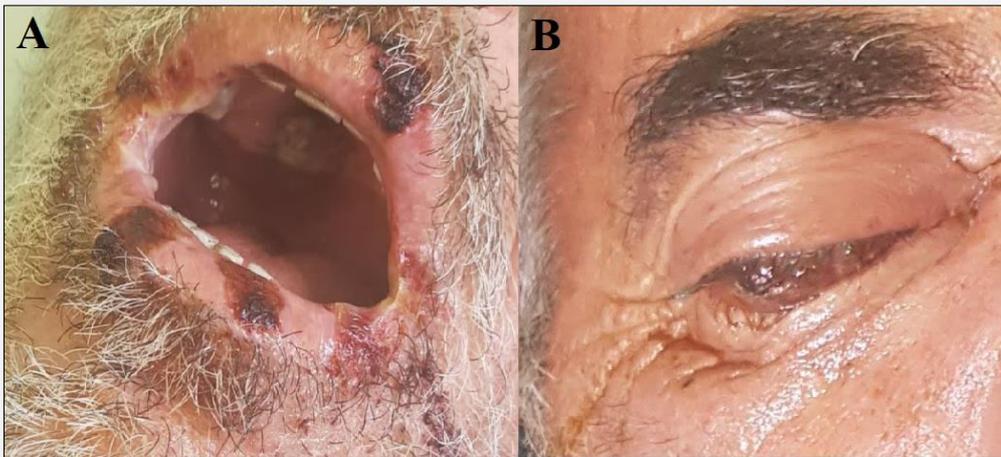


Figure 1. A) Palate necrotic ulcer. B) Edema and proptosis of right eye.

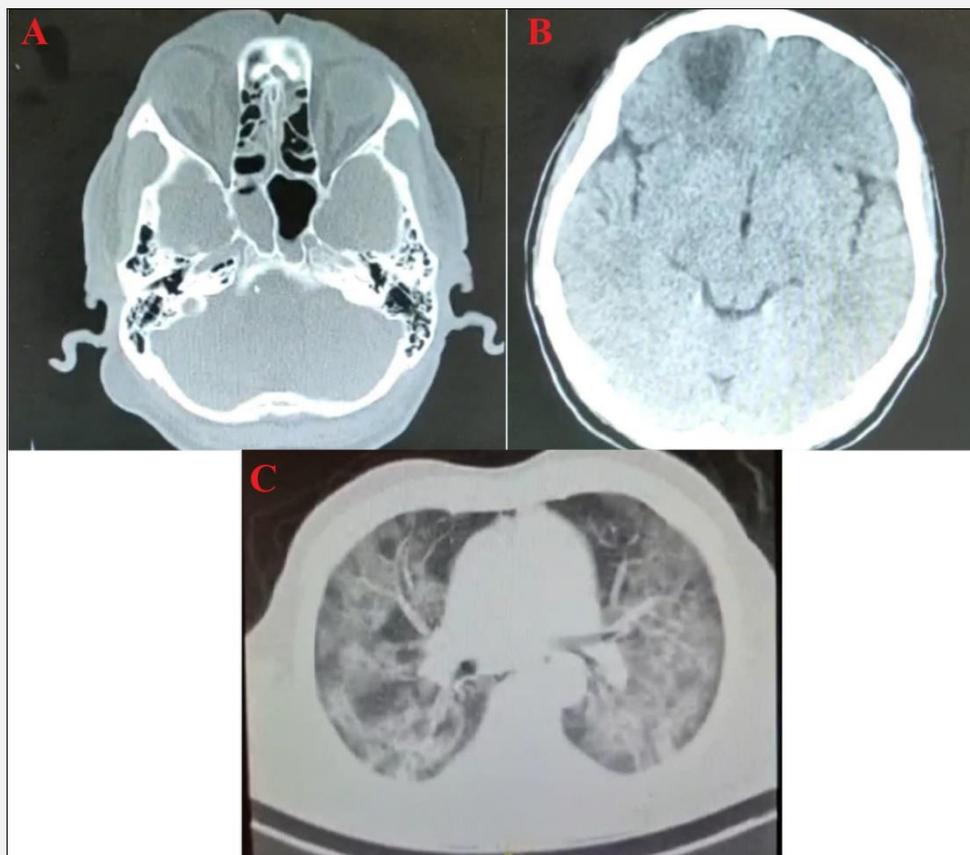


Figure 2. A) PNS CT scan revealed mucosal thickening of all paranasal sinuses, B) Brain CT scan showed hypodense area in antero-inferior cortex and white matter of right frontal lobe, C) CT scan of chest revealed diffuse ground glass opacity.

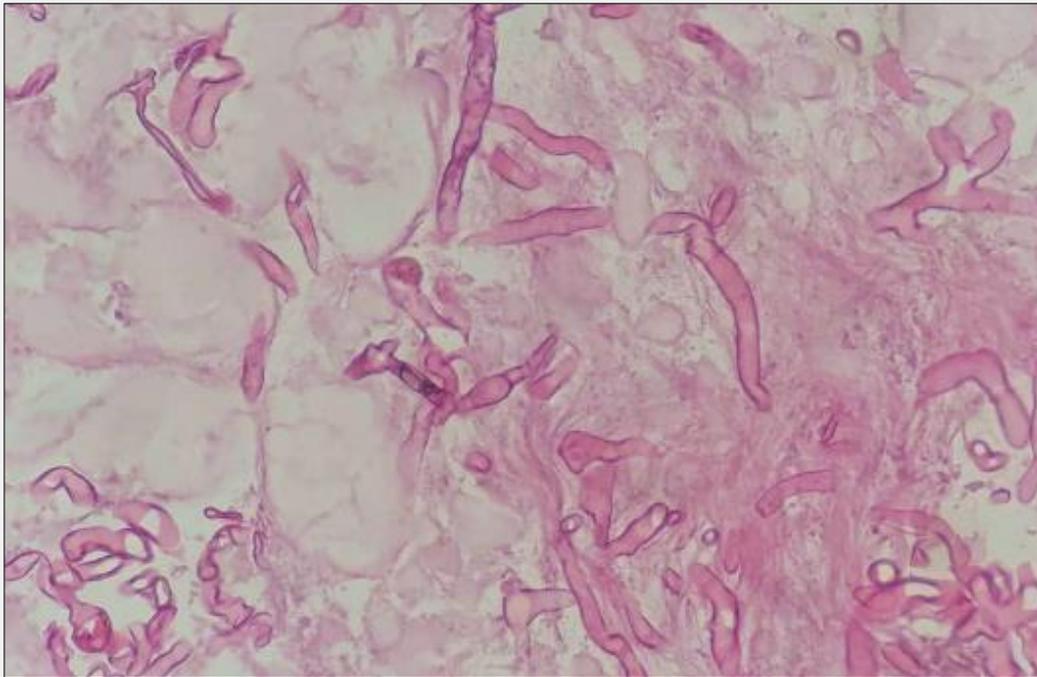


Figure 3. Palate biopsy revealed fibroconnective tissue with broad pauciseptated ribbon-like hyphae with irregular and variable width branching.

Source of Funds:

We did not receive research grants from any center.

Disclosure Statement:

Informed consent was obtained for publication of this case report.

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