Original Research Paper

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Ophthalmology

RHINO-ORBITAL MUCORMYCOSIS ASSOCIATED WITH COVID-19

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) infection is caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Thismay be associated with a wide range of disease patterns, ranging from mild to life-threatening pneumonia. A wide range of bacterial and fungal co-infections may exist and may be associated with preexisting comorbidities (diabetes mellitus, lung disease) or may develop as a hospital-acquired infection such as ventilator-associated pneumonia. India has a high prevalence rate of type 2 diabetes mellitus (8.9% of adults, 77 million patients), which is a well-known risk factor [1]. We report a case of COVID-19 infection, who during the course of the treatment, developed orbital mucormycosis.

CASE PRESENTATION

A 46-year-old Female patient was admitted with a 4-5 day history of severe breathlessness, fever and generalised weakness. She was a diabetic (almost 8 years) on insulin injections. On examination, she was having a respiratory rate of 28-29/min with a specific oxygen saturation of 94% on oxygen supplementation (15liters/min). The physical examination revealed diffuse bilateral basal crepitations with a normal cardiovascular and neurological exam.

A reverse-transcriptase polymerase chain reaction (RT-PCR) from a nasopharyngeal swab was positive for the SARS-CoV-2 virus. Computed tomography (CT) scan of the chest showed multiple peripheral ground-glass opacities and consolidations in both lungs involving both upper lobes, both lower lobes ,Right middle lobe segments- strongly suggestive of COVID-19 infection (Figures 1a,b,c and d)

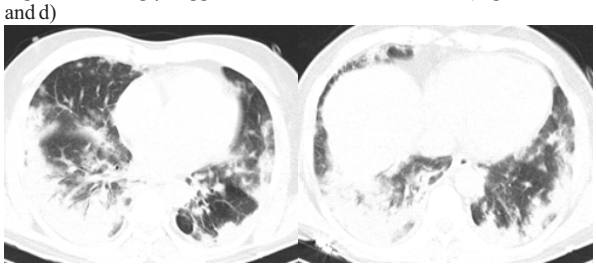

Figure 1 (a) **Figure 1 (b)**

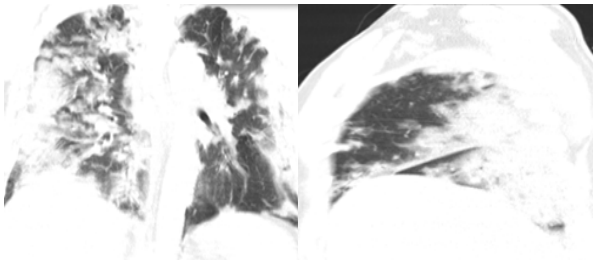

Figure 1 (c) **Figure 1 (d)**

Figure 1(a,b-Axial images ,c-Coronal image,d-Sagittal image)-Reveal multiple peripheral ground-glass opacities and consolidations in both lungs involving both upper lobes, both lower lobes ,Right middle lobe segments- strongly suggestive of COVID-19 infection

She was started on intravenous Ceftriaxone (1 gm twice daily), IV Remedesvir (100 mg twice daily), with intravenous dexamethasone (8 mg twice daily),IV Methyl prednisolone (20 mg twice daily) in conformity with the local protocol, along with general supportive care. Her diabetes mellitus was managed with Subcutaneous insulin adjusted as per a sliding scale based on herfasting blood sugar levels adjusted to maintain 150-180 mg/dl. She also received subcutaneous enoxaparin (40mg/0.4 ml) twice daily.

With this therapy she improved and after almost 7 days of the above treatment ,she was shifted to oral steroids ,continued to oral supplemental medicines and supportive care, She was discharged after almost 12 days in the hospital

After almost 2 weeks after discharge, patient developed Right periorbitaledema with right eye puffiness for which topical ciprofloxacin was prescribed. The next day, the swelling increased, The local examination of the Right eye(Figure 2 b) revealed the following findings

On Ocular examination, Figures 2 (a and b)-

EXAMINATION	RE	LE
VA	PL NEGATIVE	6/60
OCULAR SYMMETRY	MILD PROPTOSIS	NORMAL
LIDS	SEVERE PTOSIS, LID SWELLING, MATTING OF LASHES	NORMAL
PERIOCULAR	ERYTHEMA, EDEMA OVER MAXILLARY AREA WITH BLACK ESCHAR LIKE PATCHES	NORMAL
PALPEBRAL FISSURE	MODERATE PTOSIS	NORMAL
CONJUNCTIVA	DIFFUSE CONGESTION, PURULENT DISCHARGE	MILD CONGESTION
CORNEA	CLOUDY, EDEMATOUS, DECREASED SENSATION	CLEAR
ANTERIOR CHAMBER	GRADE 2 HYPOPYON	NORMAL DEPTH
IRIS	DETAILS NOT CLEAR	NORMAL COLOR & PATTERN
PUPIL	MID DILATED, NOT REACTING	NORMAL SIZE & REACTING TO LIGHT
LENS	LENTICULAR OPACITY	SENILE LENS CHANGES
FUNDUS	MEDIA HAZY, NO FUNDAL GLOW	MEDIA HAZY d/t LO MILD NPDRNOTED MACULA NORMAL
IOP	DIGITALLY ELEVATED	14mmHg
OCULAR MOVEMENTS	RESTRICTED IN ALL GAZE	FULL

A nasal swab was non-contributory but a nasal biopsy from the middle turbinate revealed broad aseptate filamentous fungal hyphae suggestive of mucormycosis, which was confirmed on a Sabourauds Dextrose Agar culture.

Figure 2(a) blackish lesion on hard palate Figure 2(b) on opening right eye

hence MRIof the orbits with screening of Brain and Paranasal sinuses(Figures 3) was suggested.

MRI reveals non-enhancing soft tissue components in the Right maxillary sinus with thinning and destruction of the anterior maxillary wall with premaxillary soft tissue components. There is also destruction of the floor of the Right orbit with involvement of the inferior rectus and medial rectus muscles of the Right orbit -with all these MRI Findings-Diagnosis of Acute invasive Rhino-orbital fungal infection was made.

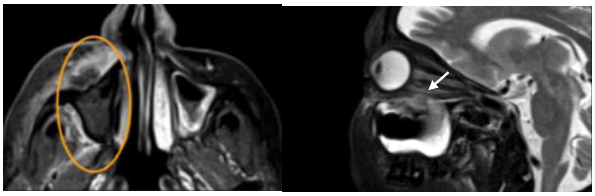

Figure 3 (a) **Figure 3 (b)**

Figure 3(a)-Axial T2 weighted MR Image reveals hypointense soft tissue components within the Right maxillary sinus with thinned out anterior wall of the Right maxillary sinus with premaxillarysoft tissue components (orange circle)

Figure 3(b)-Sagittal T2 weighted MR Image reveals heterogenous soft tissue components within the roof of the Right maxillary sinus with destruction of the floor of the Right orbital cavity with inferior rectus infiltration (Arrow)

The patient was admitted again, She was at Started on intravenous meropenem (1 gm thrice daily) and vancomycin (1 gram twice daily) with the addition of liposomal amphotericin B (5 mg/kg/day) for 15days and posaconazole 300mg BD day 1 followed by 300mg od 3weeks and the cessation of steroid therapy.

In view of involvement of right orbit and eye, an orbital exenteration was performed, surgical debridement of visible lesions, FESS and partial maxillectomy was done.

DISCUSSION

Fungal infections were observed in SARS patients in earlier studies and were considered the leading cause of death in 25% to 73.7% of patients.[1-3] Based on this experience, it is critically important to pay attention to the probability of fungal infections accompanying COVID-19.

In COVID-19 patients, co-infections of fungi were found. In China, Chen et al. found five cases of pulmonary fungal infection in 99 COVID-19 patients.[4] Yang et al. found three (3/52, 5.8%) patients with pulmonary fungal co-infection in 52 critically ill patients.[5] Other studies have found a higher percentage of secondary pulmonary infections (8%–15%) in COVID-19 patients, but it is not clear whether it is bacterial or fungal infection.[6,7] A German study found COVID-19-associated invasive pulmonary aspergillosis in 26.3% of critically ill patients with moderate to severe ARDS.[8] In another study from Netherlands, out of 31 ICU patients, there were six patients (19.4%) presumed invasive pulmonary aspergillosis.[9]

The most common presenting symptoms of patients in the current study were headache and facial pain (75%), facial numbness (66.7%), and ophthalmoplegia and visual loss (63.9%). Previous publications discussing non-COVID Fungal infection showed concomitant results. Abu El-Naaj et al., mentioned symptoms as pain resembling sinusitis, facial swelling, and fever in his case series.[10] Kursun et al. listed fever (79%), periorbital cellulitis (75%), and periorbital oedema (70%) as the most common manifestations among their cases[10] while Ketenci et al.[11] reported fever, facial edema, facial pain, and nasal obstruction as the most frequent symptoms. In the same study, nine (64%) patients had skin and/or palatal involvement in comparison to 14 cases in the present study. Also, Ketenci et al., had five cases (35%) of ophthalmoplegia and blindness in comparison to 23 (63.9%) cases in the current study.[12]

This disease and its aggressive orbital and intracranial extension should be given close scrutiny. Single most important element for successful attenuation of this infection is early diagnosis followed by aggressive medical care, surgical debridement, and control of associated diseases. In Acute fungal infection cases occurring with COVID-19, management is not an easy task both for the patient and the provider. The morbidity of isolated medical treatment, patient's general and chest condition, hazards of general anesthesia for both patient and surgical team must be balanced with benefits of aggressive surgical debridement together with an understanding of the overall prognosis of the patient.

CONCLUSION

Clinical suspicion and early diagnosis of Fungal infection in COVID-19 patients are essential for better treatment outcomes. Rapid initiation of antifungal therapy and immediate management with surgical intervention could affect the prognosis of the patients and improve survival rates.

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