

Case Report

COVID-19 associated pulmonary aspergillosis-an unusual manifestation of COVID-19

B. Anusuya*, J. Yamini

Department of Pharmacy Practice, C. L. Baid Metha College of Pharmacy, Chennai, Tamil Nadu, India

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*Correspondence:

Dr. Anusuya B.,

E-mail: anusuyabaskar98@gmail.com

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ABSTRACT

A recently identified condition known as COVID-19-associated pulmonary aspergillosis (CAPA) is connected to the COVID-19 pandemic and is known as post-COVID complications. More data are awaited, and a consensus criterion was recently published in an effort to spur more research and registries to assist clinical decision-making. However, it is evident that CAPA imposes a COVID-19 illness course that worsens with increased morbidity and mortality. Here we present the case of a 53-year-old male patient admitted to our hospital after recovering from COVID-19. Due to his clinical condition, some investigation criteria were performed and *Aspergillus fumigatus* was identified in his culture test. Treatment was provided with posaconazole as a first-line drug, and the patient showed a good clinical outcome.

Keywords: COVID-19, CAPA, Pulmonary aspergillosis, Posaconazole

INTRODUCTION

COVID-19 has been extremely widespread, infecting 43.9% of the global population and 1.34 billion in South Asia, including India.¹ 7.2% of the patients developed sequelae of COVID caused by other microbial pathogens due to hospitalization.² In that case, pulmonary aspergillosis is one of the severe sequelae of COVID-19, which is stated as COVID-associated pulmonary aspergillosis (CAPA). Pulmonary aspergillosis is mainly caused by various fungal species, particularly *Aspergillus fumigatus*. This fungal infection occasionally influences the COVID patients, especially those who underwent hospitalization for a longer duration. The other important risk factors that occur during the course of COVID-19 are the use of corticosteroids, the administration of broad-spectrum antibiotics, and severe lung damage.³ Due to the lack of a gold standard and the limitations of diagnostic procedures, estimating the incidence and diagnosis of CAPA is difficult. Hence, the diagnosis of proven, probable, and putative CAPA, as well as the differentiation from colonisation, were made using the influenza-

associated pulmonary aspergillosis (IAPA) criteria and the clinical algorithm to diagnose invasive pulmonary aspergillosis in intensive care unit patients (Asp ICU algorithm). The diagnostic workup may include histopathologic/cytologic and cultural examination, bronchoalveolar lavage (BAL), serum galactomannan (GM), -d-glucan (with restricted specificity), polymerase chain reaction (PCR), an aspergillus-specific lateral-flow device test, and a computed tomographic (CT) scan.⁴ Thus far, CAPA has been treated with voriconazole (VRC) or isavuconazole (ISV) as a first-line treatment; liposomal amphotericin B (L-AMB) has also been used as an alternative medication.⁵ Yet there is no case were reported about posaconazole treated CAPA. So here we report the case of CAPA, which was treated with posaconazole. This case report gives data about posaconazole-treated CAPA.

CASE REPORT

A 53-year-old gentleman was treated for COVID in an outpatient hospital one month ago. Now brought to the ER with the chief complaint of breathlessness for 2 weeks and

cough. He was also an ex-smoker. On examination, he was conscious, oriented, and afebrile [98.2 °F]. His SpO₂ was 94% with 15 litres of oxygen via NRBM. Heart rate was 56% and BP was 110/80 mmHg. RS was B/L AE+ and CREPTS+. Patient was admitted to MICU for further evaluation and treatment. His CT-PA shows post-COVID sequelae with fibrosis, confluent ground glass opacities, and subpleural cysts (Figure 1).

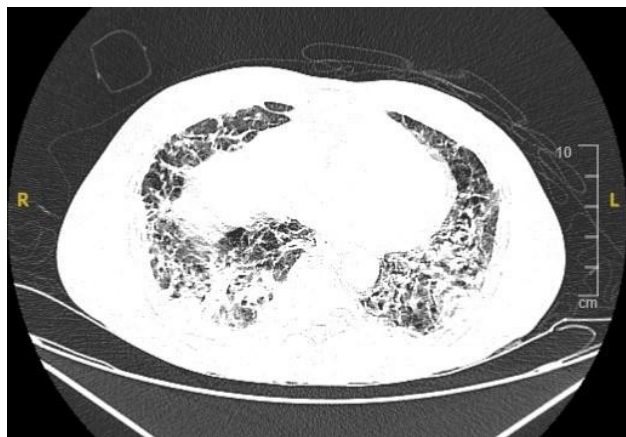


Figure 1: Post-COVID sequelae with fibrosis, confluent ground glass opacities, and subpleural cysts. Bilateral minimal pleural thickening effusion noted. Minimal left apical pneumothorax seen.

Bilateral minimal pleural thickening effusion noted. Minimal left apical pneumothorax seen. His laboratory investigation was taken, and WBC, neutrophils, C-reactive protein, and serum LDH were found to be abnormal. D-dimer value was 1698 ng/ml, which is elevated (normal value: 250). The procalcitonin test shows (0.530 ng/ml) that there is a bacterial, viral, or non-bacterial infection. He was treated with oxygen supplementation, IV antibiotics, IV proton pump inhibitors, nebulized bronchodilators, anti-fibrotics, IV steroids, anticoagulants, mucolytics, anti-tussives, and all other nutrients with pulmonary rehabilitation. Sputum was sent for C&S, and it shows *Aspergillus fumigatus*. Patient improved symptomatically well and was hence shifted to the ward. On the same day and night, patient developed breathlessness with desaturation and was shifted to MICU for further management. 2D echo shows LVEF of 61%, thickened aortic valve, no AR, and mild MR/TR. No PAH (PASP=30 mmHg). Patient developed hemoptysis, hence bronchoscopy was planned, and the result shows carina-sharp, thick blood clots removed from the left lower lobe, mucosa appears erythematous, and purulent secretion is noted in the B/L lower lobe. BAL taken from B/L LL bronchial segments shows few pus cells and no organisms. Fungal C&S shows *Aspergillus fumigatus*. *Mycobacterium tuberculosis* complex not detected. CT-PA was done in view of hemoptysis, and it showed no evidence of pulmonary thromboembolism. Diffuse ground glass opacity with interlobular septal thickening, fibrosis, and bronchiectasis in both the lungs. Subpleural and segmental consolidation are noted in both lungs (left >

right). CORADS-6. Post-COVID sequelae with likely organising pneumonia. The patient started to receive posaconazole as a drug of choice for antifungal treatment. Patient showed better results with continuous treatment and pulmonary rehabilitation. Then patient shifted to ward and Again laboratory investigations were taken they all found to be normal. A procalcitonin test was taken again, and it showed 0.25 ng/ml, which means systemic infection is not likely. Patient clinically improved and feels better; his SpO₂ level was 98% on 3 litres of O₂ and his pulse rate was 98 bpm; no further hemoptysis. Patient discharged with the following advice: continue oxygen supplementation and intermittent BIPAP with medication and nutritional supplementation.

DISCUSSION

A study by Intra et al. revealed that among COVID-19 patients admitted to the intensive care unit, there was a higher probability (57%) of bacterial secondary infection than viral secondary infection or fungal secondary infection.⁶ The patient in the current presentation was previously diagnosed with COVID-19 got admitted to the ICU at an outside hospital. After a month of his recovery, the patient developed breathing difficulty and coughing for 24 days. Now he's been admitted to MICU for further management. 24 cases of *Aspergillus spp.* colonisation were documented in four studies; however, none of them met the standards for proven, probable, or putative infection based on clinical, mycological, or radiological evidence.⁴ In this case, the patient's clinical and radiological findings met the criteria for probable CAPA. His RS was B/L AE+, and his SpO₂ level was 94% with 15L-O₂. Laboratory investigation shows elevated WBC, neutrophils, C-reactive protein, serum LDH, and D-dimer levels that are also very high. He was also initially diagnosed with CT-PA, which revealed post-COVID sequelae with fibrosis, confluent ground glass opacities, and subpleural cysts. Bilateral minimal pleural thickening and minimal left apical pneumothorax were seen. The procalcitonin test shows (0.530 ng/ml) that there is a presence of microbial infection. Patient developed hemoptysis, so a bronchoscopy was done.

In the practice guidelines for the diagnosis and management of aspergillosis published by the Infectious Diseases Society of America, it says the histopathologic or culture examination result gives a strong recommendation and high-quality evidence for diagnosis.⁷ In this current case, the patient's culture report revealed no bacterial pathogen. *Aspergillus fumigatus* grown in culture Based on the above investigation, the patient was diagnosed with COVID-associated pulmonary aspergillosis (CAPA).

Prior to the diagnosis of CAPA, the treatment consisted of an antibiotic, corticosteroid inhaler, proton pump inhibitor, anticoagulant, bronchodilator, mucolytic, nutritional supplement, and dietary food supplement. The patient's bowels were not opened for three days, so laxatives were given. The first-line treatment for pulmonary aspergillosis

is an azole antifungal, i.e., voriconazole, isavuconazole, or posaconazole. James et al revealed the summary of reported cases of CAPA in the ICU setting; the study showed that among 33 cases, 24 were treated with either voriconazole, isavuconazole, or liposomal amphotericin B but not posaconazole. 19 were declined out of 24.⁸ In this current case, the patient was treated with posaconazole (triazole, an antifungal). He responded very well to the treatment. Pulmonary rehabilitation was also provided. His cough and breathing difficulty gradually improved; there was no further development of hemoptysis; his SpO₂ level was 98% at 6 L-O₂. WBC count, sodium, and creatinine levels were also normal. His procalcitonin level of 0.25 ng/ml shows that a systemic infection is not likely. The patient was discharged with the same medication and intermittent Bipap.

CONCLUSION

CAPA is a serious complication in COVID-infected patients. Since the clinical symptoms of this entity are non-specific, an early diagnosis is difficult. Due to this challenge, the investigation and identification of the pathogenic agent are delayed, which ultimately delays the initiation of treatment. So, the mortality rate of CAPA is higher than that of COVID alone-infected cases. To decrease the mortality rate, first there should be awareness among the people, especially among health care professionals and hospitals. So that we can prevent the COVID patients from further complications. There is a need for a definite diagnosis and treatment criteria for CAPA. In this case, based on the evidence of history, a culture test, and a CT chest scan, the patient was diagnosed with CAPA. Treatment was started with posaconazole as a first-line drug. Then, the clinical features gradually improved and showed a good clinical outcome within a week, and the patient was stable. This case report shows that providing early treatment and using posaconazole in CAPA gives a better result. No cases were reported regarding posaconazole-treated CAPA, so this case report shows that posaconazole treat CAPA with a good clinical outcome.

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Ethical approval: Not required

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