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Case Report

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A case report: Successful management of pulmonary aspergillosis associated with COVID - 19 ARDS

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Abstract

The recent global outbreak of coronavirus disease-19, also known as COVID-19, has infected more than 142 million people worldwide, causing more than 3 million deaths. It has been shown that up to 40% of hospitalized COVID-19 patients may develop ARDS. Although not proven, anti-inflammatory and anti-cytokine treatments are recommended to suppress the cytokine storm that develops in the early stages of the disease.In this case report, a case of pulmonary aspergillus developed as a complication of treatment for ARDS caused by covid 19 in a 50-year-old male patient will be presented in the light of current literature.

Keywords: acute respiratory distress syndrome, covid-19-associated pulmonary aspergillosis, pulmonary aspergillosis, steroid treatment

1. Introduction

From last year to today, the covid-19 pandemic continues to fluctuate worldwide. Although there have been remarkable advances regarding vaccines, there is no specific treatment for the disease. Currently, the primary approach to prevent hyperinflammation caused by the disease is systemic steroid administration. In this case report, a case of pulmonary aspergillus developed as a complication of treatment for ARDS caused by covid 19 in a 50-year-old male patient will be presented in the light of current literature.

2. Case Report

A 50-year-old male patient with a known history of asthma bronchiale was admitted to the emergency room and then to the intensive care unit after respiratory distress increased on the 7th day of Covid 19 (polymerase chain reaction) PCR positivity. While taking O_2 with a reservoir mask and nasal cannula at the time of admission, sat O_2 was measured as 84%, fever was 37.8°C, respiratory rate was 25-30 breaths/min, cardiac apex beat was 120 beats/min, and blood pressure was 145/90 mmHg. Laboratory findings were detected as follows: Sedimentation rate: 56 mm/h, Ferritin: 539.60 µg/l, C-reactive protein (CRP): 86.7 mg/l, WBC: 14600 x 10^9 /mm^3, Neutrophil count: 13.53 x 10^9 /mm^3, Lymphocyte count: 440 x 10^9 /mm^3, Platelet count: 145000 x 10^9 /mm^3, LDH: 495 Iu/mL, Fibrinogen: 645 mg/dL, Procalcitonin: 0.26 ng/mL, pH: 7.23, pCO_2:66 mmHg, pO_2:38 mmHg, Lactate: 3.4 mmol/L. PA radiography and thorax tomography revealed ground glass-consolidation areas and linear atelectasis (Fig 1 A, B). The patient was treated with FiO_2: 100%, 60 L/min nasal high flow oxygen therapy (NHFO), and non-invasive ventilation (NIV) (FiO_2: 100% Peep: 7 cm/H_20 above Peep: 18 cm/H_20) treatment. CRP and ferritin levels increased in consecutive measurements. Medical treatment was started with piperacillin-tazobactam 3x4.5 gr, moxifloxacin 1x400 mg, methylprednisolone 500 mg 2x1, anakinra 3x100 mg, lansoprazole 2x40 mg, enoxiparin 2x 6000 IU, and budesonide 2x1 mg. On the 2nd day of the treatment, the patient whose saturation decreased and tachypnea increased, was intubated and connected to a mechanical ventilator. The ventilator setting was adjusted to be Fio_2: 1.0, Peep:9 cm/H_20, Above Peep:20 cm/H_20, respiratory rate:20/min, and i/e:1.80 in Synchronized intermittent mandatory ventilation (PSIMV) mode.

The dose was adjusted for the patient whose PaO_2/FiO_2 ratio was around 100 during the first week of intubation, and midazolam (0.1 mg/kg/h) and rocuronium (0.1 mg/kg/h) infusion was administered. Methylprednisolone was administered to the patient at 1000 mg for the first 3 days, 4000 mg in total, and for 20 days during hospitalization. Anakinra treatment was administered at 300 mg/day for 10 days. After two unsuccessful extubation attempts on the 21st day of hospitalization, percutaneous tracheostomy with bedside bronchoscopy was performed. After tracheostomy, all sedation was terminated, and the patient started weaning. Control thorax (computed tomography) CT was performed on the 50th day of hospitalization of the patient whose secretion from the tracheostomy cannula did not decrease and CRP and ferritin levels did not decrease (Fig. 2 A, B). Along with partly localized pneumothorax in the right hemithorax, an irregularly shaped, cavitary, abscess-like lesion measuring 6.5x 5.5 cm was detected in the anterior left upper lobe of the left lung.

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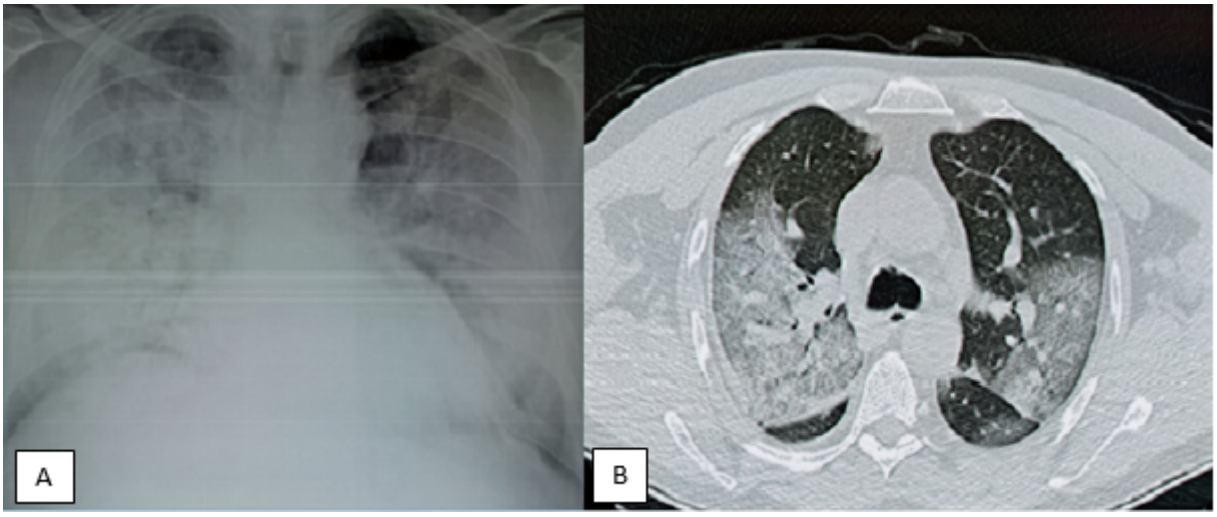

Fig 1. (A.B). PA radiography and thorax tomography revealed ground glass-consolidation areas and linear atelectasis

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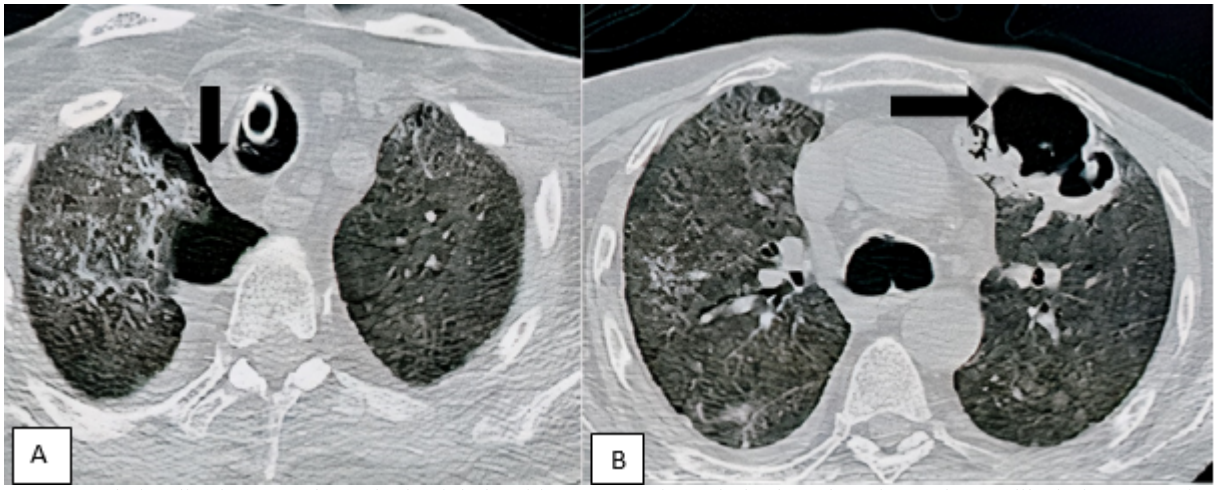

Fig 2. A partly localized pneumothorax in the right hemithorax, B. an irregularly shaped, cavitary, abscess-like lesion measuring 6.5x5.5 cm was detected in the anterior left upper lobe of the left lung

In the follow-up, the culture result obtained from the bronchoscopic lavage sample was compatible with Aspergillus fumigatus, while galactomannan antigen was detected as Aspergillus (3.01, optical index).

The intervention was not considered for the patient who was referred to the department of thoracic surgery. The patient's antibiotic therapy was arranged as iv voriconazole 2 × 6 mg/kg loading for the first 5 days, after which 2 × 4 mg/kg maintenance was administered, and then 2x200 mg oral administration.

He was transferred to the chest disease service as being conscious, cooperative-oriented, Glasgow coma scale (GCS):15, tracheostomized, and received O_2 from the tube at a rate of 4-5 l/min.

3. Discussion

The recent global outbreak of coronavirus disease-19, also known as COVID-19, has infected more than 142 million people worldwide, causing more than 3 million deaths. It has been shown that up to 40% of hospitalized COVID-19 patients may develop ARDS (SARS-CoV-2), although it may create a wide spectrum of clinical manifestations depending on the presence of the underlying disease (1)

The World Health Organization (WHO) has reported that there is currently no scientifically proven specific treatment for COVID-19. Although not proven, anti-inflammatory and anti-cytokine treatments are recommended to suppress the cytokine

storm that develops in the early stages of the disease. In the COVID-19 treatment guidelines of the Turkish Ministry of Health, steroid use is included in patients with macrophage activation syndrome (MAS) or cytokine storm. Recovery study showed that the use of dexamethasone reduced the 28-day mortality rate (2). The Surviving Sepsis Campaign recommends the use of short-term systemic corticosteroids. Several studies have shown that pulse methylprednisolone application is beneficial as it was applied in our case. It is known that while it suppresses hyper-inflammation during periods such as cytokine storm with steroid treatment, it also causes side effects.

In the pre-pandemic period, pulmonary aspergillosis was observed in patients with severe immunosuppression, particularly those associated with hematological malignancies and transplantation. Most recent studies have emphasized the epidemiology and importance of aspergillosis after severe viral infections, especially influenza and COVID-19 (3). However, increasing rates of bacterial, fungal, and viral infections have been detected in COVID-19 patients. In line with this, in the study of Borman et al. in which they examined the samples of 719 undiagnosed critically ill patients, they detected approximately 5% to 15% of COVID-19-associated pulmonary aspergillosis (CAPA) (4).

Current guidelines recommend diagnostic procedures for the diagnosis of Aspergillus, such as respiratory culture and galactomannan index of Bronchoalveolar lavage (BAL) samples (5). Despite the high risk of transmission of Covid 19 due to aerosol exposure during bronchoscopy, a bronchoscopic lavage culture was sent from the patient. The culture result was determined as A. fumigatus, and the GM antigen sent afterward was also detected as positive.

According to the treatment part of the same guideline, voriconazole or echinocandin combination is recommended in patients without azole resistance (5). In our patient, azole resistance was not detected, oral monotherapy after IV voriconazole was sufficient, and no side effects were detected.

Severe COVID-19 infection is associated with an irregular immune response that affects not only the clinical worsening of patients but also alters susceptibility to secondary infections such as Aspergillus infection by impairing host defenses. Pharmacological agents applied for treatment have effects that increase the immunosuppressive effect. Pulmonary aspergillosis is a serious and life-threatening complication in patients with severe COVID-19 receiving immunosuppressive therapy. Clinicians should be aware of new secondary infections and should be more careful to avoid possible complications with the duration and dose of immunosuppressive therapy.

Conflict of interest

The authors declare no conflicts of interest

Acknowledgments

The patient provided informed consent for the publication of this case. In accordance with the provisions of the Ministry of Health of the Republic of Turkey, the ethics committee of the Ministry of Health was applied and approval was obtained with the number DURSUN FIRAT ERGÜL-2021-06-02T11_51_11. Attached is the e-mail printout showing that it was accepted.

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