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Case Report

Mortal Covid-19 Case with Fungal Infection

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Abstract

Covid-19 increases the risk of developing opportunistic infections, including fungal infections. The immune system can be compromised by Covid-19 itself and certain immunosuppressive agents and steroids used in Covid-19 treatment [1]. Fungal infections associated with Covid-19 significantly worsen the severity of the disease and increase the risk of death [2, 3]. The most commonly reported fungal infection agents in conjunction with Covid-19 are aspergillus, candida albicans, and mucormycosis [4, 5]. In this case report, we present our patient, a 79-year-old who deteriorated clinically while under Covid-19 follow-up, with positive culture results for aspergillus, candida albicans, and mucormycosis in bronchoalveolar lavage fluid obtained through bronchoscopy, as well as histopathological examination of tissue biopsy from the lesion. Our patient passed away on the 46th day of hospitalization.

Keywords: Covid-19, fungal infection, mucormycosis, aspergillus, candida albicans

Case Presentatıon

A 79-year-old female patient diagnosed with Covid-19 in September 2020 is being followed up with a history of type 2 diabetes mellitus, hypertension, and asthma. She is on continuous medication including metformin,acarbose, telmisartan / hydrochlorothiazide, indapamide, salmeterol / fluticasone, and tiotropium bromide. After being diagnosed with Covid-19, she used favipiravir at home for 5 days. However, due to worsening dyspnea, she was admitted to a different center and completed a 10-day course of favipiravir treatment in the Covid-19 ward. She was discharged from the center she was being followed up with, as she did not require oxygen and her vital signs were stable. In November 2020, she developed increased dyspnea and hoarseness of voice, and a non-contrast chest computed tomography (CT) scan revealed bilateral subpleural ground-glass opacities (Figure-1). Due to the elevated levels of C-reactive protein (CRP) and procalcitonin, and the presence of fever (38.4 degrees), she was admitted to the Covid-19 ward for further monitoring. She did not require oxygen, and her CRP level was 118 mg/L and procalcitonin level was 0.28 ug/L. Due to her recent hospitalization history, she was started on intravenous (IV) Meropenem 2x1 g and IV 40 mg prednisolone for bronchospasm. She was evaluated by the Ear-Nose-Throat department for hoarseness of voice, but no pathology was found. During her clinical follow-up, she developed oxygen requirement and had green-colored abundant sputum production. A new non-contrast chest CT scan in December 2020 revealed a lesion in the right main bronchus (Figure-2), and due to the presence of a large amount of sputum, fiberoptic bronchoscopy (FOB) was performed to investigate secretion. During bronchoscopy, a yellow-colored hard lesion that could not be aspirated was observed extending from the lower end of the trachea to the entrance of the right main bronchus, and when the distal bronchus was examined with difficulty, yellow-white lesions surrounding the main bronchus and yellow-white lesions at the entrance of the left

main bronchus were detected (Figure-3, Figure-4). Biopsy was taken from the lesion in the right main bronchus, lavage culture and bronchoalveolar lavage (BAL) sample were sent for galactomannan analysis. Empirical voriconazole treatment was initiated as 2x6 mg/kg loading dose followed by 2x4 mg/kg IV based on the suspicion of fungal infection, with the consultation of infectious diseases. The galactomannan antigen level in the bronchoalveolar lavage was found to be 45.97 pg/mL, and candida albicans growth was detected in the lavage culture. Liposomal amphotericin B was added to the treatment as 5 mg/kg IV and 3x10 mg inhaler due to the patient's high amount of sputum. During rigid bronchoscopy after fiberoptic bronchoscopy, the hard lesion at the level of the main carina was excised. Histologically, fungal hyphae and spores were observed in the biopsy specimens stained with alcian blue/periodic acid-Schiff, diastase-periodic acid-Schiff, and Giemsa, showing branching hyphae and septa at a 45-degree angle in blood and fibrin, supporting the diagnosis of aspergillus. The microscopic appearance of the material sample sent during rigid bronchoscopy also showed fungal hyphae without septa, largely degenerate among actinomyces microorganisms. Histochmical studies revealed fungal hyphae with periodic acid-Schiff and Giemsa, and were predominantly suggestive of mucormycosis (Figure-5). The patient, who also had positive growth for mucormycosis, was started on 4x4 g ampicillin-sulbactam. Due to the development of tachypnea and the need for oxygen with a 15 liter/minute reservoir mask, she was transferred to the intensive care unit. On the first day of intensive care unit admission, the patient became hypotensive and required vasopressor support after cardiac arrest. She was intubated and treated for non-ST myocardial infarction. On the third day of intensive care unit admission, she expired after cardiac arrest. No autopsy was performed.

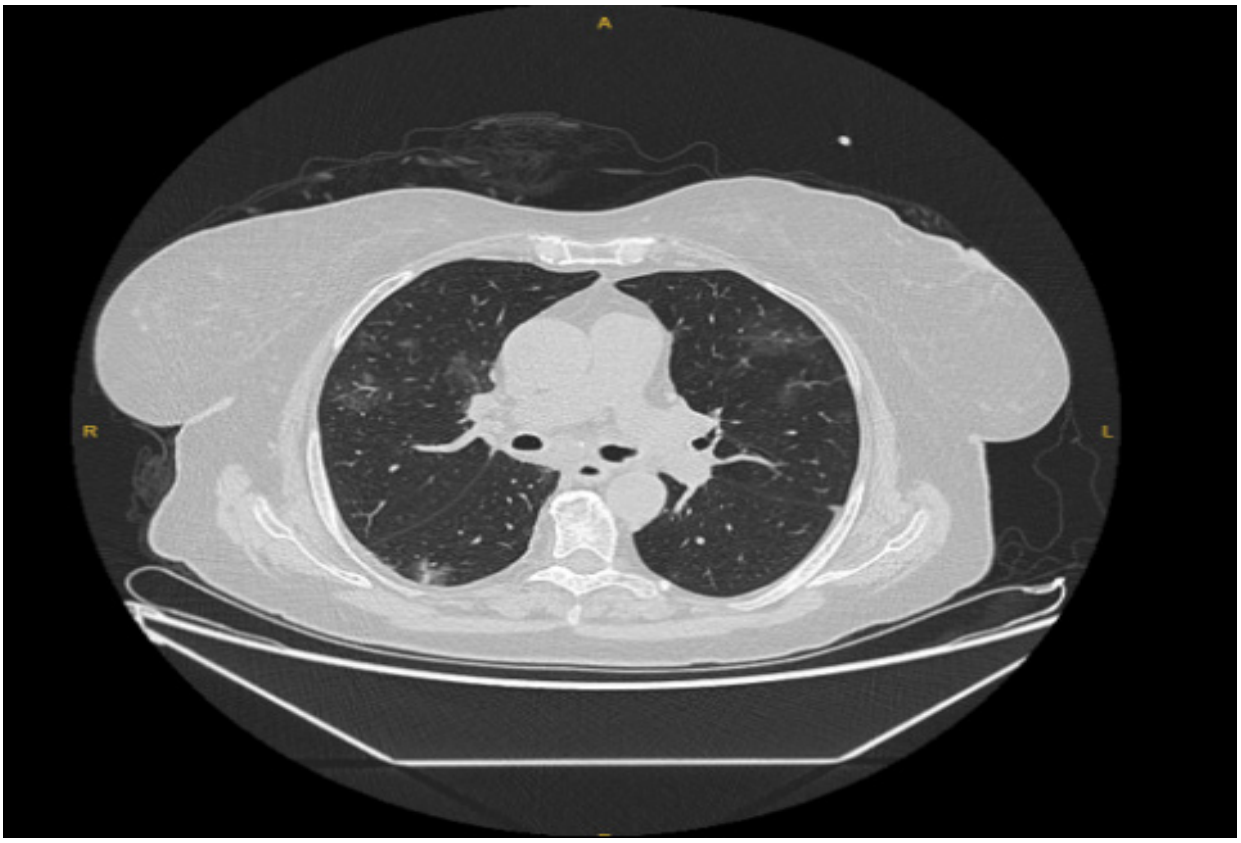

Figure 1: Bilateral subpleural ground-glass opacity lesions observed on computed tomography.

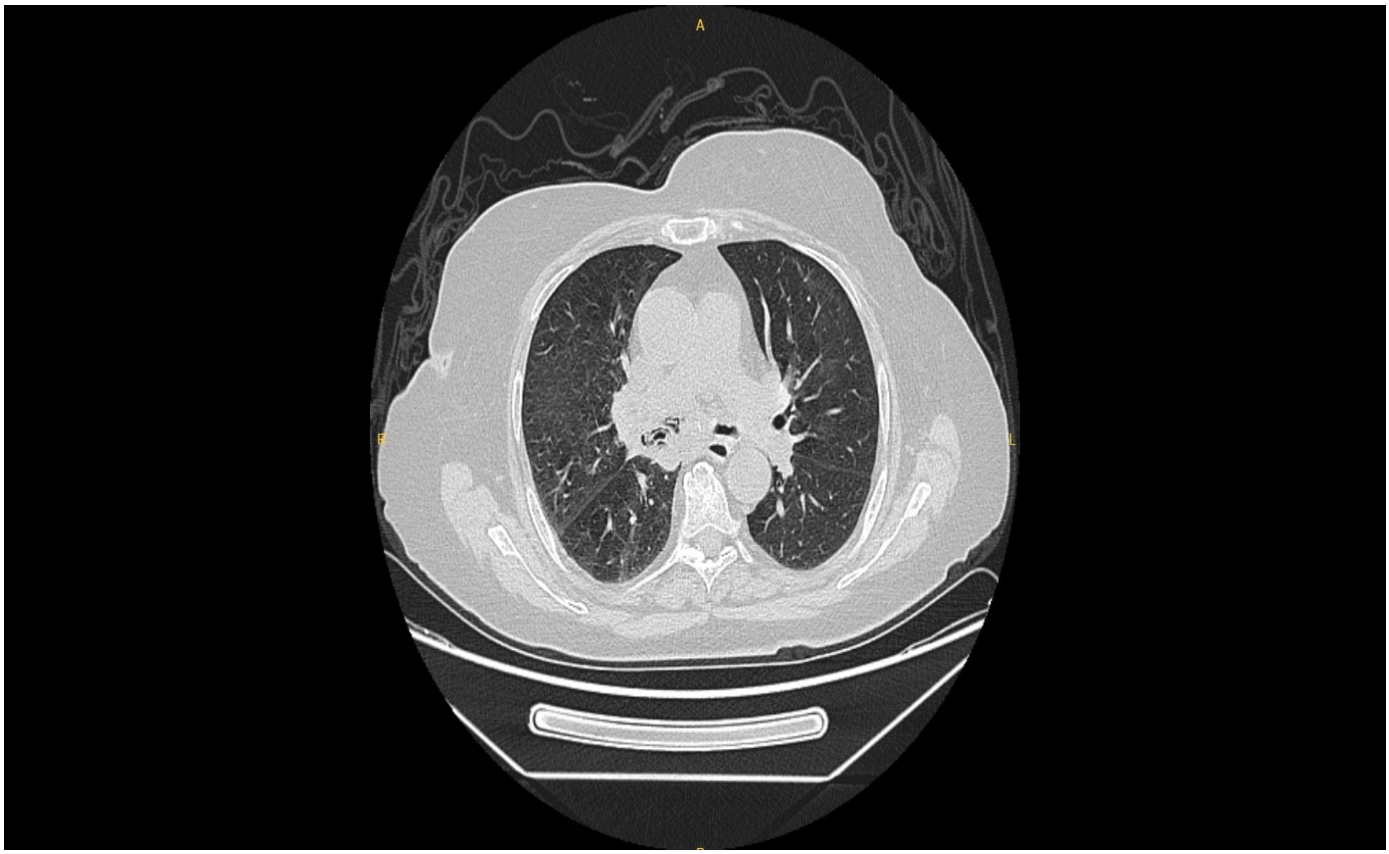

Figure 2: Computed tomography image of the lesion observed in the right main bronchus.

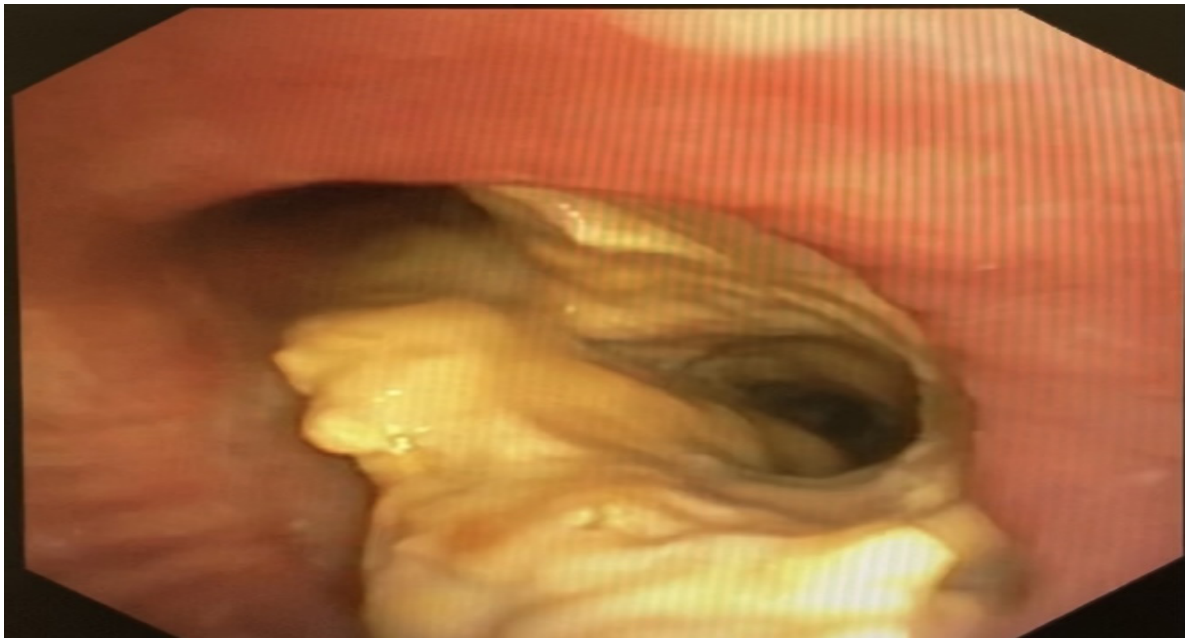

Figure 3: Bronchoscopic image of a firm, yellowish-white lesion extending from the distal trachea into the right main bronchus

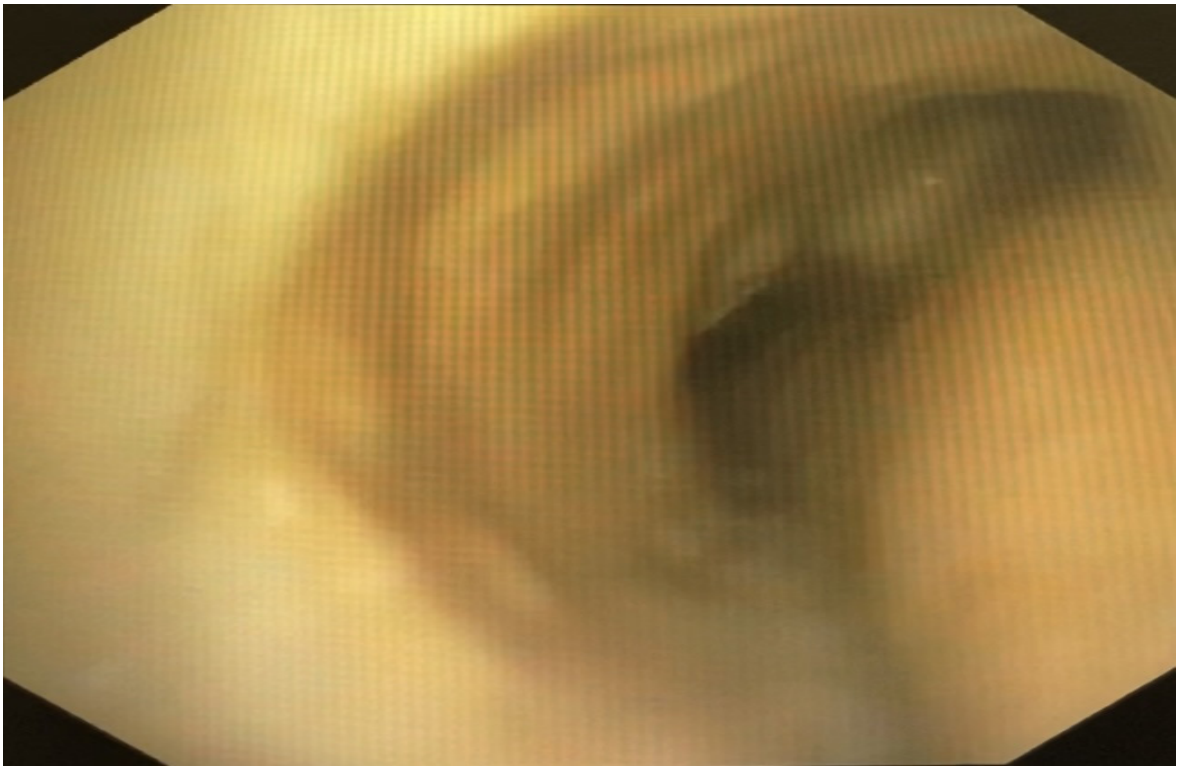

Figure 4: Bronchoscopic image of a firm, yellowish-white lesion extending from the distal trachea into the right main bronchus

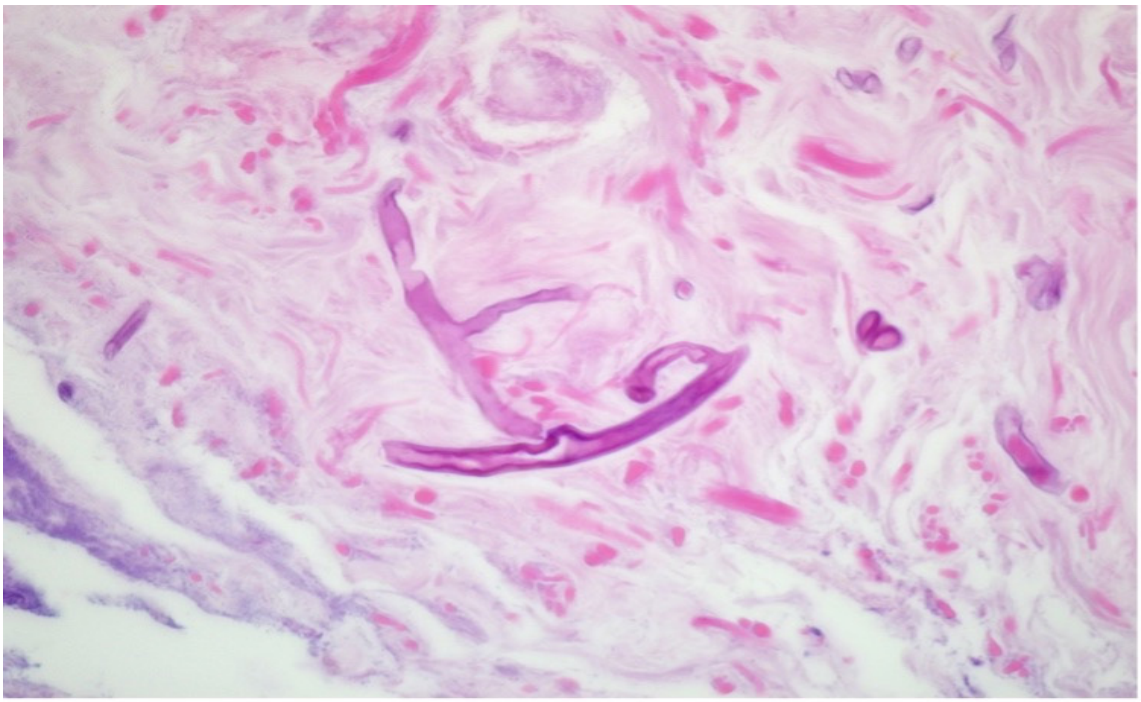

Figure 5: Fungal hyphae observed with periodic acid-Schiff (PAS) and Giemsa staining.

Discussion-Conclusion

The symptoms of Covid-19 and pulmonary fungal infections are similar. Both infections can present with fever, cough, and shortness of breath [6].

Covid-19 causes damage to the lung epithelium, lymphopenia and dysfunction of cellular immunity. The use of corticosteroid treatments, immunosuppressive drugs, and broad-spectrum antibiotics in the treatment of Covid-19 create an environment conducive to fungal infections in Covid-19 patients [7].

Aspergillus is typically seen in immunocompromised individuals but can also occur without immunosuppression in some viral respiratory infections such as influenza. There are multiple studies showing an increased incidence of aspergillus with Covid-19 [8-10].

Mucormycosis, particularly known as “black fungus,” is a fungal infection that has become more prevalent with Covid-19, especially in certain regions such as India, posing a significant public health problem. Uncontrolled diabetes and long-term high-dose steroid treatments in Covid-19 patients are risk factors for mucormycosis [11,12].

In our case, the presence of Covid-19 infection, prolonged use of broad-spectrum antibiotics, and steroid treatment raised suspicion of opportunistic infections contributing to the patient’s clinical deterioration. Empirical treatment was initiated based on the suspicion of fungal infection, and the treatment was revised according to the identification of the specific microorganisms through lavage culture, serology, and histopathological examinations.

Despite treatment, sepsis developed, and the patient was lost during intensive care unit follow-up. In conclusion, when patients with Covid-19 who are admitted to the hospital do not respond to treatment, opportunistic infections should be considered, and investigations to identify the causative agents should be promptly conducted. In cases with risk factors for opportunistic and fungal infections, treatment should be revised to cover possible pathogens when there is no response to therapy, and advanced investigations should be performed to identify the causative agent.

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