

## A fatal case of combined IPA and mucormycosis infection in an immunocompetent patient with COVID-19

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Although steroids are commonly used for the management of severe Coronavirus disease 2019 (COVID-19) and have been shown to reduce mortality, the use of steroids may be associated with opportunistic fungal infections such as COVID-19 associated invasive pulmonary aspergillosis (CAPA) and COVID-19 associated mucormycosis (CAM). To our knowledge, there have been no reports of combined fungal infections in COVID-19 patients in Korea to date. A 67-year-old male COVID-19 patient was admitted to our hospital with fever, chilling, dry cough, and headache. He had no co-morbidity or pre-existing lung disease. On hospital day 7, he was transferred to the intensive care unit due to respiratory failure and treated with remdesivir and dexamethasone. On hospital day 10, he was intubated and received extended intravenous dexamethasone therapy (6mg daily for 20 days, and followed by 3mg daily for 8 days). His chest radiograph was gradually improved, and he was extubated on hospital day 18. However, his chest radiograph showed new infiltrations and he was reintubated on hospital day 32. *Aspergillus fumigatus* grew repeatedly in tracheal aspirate and galactomannan assay was positive. Chest computed tomography scan showed multifocal cavitary consolidations in both lungs. He was diagnosed with probable CAPA and treated with intravenous voriconazole. After 4 weeks of voriconazole therapy, however, his conditions and chest radiographic findings did not show significant improvement. On hospital day 60, a bronchoscopy was performed. White and thick mucus plugs were observed from the distal trachea to right lower lobe bronchus. Histopathology examination demonstrated two morphological forms of fungal hyphae (broad non-septated hyphae and slender septated hyphae) involving the bronchial cartilage. His diagnosis was revised with combined CAPA and CAM, and voriconazole was changed to intravenous liposomal amphotericin B on hospital day 65. We report here on a new case of combined CAPA and CAM in an immunocompetent COVID-19 patient with steroid therapy.

