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CASE REPORT – OPEN ACCESS

A Critically Ill Patient with *Aspergillus Fumigatus* Sepsis-Related Ischemic Colitis

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ABSTRACT

Background: Invasive aspergillosis (IA) is an opportunistic infection generally encountered in patients with hematological malignancies. However, IA is increasingly recognized in non-neutropenic and critically ill patients in the absence of classic risk factors.

Case Report: An 81-year-old man with diabetes mellitus (DM), chronic renal failure (CRF), and heart failure, who had had 1-week complaints of diarrhea, nausea, and vomiting, was admitted to the intensive care unit with septic shock, acute respiratory failure, and acute kidney injury. Chest computed tomography showed cavitary lung lesions and colonoscopy revealed ischemic ulcers in the descending colon. Other causes of cavitary lung lesions were excluded and all cultures were negative, except for bronchoalveolar lavage yielding *Aspergillus fumigatus*. Thus, *Aspergillus fumigatus* sepsis with multiorgan failures was diagnosed.

Conclusion: Inhaled *Aspergillus* conidia are kept under control by alveolar macrophage. DM, CRF, and aging are the conditions that disrupt phagocytic activity of macrophages and predispose to IA.

Keywords: Critically ill patient, invasive aspergillosis, ischemic colitis, phagocytic function, sepsis

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INTRODUCTION

Invasive aspergillosis (IA) is an opportunistic infection that mainly occurs in immune compromised patients (1, 2). Although the lung is the main site of infection, almost every organ or system of the body can be infected through the hematological spreading after blood vessel invasion by Aspergillus hyphae (1, 3). IA has increasingly been diagnosed in patients admitted to the intensive care unit (ICU), even in the absence of a classic predisposing immunodeficiency. The incidence of IA in the ICU ranges from 0.3% to 5.8% (4, 5). The complex underlying conditions in the patients and non-specific presentation of the symptoms can confound IA diagnosis in the ICU (5). We report a patients with multiorgan failures admitted to the ICU where lung IA was detected as the cause of sepsis although the patient did not have definitive risk factors for IA.

CASE REPORT

An 81-year-old male patient with coronary artery disease, heart failure, diabetes mellitus (DM), pace maker, and chronic renal failure (basal creatinine, 1.6–1.9 mg/dL) was admitted to the hospital with one-week complaints of nausea, vomiting, and watery diarrhea with no blood or mucus. On admission, his blood pressure was 96/45 mm Hg, respiratory rate 26/min, and room-air oxygen saturation 84% by pulse oximeter with normal temperature and heart rate. The initial abnormal laboratory tests were creatinine, 3.1 mg/dL; urea, 164.5 mg/dL: sodium, 122 mEq/L; C-reactive protein, 22.3 mg/dL; partial thromboplastin time, 51 s; prothrombin time, 16.7 s; leukocytes, 13.7×10^9; hemoglobin, 8.4 gr/dL; pH, 7.196; PCO_2, 20.1 mm Hg; HCO_3, 10.1 mEq/L; lactate, 2.4 mg/dL; and base excess, -19.2 mg/dL. The patient was hospitalized with the diagnosis of diarrhea and acute kidney injury. The patient was intubated 24 h later due to hypotension and respiratory failure, and admitted to the ICU with the diagnosis of septic shock. Chest computed tomography (CT) demonstrated cavitary lesions mainly located at the left lung along with the left pleural effusion (Fig. 1). Deep tracheal aspirate (DTA), blood, urine and stool cultures, and acid-fast bacilli (AFB) staining of DTA on 3 consecutive days were negative. Stool examination showed leukocytes, but was negative for *Clostridium difficile* enterotoxin, ova, and parasites. Pleural fluid was in transudate with negative AFB staining, culture, and cytology. The possibility of rheumatologic diseases was excluded by autoantibody panels. Lung septic embolism from infective endocarditis was ruled out by esophageal echocardiography. Neck and abdominal CT were normal as bronchoscopy. Studies of human immunodeficiency virus (HIV), hepatitis virus C and B, severe acute respiratory syndrome coronavirus-2, protein electrophoresis, and blood smear were unremarkable. Colonoscopy, done on day 4, showed ulcers with

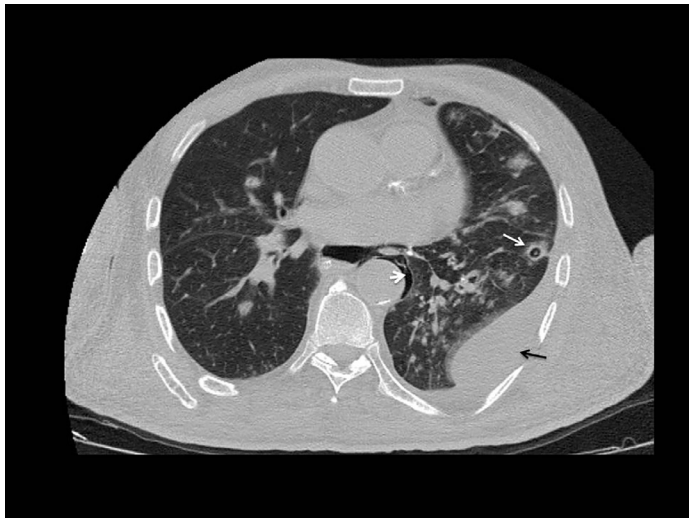

Figure 1. Chest computed tomography demostrated a left cavitary lesion (white arrow), left pleural effusions (black arrow), and air around thoracic aorta and esophagus (short white arrow)

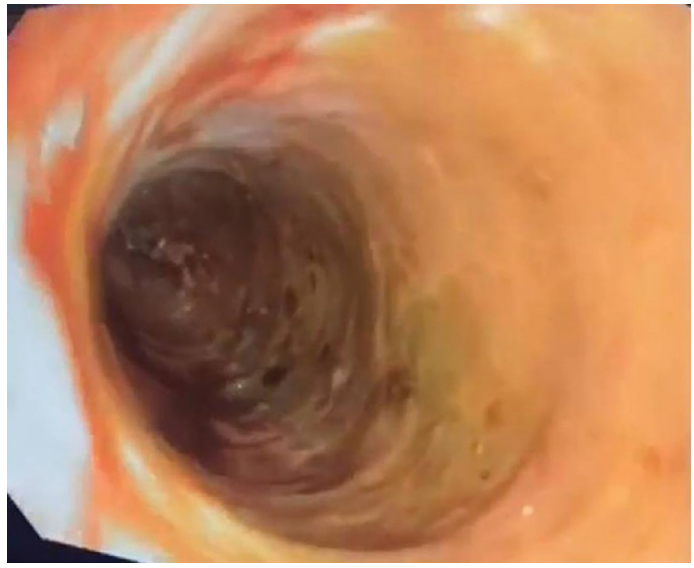

Figure 2. Colonoscopy showed the longitudinal ulcerations at descending colon

sharp borders and centrally located exudates in the descending colon, and ischemic colitis was assessed (Fig. 2). Since the abdominal examination of the patient was unremarkable along with normal abdominal CT and ultrasonography, the perforation was not considered. Tazobactam-sulbactam, metronidazole, and linezolid were prescribed in the ICU, but the patient did not improve. Mold growth in BAL culture was determined on day 6 and amphotericin B was begun. The patient benefited from the therapy and noradrenaline infusion was stopped on day 10. The patient deteriorated on day 17 because of ventilator-associated pneumonia, did not responded to antibiotic therapy and died on day 20. The family refused an autopsy. BAL culture yielded *Aspergillus fumigatus*. Mycobacterium and colon tissue cultures resulted negative. Pathology of the colon delineated ischemic colitis with no *Aspergillus* hyphae.

DISCUSSION

Species of the genus Aspergillus are ubiquitous fungi. The conidia (spores) are easily aerosolized and lung infections are caused by inhalation of airborne conidia (2). They are most commonly found in the upper respiratory tract, including the external ear. IA is an opportunistic infection that mainly occurs in patients having allogeneic stem cell transplantation, solid organ transplantation, HIV/acquired immunodeficiency syndrome, and immunosuppression by chemotherapy or corticosteroids, and is mostly caused by *Aspergillus fumigatus* (1–3). However, IA has been recognized in patients in the absence of an apparent predisposing immunodeficiency. Other conditions seemed to be associated with IA are chronic obstructive pulmonary disease, emphysema, autoimmune disease, DM, acute/advanced liver failure, renal failure, aging, and being in ICU (2, 6). IA in the ICU can be two types; the patients can have the disease of IA when admitted to the ICU or develop IA in the ICU after the airways are colonized by the microorganism, and critical illness-induced immunosuppression leads to the microorganism to invade the alveoli (4, 5). A high index of suspicion is needed to diagnose IA in critically ill patients without known predisposing risk factors, especially when the pulmonary infiltration was persisted despite the broad-spectrum antimicrobial therapy (4). IA in the ICU carries a high mortality rate reaching 80% (7). The diagnosis of IA in non-neutropenic critically ill patients is difficult as signs and symptoms are not specific, and importantly, low clinical suspicion leads to delayed initiation of diagnostic tests. In the present case, we first focused on tuberculosis and septic emboli, and then, on rheumatologic diseases. When mold growth from BAL was reported, IA was moved to the top of the list of possible diseases as the cause of cavitary lesions, ischemic colitis, shock, and AKI. Since microbiologic and pathological studies of the colon did not show *Aspergillus* invasion, the ischemic colitis was considered to be sepsis-related.

Aspergillus conidia are kept under control by alveolar macrophages in immune competent individual. Defects in phagocytic function of macrophage as seen in chronic granulomatous disease or prolonged neutropenia impair killing, and result in continued fungal growth within the host (1, 2). Once conidia germination occurs, *Aspergillus* invades lung parenchyma and arteriole and causes ischemic necrosis (2). Although our patient did not have classic risk factors, he was older, and had DM and renal failure that all three conditions cause abnormalities in phagocytic function of leukocytes (8–10). Voriconazole is the first choice of the drug for IA treatment. Intravenous voriconazole includes the vehicle sulfobutylether-beta-cyclodextrin that can accumulate in moderate-severe renal impairment (5). Amphotericin B is the second line drug which was ordered in our case as the patient had renal impairment.

CONCLUSION

IA in critically ill patients represents a challenge for the clinicians. The complex underlying conditions in the patients, non-specific presentation of the signs, and lack of clear identification criteria can confound the diagnosis. Therefore, a high index of suspicion is needed to diagnose IA in critically ill patients.

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REFERENCES

1. Cadena J, Thompson GR 3rd, Patterson TF. Invasive aspergillosis: Current strategies for diagnosis and management. Infect Dis Clin North Am 2016; 30(1): 125–42. [CrossRef]
2. Latgé JP, Chamilos G. Aspergillus fumigatus and Aspergillosis in 2019. Clin Microbiol Rev 2019; 33(1): e00140–18. [CrossRef]
3. Denning DW, Stevens DA. Antifungal and surgical treatment of invasive aspergillosis: review of 2,121 published cases. Rev Infect Dis 1990; 12(6): 1147–1201. [CrossRef]
4. Trof RJ, Beishuizen A, Debets-Ossenkopp YJ, Girbes AR, Groeneveld AB. Management of invasive pulmonary aspergillosis in non-neutropenic critically ill patients. Intensive Care Med 2007; 33(10): 1694–703.
5. Bassetti M, Bouza E. Invasive mould infections in the ICU setting: complexities and solutions. J Antimicrob Chemother 2017; 72(suppl_1): i39–i47. [CrossRef]
6. Shimodaira K, Okubo Y, Nakayama H, Wakayama M, Shinozaki M, Ishiwatari T, et al. Trends in the prevalence of invasive fungal infections from an analysis of annual records of autopsy cases of Toho University. Mycoses 2012; 55(5): 435–43. [CrossRef]
7. Vandewoude K, Blot S, Benoit D, Depuydt P, Vogelaers D, Colardyn F. Invasive aspergillosis in critically ill patients: Analysis of risk factors for acquisition and mortality. Acta Clin Belg 2004; 59(5): 251–7.
8. Szablewski L, Sulima A. The structural and functional changes of blood cells and molecular components in diabetes mellitus. Biol Chem 2017; 398(4): 411–23. [CrossRef]
9. De Maeyer RPH, Chambers ES. The impact of ageing on monocytes and macrophages. Immunol Lett 2021; 230: 1–10. [CrossRef]
10. Chonchol M. Neutrophil dysfunction and infection risk in end-stage renal disease. Semin Dial 2006; 19(4): 291–6. [CrossRef]