Short Communication

Fungemia and Cutaneous Zygomycosis Due to *Mucor circinelloides* in an Intensive Care Unit Patient: Case Report and Review of Literature

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**SUMMARY:** *Mucor* spp. are rarely pathogenic in healthy adults, but can cause fatal infections in patients with immunosuppression and diabetes mellitus. Documented mucor fungemia is a very rare condition in the literature. We described a fungemia and cutaneous mucormycosis case due to *Mucor circinelloides* in an 83-year-old woman with diabetes mellitus who developed acute left frontoparietal infarctus while hospitalized in a neurological intensive care unit. The diagnosis was made based on the growth of fungi in the blood, skin biopsy cultures, and a histopathologic examination of the skin biopsy. The isolates were identified as *M. circinelloides* by molecular methods. This case is important in that it shows a case of cutaneous mucormycosis which developed after fungemia and provides a contribution to the literature regarding *Mucor* fungemia.

Mucormycosis manifests as a rhinoorbitocerebral, pulmonary, gastrointestinal, cutaneous, or disseminated disease. The most frequently isolated pathogens are *Rhizopus*, *Mucor*, *Cunninghamella*, and *Absidia*. Although mucormycosis tends to invade blood vessels and generates a disseminated disease, documented mucor fungemia is very rare, and blood cultures are mostly negative (1). Herein, we describe a case of fungemia and cutaneous mucormycosis due to *Mucor circinelloides* in a neurological intensive care unit patient with diabetes mellitus and discuss it in the light of the current literature.

An 83-year-old diabetic woman was admitted to our emergency service with complaints of consciousness disturbance and sudden onset right hemiplegia. She had been receiving oral antidiabetic treatment, and the level of HbA1c was 7.5%. She had never received insulin treatment. The patient was intubated because of increased difficulty in breathing and transferred to the Neurology Intensive Care Unit. She was mechanically ventilated in this unit. During physical examination on the 8th day of admission, her temperature was 38.3°C. Her lung examination revealed crackles on bilateral lower lung fields. The leukocyte count was 13,500 cells/mm³ with 78% neutrophils. A chest radiograph revealed a paracardiac pulmonary infiltration in the right lung. The patient was started on intravenous ampicillin-sulbactam 1.5 g per 6 h. Sputum and blood cultures were negative at this time.

On the 10th day, her body temperature was normal, and she was stable over the following week. On the 17th day, her body temperature rose to 38.5°C, and her clinical condition worsened. Deep tracheal aspirate culture grew *Pseudomonas aeruginosa*, and the patient’s antibiotic therapy was switched to intravenous piperacillin-tazobactam 4.5 g per 8 h. Four days later, the microbiology laboratory reported a growth of mold on a blood culture. In fact, this growth pattern was not taken into account at the beginning, since it was considered to be contamination. This was because the patient’s clinical findings were not associated with an invasive fungal disease. In addition, paranasal sinus and pulmonary computed tomography (CT) results were not indicative of any invasive fungal disease. On the 24th day of treatment a slightly erythematous and oedematous area began to develop on the patient’s right hand. During dermatological examination, a centrally located necrotic thick crust layer was observed. This slightly erythematous and oedematous lesion covered the whole dorsal aspect of the hand extending to the forearm. The lesion resembled that of cellulitis, but on palpation a purulent exudation and hemorrhagic drainage were observed (Figure 1). Samples for bacterial and fungal culture were taken from the exudate. Histopathological examination of a deep excisional biopsy material revealed pathognomonic changes of broad, irregular, nonseptate, branching fungal hyphae and spores relevant to mucormycosis by hematoxylin and eosin (H&E) stain. Necrosis and a neutrophilic infiltrate were additional characteristic features (Figure 2). These findings were consistent with deep fungal infection of the skin. In addition a skin biopsy culture yielded a mold similar to that in the blood culture. Microscopic examination showed the absence of stolons, apophyses, and rhizoids. Both isolates were morphologically identified as a

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Fig. 1. Slightly erythematous and oedematous area on the hand with a centrally located necrotic thick crust layer. On palpation a purulent exudation and hemorrhagic drainage were observed.
risk for disseminated mucormycosis, because they are often immunosuppressed as a result of malnutrition and medications (including corticosteroids) and may be hyperglycemic as a result of parenteral hyperalimentation or diabetes mellitus. In our case, when oral antidiabetic treatment was initiated, the patient’s blood glucose level was 120 mg/dl. The skin lesion on the right hand appeared 6 days after the fungemia. Therefore, we concluded that cutaneous lesions occurred secondary to bloodstream infection. The primary source of infection was not detected in this case. The CT scan of the lungs, paranasal sinuses and brain revealed no foci for mucormycosis. Cutaneous involvement is seen in 19% of mucormycosis cases. Clinical features of cutaneous mucormycosis range from skin swelling or pustulas to necrotic ulcerations and ecthyma gangrenosum-like lesions. Cutaneous mucormycosis can occur through hematogenous dissemination from other organs (3%), but cutaneous infection can also spread to other noncontiguous organs (20%) (1). Diagnosis of mucormycosis remains difficult. Culture positivity is seen in only half of patients. *Mucor* fungemia is a very rare clinical condition, even if the disseminated form is not uncommon. There are very limited data in the literature about positive blood cultures in mucormycosis cases. Nakamura et al. reported a case of peritoneal mucormycosis with positive blood culture, but the diagnosis was made post-mortem (4). In a study by Chan-Tack et al., a case of fungemia due to *M. circinelloides* associated with a central venous catheter was reported (5). They stated that early diagnosis of mucormycosis led to a successful outcome in this case. In another study by Abolins et al., a case of *Mucor indicus* fungemia secondary to gastrointestinal mucormycosis was presented (6). In both of these cases, mucormycosis was treated with amphotericin B in the early stage of the disease and the patients recovered well. Unfortunately, the antifungal therapy was initiated late in our case despite the growth on the blood culture. The antifungal therapy was only started after the growth of fungi from the skin biopsy specimen. It can be postulated that detecting the fungi on blood cultures is important for the early diagnosis of disseminated mucormycosis and may be related to survival.

Molecular techniques using genomic targets within the rRNA complex have been shown to be reliable for *Mucor* spp. There is a close relationship between *M. circinelloides* and *M. racemosus* using the 18S and 28S rRNA gene targets. Thus, we confirmed the sequence data obtained from a case strain with the data for reference strains. Also, *M. circinelloides* grew well at 37°C, at which *M. racemosus* is not known to grow. *Mucor* spp. have been associated with invasive zygomycosis, but fungemia and cutaneous involvement have rarely been reported (5,6). *M. circinelloides* was the causal agent in four cases with cutaneous mucormycosis (3,4,7,8).

In conclusion, our case once again emphasizes that many cases of mucormycosis are undiagnosed; therefore, publishing more case reports and sharing our experience in this difficult-to-diagnose disease may provide a better understanding of the different aspects of this rare clinical entity.

REFERENCES


