

Management of Isolated Mucormycosis on the Upper Extremity, A Rare Case Report

 Ahmet Umut Yuvacı^{1*}

¹ Plastic, Reconstructive and Aesthetic Surgery, Private Clinic, Istanbul, Turkiye

*Correspondence: Ahmet Umut Yuvacı; drauyuvaci@gmail.com

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Abstract

Objective: Mucormycosis is an invasive fungal infection characterized by rapid tissue necrosis and high mortality, particularly in immunocompromised patients. Upper extremity involvement is extremely rare. Herein, we present a case of cutaneous mucormycosis in the left forearm of a patient with a history of bone marrow transplantation and discuss the diagnosis and treatment process in light of the literature. **Methods:** A 66-year-old male patient with a history of bone marrow transplantation presented with redness and pain in the left volar forearm after peripheral venous access. Necrosis rapidly progressed over two weeks, extending to the wrist. Surgical debridement was performed. Tissue biopsy and wound culture confirmed mucormycosis. **Results:** On the second postoperative day, new necrotic foci and hyperemia developed around the wound. The diagnosis of mucormycosis was confirmed by histopathology and culture. The patient received intravenous antifungal therapy, adjunctive hyperbaric oxygen therapy, and topical antifungal wound care. By day 40 of follow-up, epithelialization from the periphery to the center of the defect was observed with no further necrotic progression. **Conclusion:** Early diagnosis and a multidisciplinary approach are crucial in managing mucormycosis, especially in immunocompromised individuals. Combined treatment with surgery, systemic and topical antifungals, and adjunctive therapies such as hyperbaric oxygen may prevent limb loss and improve outcomes.

Keywords: Mucormycosis, upper extremity infection, immunosuppression, debridement, hyperbaric oxygen.

1. Introduction

Mucormycosis is an aggressive and highly fatal fungal infection caused by fungi belonging to the order Mucorales. It is more frequently observed in immunosuppressed individuals and typically involves the nasal, orbital, or pulmonary regions. Although the cutaneous form is rare, it may develop due to iatrogenic causes such as trauma, surgical intervention, or vascular access^{1,2}. Upper extremity involvement is quite rare, especially in patients with hematological malignancies³. In this study, a case of cutaneous mucormycosis developing in the left forearm of a patient with a history of bone marrow transplantation is presented.

2. Case Presentation

A 66-year-old male patient with non-Hodgkin lymphoma who had previously undergone allogeneic bone marrow transplantation and was receiving immunosuppressive therapy with dexamethasone 60 mg/day and cyclosporine 25 mg twice daily presented with redness, swelling, and pain involving the left forearm. Three days after attempted peripheral venous access on the flexor surface of the left forearm, erythema developed at the intervention site. The patient initially presented to the dermatology department of an external center and received topical treatment; however, no clinical improvement was observed. On day 10 of the lesion, he presented to our department with progressive skin necrosis extending from the flexor aspect of the left forearm toward the extensor surface and dorsum of the left hand (Figure 1). Upon hospitalization, prophylactic posaconazole (300 mg once daily) and empirical meropenem trihydrate (1 g three times daily) were initiated.

Upper extremity arterial Doppler ultrasonography demonstrated triphasic flow patterns with normal velocities in the left subclavian, axillary, brachial, radial, and ulnar arteries. Inflammatory findings were reported around the necrotic area, along with a fluid collection in the deeper tissues. The patient, who was taken to debridement and exploration with a preliminary diagnosis of hematoma, was found intraoperatively to have widespread necrosis in the fascia and some flexor and extensor muscle groups. Fascia debridement was not performed in order to preserve vital structures. (Figure 2)



Figure 1. Day 10 of the lesion, demonstrating extensive skin necrosis extending from the flexor aspect of the left forearm to the dorsum of the hand at presentation.



Figure 2. Day 10 of the lesion, intraoperative view demonstrating extensive necrosis involving the fascia and underlying flexor and extensor muscle groups.

On the 2nd postoperative day, increased erythema and new necrotic foci were observed around the defect (Figure 3). Histopathological examination of the necrotic tissue demonstrated broad, ribbon-like fungal hyphae of irregular thickness with absent or sparse septations and irregular branching. Fungal hyphae were also identified within

vascular structures and adipose tissue, with involvement of the vascular walls and lumina accompanied by thrombosis. The diagnosis of mucormycosis was confirmed by histopathological examination and culture. Following confirmation of the diagnosis, intravenous liposomal amphotericin B (650 mg/day) was added to the ongoing posaconazole treatment. In addition, hyperbaric oxygen therapy (once daily, 90 minutes, at 2.5 ATA pressure) and topical antifungal dressings (containing miconazole and zinc) were applied. It was observed that the progression of necrotic areas had stopped and the peripheral erythema had decreased. On the 27th day of hospitalization (day 37 of the lesion), epithelialization from the periphery toward the center of the defect was observed (Figure 4). The patient was followed conservatively without the need for further surgical reconstruction. On the 35th day of follow-up, the patient died due to cytomegalovirus infection that developed in the lungs.

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. All clinical data were presented without revealing the patient's identity, and written informed consent was obtained from the patient for scientific use. As this is a single case report, additional ethics committee approval was not required.



Figure 3. Day 12 of the lesion, demonstrating progressive erythema and newly developed necrotic foci around the wound margins.



Figure 4. Day 37 of the lesion, demonstrating progressive epithelialization from the wound periphery toward the center, with cessation of necrotic progression.

3. Discussion

Mucormycosis is a rapidly progressive, angioinvasive fungal infection predominantly affecting immunocompromised individuals, particularly those with hematological malignancies and recipients of hematopoietic stem cell transplantation^{1,2}. Profound immunosuppression, impaired neutrophil function, and disruption of normal host barriers contribute to increased susceptibility and aggressive disease progression in this population¹.

Cutaneous mucormycosis, although less common than rhino-orbital-cerebral or pulmonary forms, is strongly associated with direct inoculation following trauma or iatrogenic interventions such as intravenous catheterization³. The present case highlights the critical role of even minor iatrogenic breaches in skin integrity as potential entry points for invasive fungal pathogens in high-risk patients. Notably, upper extremity involvement remains exceedingly rare, further underscoring the atypical presentation of this case.

A defining feature of mucormycosis is its marked angioinvasion, leading to vascular thrombosis, tissue ischemia, and rapidly progressive necrosis². This pathophysiological mechanism explains the fulminant clinical course observed in our patient, with continued necrosis despite initial surgical debridement. The persistence or progression of necrotic tissue following early intervention should therefore prompt immediate reconsideration of the diagnosis and raise suspicion for invasive fungal infection, particularly in immunocompromised hosts.

In the literature, extremity mucormycosis in patients with hematological malignancies has been rarely reported. Yedikian et al. reported a similar case of upper extremity mucormycosis in a patient with acute myeloid leukemia, in which early diagnosis and surgical intervention prevented limb loss³. In the meta-analysis by Jeong et al., diabetes mellitus was identified as the most common cause, while the most frequent involvement was the nasal-orbital region¹.

Timely diagnosis remains a major clinical challenge. Although histopathological identification of broad, non-septate hyphae and positive fungal cultures constitute the diagnostic gold standard, delays in obtaining these results often contribute to poor outcomes^{2,4}. In this context, a high index of clinical suspicion is essential, especially in cases of rapidly progressive soft tissue infection unresponsive to conventional antibacterial therapy. Early biopsy and microbiological confirmation should not be delayed when clinical progression is disproportionate to initial findings.

The cornerstone of mucormycosis management is a multimodal strategy that includes prompt initiation of systemic antifungal therapy, aggressive surgical debridement, and reversal of underlying predisposing factors^{2,5,6}. Liposomal amphotericin B remains the first-line treatment, with azoles such as posaconazole and isavuconazole serving as step-down or salvage therapy⁶. In the present case, fascial debridement was not performed to avoid injury to critical anatomical structures. Although local progression subsequently ceased during combined antifungal and adjunctive treatment, the contribution of this limited surgical approach to local disease control cannot be determined from a single case.

Adjunctive therapies such as hyperbaric oxygen therapy (HBOT) have been proposed to enhance treatment outcomes by improving tissue oxygenation, augmenting host immune response, and exerting potential antifungal effects². Although the available clinical evidence remains limited, HBOT was used as an adjunct to systemic antifungal therapy and wound management in the present case; therefore, its independent contribution to local disease control cannot be determined.

Despite successful local control of infection, the patient ultimately died due to cytomegalovirus infection of the lungs, highlighting the complex clinical course of severely immunocompromised patients. This underscores that mucormycosis management should not be considered in isolation, but rather within the broader context of systemic immunosuppression and susceptibility to opportunistic infections. Consequently, comprehensive multidisciplinary management remains essential to improve overall outcomes in this high-risk population.

4. Conclusion

Mucormycosis is a rare but highly aggressive infection associated with substantial morbidity and mortality. This case emphasizes the importance of considering mucormycosis early in the differential diagnosis of rapidly progressive necrotic skin lesions, particularly in severely immunocompromised patients, and of promptly initiating multidisciplinary management.

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Informed Consent Statement: Written informed consent was obtained from the patient for scientific use of the clinical data. All clinical data were presented without revealing the patient's identity.

Conflict of Interest: The author declares no conflict of interest.

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