

## A Solitary Necrotic Lesion in a Man with Acute Myeloid Leukemia and Neutropenia

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### Case Report:

A 53-year-old man with acute myeloid leukemia status post chemotherapy was admitted with febrile neutropenia, neutropenic enterocolitis, and *Stenotrophomonas pneumonia*. An inpatient workup revealed central nervous system involvement of his acute myeloid leukemia, and intrathecal chemotherapy was initiated. On hospital day 28, dermatology was consulted for a 7-day history of a painful, progressively enlarging lesion on his left arm. He denied any known history of trauma to the area. Physical examination revealed a 2 centimeter indurated, gray and black plaque with a central vesicle and surrounding erythema on the patient's left upper arm (Figure 1: A). A punch biopsy of the lesion was performed, and tissue was sent for culture and histologic evaluation (Figure 1: B, C, and D). Laboratory evaluation revealed a white blood cell count of 0.1 million cells per microliter. Tissue cultures revealed that the lesion on this patient's arm

was a primary cutaneous zygomycosis. The cultures grew *Absidia corymbifera*, which is in the class *Zygomycetes*, along with *Mucor* and *Rhizopus*.<sup>1</sup>

While immunocompetent individuals are usually unaffected after exposure to these ubiquitous fungi, infection with the opportunistic pathogens in this class can be fatal in an immunocompromised host if not promptly diagnosed and treated.<sup>2</sup> Systemic risk factors include any disease process that results in neutrophil dysfunction or, as was present in this case, neutropenia. Diabetes accounts for the majority of human infections with fungi in the *Zygomycetes* class, as ketoacidosis induces neutrophil dysfunction.<sup>1</sup> Other predisposing conditions include hematologic malignancies, immunosuppressive therapy, and bone marrow suppression secondary to chemotherapy.<sup>2</sup> Cutaneous disease most often occurs by primary percutaneous inoculation, but can also be seen in the setting of hematogenous dissemination.<sup>3</sup> While no

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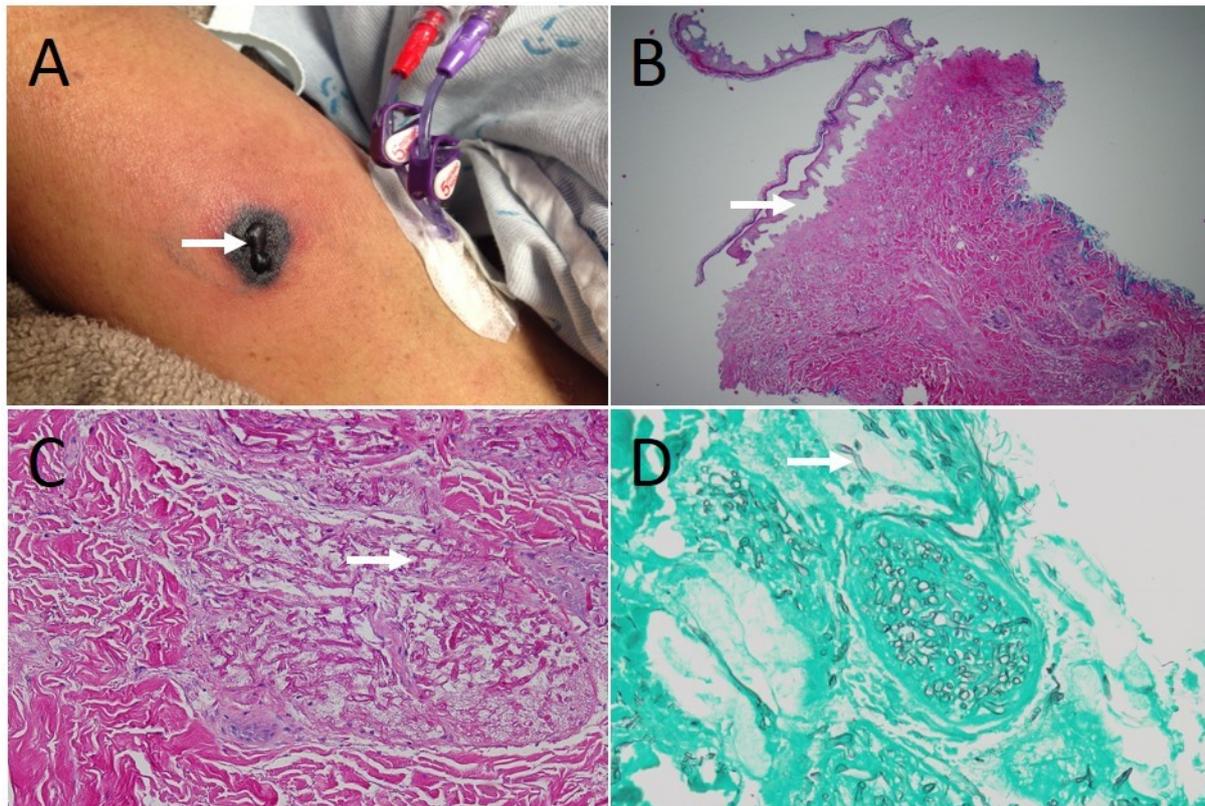
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**Figure 1.**

- A. Indurated gray and black plaque with a central vesicle (arrow) and surrounding erythema on the left upper arm
- B. Biopsy specimen showing numerous angioinvasive fungal organisms in dermis, purpura, and a subepidermal cell-poor bulla (arrow) (hematoxylin-eosin, low power)
- C. Biopsy specimen showing wide, aseptate hyphae (arrow) branching at right angles (hematoxylin-eosin, high power)
- D. Fungal stain showing wide, aseptate hyphae (arrow) branching at right angles (Gomori methenamine silver)

local risk factors, such as trauma, could be identified in this case, any disruption of the cutaneous barrier in a susceptible patient can provide an entry point for the fungus and lead to cutaneous zygomycosis.<sup>2</sup> It is possible that the trauma allowing for fungal entry could have gone unnoticed by the patient and the physician, as the entry point can be as minor as the trauma associated with removing adhesive bandages.<sup>4</sup>

Primary cutaneous zygomycosis typically presents as a single erythematous papule, which then progresses to an indurated plaque with central necrosis, followed ultimately by a black eschar and ulceration.<sup>3</sup> Primary cutaneous infections caused specifically by *Absidia*

*corymbifera* are generally described as enlarging gray to black plaques, as was present in this case.<sup>1</sup> The clinical manifestations of cutaneous zygomycosis can be explained by the angioinvasive nature of the fungus, which leads to thrombosis and tissue necrosis.<sup>3</sup> The outcome of primary cutaneous fungal infections is usually threefold: the lesion resolves with treatment, invades locally into surrounding muscle, tendon, or bone, or becomes disseminated through hematogenous spread.<sup>4</sup> Mortality increases with each stage of the disease, so early recognition and treatment is imperative.<sup>5</sup>

Cutaneous zygomycosis is diagnosed by histopathologic examination and culture of tissue samples. In tissue sections, fungi in the *Zygomycetes* class exhibit angioinvasive, wide, aseptate hyphae branching at right angles.<sup>1</sup> Once diagnosed, the treatment of a primary cutaneous zygomycosis includes antifungal treatment with amphotericin B, usually accompanied by surgical debridement.<sup>3</sup> Unfortunately, the lesions may not resolve with appropriate antifungal therapy, and reversal of the neutropenia is often necessary.<sup>4</sup> In this case, the patient was placed on intravenous liposomal amphotericin B and posaconazole. He also underwent treatment with hyperbaric oxygen, which is believed to increase survival through improved neutrophilic killing and direct growth-suppressive effects on the fungi.<sup>1</sup> The lesion has significantly improved since initiation of this treatment.

Physicians should have a high index of suspicion for cutaneous zygomycosis when a patient presents with a solitary necrotic skin lesion, especially when the patient is immunocompromised. This case also highlights the importance of performing thorough skin examinations and paying close attention to any new cutaneous lesions in neutropenic patients. Early tissue biopsy of any suspicious lesions with pathologic evaluation and culture can lead to early diagnosis, proper treatment, and improved outcomes in patients with cutaneous zygomycosis.

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