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CASE REPORT

Case report: skin infection by Rhizopus sp in pediatric patient

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Abstract

This paper describes the case of a 7-month-old female infant diagnosed with spinal muscular atrophy who developed cutaneous infection around the orogastric tube fixation site caused by *Rhizopus sp*. unresponsive to therapy with antibiotics and dressing changes. Fungi of the genus Rhizopus in the order Mucorales cause severe opportunistic infection in immunodeficient individuals. This paper narrates a case of aggressive cutaneous Rhizopus infection (mucormycosis/zygomycosis) resolved after proper prolonged therapy. More studies on the subject are required, since this is an uncommon infection without an established standard of care published in the literature.

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INTRODUCTION

Zygomycosis is a severe infection caused by fungi in class Zygomycetes. Fungi in the order Mucorales cause most cases of the disease. Species in the genus Rhizopus have been particularly associated with opportunistic infection[1].

A study carried out in the United States estimated the incidence of mucormycosis to be 1.7 cases per million people per year, although prevalence in patients undergoing bone marrow transplantation has been described to be as high as 2-3%[2]. Other risk factors associated with increased risk of infection are diabetes; leukemia; lymphoma; other hematologic malignancies; severe neutropenia; and steroid therapy. The condition has been associated with low birth weight, diarrhea, and malnutrition in pediatric patients[3].

Primarily cutaneous mucormycosis is characterized by extensive angioinvasion, venous thrombosis, and early tissue obliteration. Cutaneous mucormycosis is the least lethal variation among diseases in this group and have been poorly associated with predisposing factors[2-3-4].

Treatment revolves around attenuating predisposing factors, promoting early surgical debridement, and promptly starting antifungal therapy[2-4-5]. The choice of drug therapy is based on case reports and local experience, since clinical trials on mucormycosis with proper statistical power are not easy to organize[2-4].

CASE REPORT

A 7-month-old female infant diagnosed with spinal muscular atrophy arrived at the emergency unit of our hospital with pneumonia. She developed respiratory failure after 23 days on antibiotics and was referred to intensive care. Approximately one month into admission the patient presented with rapidly progressing right malar erythema (Figure 1) on the site of fixation of the orogastric tube. The lesion progressed to a circular ulcer with approximately 2.5 cm in diameter with a necrotic spot in its center (Figure 2). A few days later a similar lesion measuring 1.5 cm in diameter appeared on the left malar area. The patient was on linezolid, meropenem, and polymyxin B for pulmonary sepsis.

The patient was suspected for Fusarium infection after consultation with a specialist. She was prescribed amphotericin B and referred to a biopsy on the site of infection. The patient was kept on combined antifungal and antibiotic therapy after culture results showed fungal infection by *Rhizopus*. Four days after diagnosis the patient underwent surgical debridement, a tracheostomy and a gastrostomy - the latter two to spare her face from additional trauma. Her lesions had significantly improved after 21 days on amphotericin B. However, since her wounds had not healed completely, the patient was kept on drug therapy for another seven days. After 28 days on antifungal therapy the lesions were almost entirely healed, and the patient was kept on frequent dressing changes until they resolved completely.



Figure 1. Initial Lesion.

DISCUSSION

Cutaneous infection is the most common form of zygomycosis/mucormycosis in pediatric patients, whereas adults are predominantly affected by rhinocerebral mucormycosis[3-5]. In addition to differences in the site of infection, growth has been reported in the number of cases of infection in adults, while incidence appears to remain unaltered in the pediatric population[7].

Cutaneous zygomycosis is a relevant condition in hospital settings, since direct inoculation is the most common route of contamination regardless of patient immune status. Immunocompetent individuals tend to develop infection after events such as trauma, burns, use of venous catheters, stasis ulcers, or abrasion by sterile dressings and/or bandages[6]. Agents of mucormycosis are typically unable to cross an intact barrier. Patients with compromised skin - as in the case reported herein, where the patient underwent multiple orogastric tube fixation changes - are at higher risk of developing cutaneous infection[2].

Upon crossing the epidermis, fungi may invade subcutaneous layers, fat tissue, muscle, fascia, and even underlying bone. Infection may disseminate hematogenously if the fungi reach the vascular system. Given the chances of fungal invasion, computed tomography scans of the face were ordered



Figure 2. Evolution of the lesion in the right malar region.

for our patient at the time of diagnosis and two weeks after the start of therapy, each revealing only subcutaneous involvement in the malar region on both sides.

Treatment success relies on avoiding the progression of infection onto deeper planes, proper antifungal therapy, early surgery, and adjuvant therapy. Lesions characteristically progress from reddish or purpuric plaque (with or without pustules) to necrosis and ulcer formation. Since it may affect deeper tissue, other etiologic agents such as Aspergillus and Fusarium must be ruled out[6]. In our case, culture on a biopsy specimen was performed.

Since isolated cutaneous disease offers good prognosis and low mortality rates when early proper surgical debridement is performed[2], our patient was operated four days after she had been diagnosed and started on antifungal therapy. In addition to debriding the borders, we removed a round spongy whitish lesion that easily detached from deeper tissues.

Roden et al. described survival rates of 62% for patients on any antifungal therapy; 61% for subjects on amphotericin B deoxycholate; 57% for individuals offered surgery alone; and 70% for patients on combined surgery and antifungal therapy. The survival rate of untreated patients was 3%[3].

According to the literature, drug therapy must be started immediately when patients are suspected for zygomycosis in order to avoid the establishment of the disseminated and lethal form of the disease[8]. Therapies with amphotericin B deoxycholate, liposomal amphotericin B, amphotericin B lipid complex, itraconazole, posaconazole, and caspofungin have been described. Some authors have reported efficacy only when polyenes (amphotericin and its lipid derivatives) were used against agents of mucormycosis[5-7-8]. Lack of consensus stems from scarce knowledge on the molecular biology of fungi in class Zygomycetes and their mechanisms of drug resistance[2].

CONCLUSION

This report described a successful attempt at treating a patient with cutaneous Rhizopus infection by combining amphotericin B deoxycholate and early surgical debridement. However, there is a pressing need for more studies on the agents causing zygomycosis and on specific and more effective antifungal therapies for pediatric populations in particular.

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