

CASE REPORT

Post-exposure prophylaxis with isavuconazole after occupational exposure to *Rhizopus*

Mohanad Al-Obaidi^{1,*}, Pamela Younes² and Luis Ostrosky-Zeichner¹¹Division of Infectious Diseases, McGovern Medical School, Houston, TX, USA, and ²Department of Pathology, McGovern Medical School, Houston, TX, USA

*Correspondence address. 6431 Fannin, MSB 2.112, Houston, TX 77030, USA. Tel: +1-713-500-6767; Fax: +1-713-500-5495; E-mail: Mohanad.M.AlObaidi@uth.tmc.edu

Abstract

Invasive mucormycosis is typically seen in patients with hematological malignancies, diabetes and other conditions that affect the immune system. However, locally invasive disease can also be seen in both immunocompromised and immunocompetent hosts after trauma and direct inoculation. Since historically post-exposure prophylaxis with lipid-based amphotericin B compounds has not been feasible because of a high toxicity profile, there is no experience regarding the role of post-exposure prophylaxis after injuries contaminated with agents of mucormycosis. We describe the first case of a patient with occupational exposure to *Rhizopus* that received post-exposure prophylaxis with oral isavuconazole.

INTRODUCTION

Mucormycosis is an invasive mould infection caused by the agents of the Mucorales order that include *Mucor*, *Rhizopus* and *Absidia* species. It is reported to affect mainly patients with hematological malignancies, diabetes or other types of conditions that depress cellular immunity. However, patients without underlying risk factors can acquire invasive disease through direct inoculation after trauma [1, 2]. It has also been shown that a history of remote trauma can lead to invasive disease in the immunocompromised population [3]. There are currently no guidelines addressing the role of antifungal prophylaxis for injuries contaminated with agents of mucormycosis.

CASE REPORT

A 53-year-old Caucasian female with a past medical history of hypothyroidism and treated latent tuberculosis presented to the infectious diseases clinic after she sustained a deep cut to her left index finger with a scalpel while processing clinical

tissue samples containing *Rhizopus spp.* in the pathology laboratory where she worked.

The patient had washed her wound thoroughly, contacted employee health and followed the standard institutional occupational health post-exposure protocol. She was not offered HIV post-exposure prophylaxis as the source patient was known to be HIV negative. Her hepatitis B immunizations were up to date. After consultation with the infectious diseases department the patient was initiated on isavuconazole 372 mg PO daily with an arbitrary planned duration of 30 days. The patient developed severe nausea, refractory to ondansetron and diarrhea while on therapy, therapy was stopped after 2 weeks. Liver function tests were monitored and remained normal through the course of treatment. The scalpel wound healed well and showed no signs of infection.

DISCUSSION

Mucormycosis refers to a distinctive set of invasive fungal infections caused by moulds in the order of Mucorales. Mucormycosis is characterized by angioinvasion and dissemination, which accounts for significant morbidity and mortality in

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infected patients. Although typically known to affect immunocompromised patients such as patients with hematological malignancies and diabetes mellitus, cases of invasive infection in immunocompetent hosts have been reported. Skin inoculation through direct penetrating injury is one of the portal of entries for Mucormycosis, which can lead to serious deep seated infections [4]. In a literature review of 929 published cases, 176 did not have documented underlying predisposing condition. Overall, 44 of those cases involved trauma preceding the infection [5]. In another prospective study of 237 cases, 18 immunocompetent patients developed invasive mucormycosis with 89% of them involving soft tissue infection caused by a trauma [1]. The role of post-exposure prophylaxis in cases of Mucormycosis has not been described partly due to the absence of a tolerable and wide spectrum mould active triazole with low level toxicity. We described a case of a direct skin inoculation of *Rhizopus* spp. in an immunocompetent patient who was treated prophylactically with isavuconazole to prevent a potentially devastating invasive mould infection.

It is impossible to know whether this patient would have developed invasive disease in the absence of prophylactic treatment. However, given that the risk of infection in immunocompetent patients after traumatic inoculation has not been defined, we felt prophylactic therapy was warranted. Isavuconazole has been shown to be effective for the treatment of invasive Mucormycosis and is generally tolerated with fewer adverse events compared to other mould active antifungal medications [6]. Another option such as amphotericin B, which would be impractical and is associated with serious adverse side effects including electrolyte disturbance and renal failure [7]. The side effects typically seen with azoles are limited mainly to gastrointestinal symptoms and occasionally transaminitis. The latter usually resolves by holding the medication. Otherwise, such adverse events are fewer and less severe compared to comparators [6, 7]. Despite the side effects our patient experienced, we believe isavuconazole can be safely utilized in cases that may warrant post-exposure prophylaxis after direct inoculation of these agents.

In conclusion, future studies are needed to adequately assess the role of post-exposure prophylaxis in high risk selected groups such as in cases of traumatic inoculation or occupational exposures.

KEY POINTS

- Invasive mucormycosis is a serious life-threatening disease that affects mainly the immunocompromised but can also

affect immunocompetent patients through direct traumatic inoculation.

- New mould active triazoles such as isavuconazole have good safety and tolerability profiles and can be utilized as post-exposure prophylactic against invasive moulds.

CONFLICT OF INTEREST STATEMENT

None declared.

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