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Oleksandra Lupak, Kassem Bourgi, Tricia Stein

ABSTRACT

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Case Report: We report a case of healthcare cutaneous mucormycosis in 51-year-old female initially presenting as cellulitis. The patient subsequently had worsening necrotizing infection and required multiple extensive intra-operative debridement procedures along with right arm amputation. Histopathology later confirmed by tissue cultures, revealed evidence of *Rhizopus*. The patient was then started on lifelong isavuconazole therapy.

Conclusion: Healthcare associated mucormycosis is a growing problem that requires high index of suspicion to ensure early diagnosis and prompt treatment.

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CASE REPORT

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Keywords: Amphotericin B, Immunocompromised patients, Isavuconazole, Mucormycosis

How to cite this article

Lupak O, Bourgi K, Stein T. Healthcare-associated necrotizing cutaneous mucormycosis: A case report. Int J Case Rep Imag 2016;7(4):232–234.

Article ID: Z01201604CR10627OL

doi:10.5348/ijcri-201639-CR-10627

INTRODUCTION

Mucormycosis is an aggressive opportunistic fungal infection caused by filamentous Mucorales [1]. It commonly affects immunocompromised patients and is associated with high morbidity and mortality. While rhino cerebral and pulmonary mucormycosis are the most common forms of the disease; cutaneous, gastric, and intestinal manifestations are becoming more prevalent as the numbers of immunocompromised hosts expands [1]. Cutaneous mucormycosis is less common than other clinical forms, however, it can be lethal if not identified and treated early [2].

CASE REPORT

Our patient is a 51-year-old African-American female with multi-system sarcoidosis and steroid-induced hyperglycemia. She was hospitalized, prior to current presentation, for a neurosarcoid flare requiring pulse dose of IV steroids. At the time of discharge the patient noted mild erythema on the right forearm, at the site of intravascular catheter placement. On a follow-up

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Received: 04 December 2015

Accepted: 05 January 2016

Published: 01 April 2016

appointment with her primary care physician, one week post-discharge, the erythema was worsening. She was started on a 7-day course of cephalexin for treatment of presumed cellulitis. Despite the antibiotic therapy, her symptoms progressed as she developed purulent bloody discharge. On initial evaluation in the emergency department, the patient had no complaints of fevers, chills, numbness or pain. The right forearm appeared swollen, red, and tender to palpation. Superficial eschar was visualized over the medial aspect. Initial laboratory results were significant for leukocytosis of 12.8×10^9 per liter. A computed tomography (CT) of the right forearm revealed diffuse soft tissue swelling of the ulnar aspect with scattered subcutaneous gas. There was evidence of small focal fluid collection with no gas seen within deep muscular compartment.

The patient was diagnosed with right forearm abscess and started on IV vancomycin. Plastic surgery team performed an intraoperative right forearm superficial debridement. Intraoperative wound cultures grew *Escherichia coli*, *Enterococcus faecalis*, and *Morganella morganii*. Based on the results of in vitro susceptibility, antibiotics were then escalated with the addition of intravenous meropenem.

The patient continued to deteriorate despite aggressive therapy. On day-five of her hospitalization an extensive debridement of the forearm was performed. Histopathology of muscular and subcutaneous tissue revealed necrotizing infection with angioinvasion, surrounding infarction as well as perineural invasion secondary to zygomycetes (mucormycosis) (Figure 1). Liposomal amphotericin B was then initiated. Rhizopus subsequently grew on the intraoperative cultures 72 hours later. A full body CT ruled out any evidences of disseminated infection. The patient continued to have extensive muscle and tissue necrosis requiring right arm amputation with shoulder disarticulation to prevent systemic dissemination of the infection.

Figure 1: Histopathology from debrided tissue showing angioinvasion and perineural invasion with broad thin-walled zygomycetes (H&E stain, x200).

Hospital course was complicated by acute renal failure that was attributed to the amphotericin B. At that time, she was switched to oral isavuconazole and discharged home to continue a prolonged course of therapy. On follow-up with infectious disease clinic at 2 and 4 weeks post-discharge she had no evidence of disease recurrence. It was decided to continue the patient on lifelong treatment with isavuconazole.

DISCUSSION

Healthcare associated mucormycosis is a growing concern as the number of immunocompromised patients increase [3]. Necrotizing infection secondary to cutaneous mucormycosis is an infrequent presentation of a relatively rare infection. Reports have associated cutaneous mucormycosis to minor skin breaks and trauma resulting in spore inoculation into the dermis [4, 5]. The entry site of the fungi in the health care setting has been previously associated with an intravenous catheters [3], as appears to be the case with our patient.

The diagnosis of mucormycosis relies upon the identification of organisms in tissue by histopathology with culture confirmation. As our case demonstrates, culture often yields no growth initially, and histopathology identification may be the only evidence of infection. High clinical suspicion coupled with early identification is crucial as treatment of mucormycosis involves a combination of aggressive surgical debridement with adjunctive antifungal therapy and decreased immunosuppressive therapy [6]. Lipid formulation of amphotericin B is currently the recommended first-line antifungal [6]. However, as in our case, it is often associated with dose-related toxicity resulting in renal damage limiting its use. Isavuconazole is a newly approved extended spectrum triazole with activity against mucormycosis [7]. Advantages of using isavuconazole include great oral bioavailability, predictable pharmacokinetics in adults, and availability of a water-soluble intravenous formulation [8, 9]. Recent open-label case control trial have showed isavuconazole was similar in efficacy to amphotericin B and posaconazole for mucormycosis primary and salvage treatment [10]. Recent data also shows that isavuconazole is well tolerated, has fewer serious side effects and less drug-drug interaction when compared to amphotericin B [9].

CONCLUSION

In summary, mucormycosis emerges as concerning infection especially in the immune suppressed population. Our case demonstrates the need for prompt diagnosis and early treatment of mucormycosis, especially for the less common clinical form. The availability of new broad-spectrum antifungal antibiotics provides more

options for patients in whom amphotericin B is not well tolerated.

Author Contributions

Oleksandra Lupak – Substantial contributions to conception and data acquisition, Analysis and interpretation, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Kassem Bourgi – Substantial contributions to data acquisition, Analysis and interpretation., Revising article critically for important intellectual content, Final approval of the version to be published

Tricia Stein – Substantial contributions to conception, Revising article critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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