

Case Report

Post traumatic cutaneous mucormycosis: a diagnostic dilemma

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ABSTRACT

The incidence of mucormycosis, an invasive fungal disease, is more in the developing countries, especially among the immunocompromised individuals. However, this disease can also occur in those without any predisposing factors. In the developed countries, those undergoing haematopoietic stem cell transplantation were more prone to developing this disease. There can be varied presentations of mucormycosis. It could be rhinocerebral, pulmonary, cutaneous, gastrointestinal or even disseminated forms. Post traumatic mucormycosis is infrequently reported and is often difficult to diagnose earlier due to its unusual presentation. In this case report, we describe two patients who acquired cutaneous mucormycosis following traumatic wounds and how they characteristically presented with 3 zones which was identified by us and has not been reported of earlier. This can help in diagnosis of this condition earlier and to follow the treatment protocol accordingly and prevent the morbidity and mortality associated with this disease.

Keywords: Mucormycosis, Amphotericin B, Trauma, Burns

INTRODUCTION

Mucormycosis is a dangerous fungal infection, the causative organism being Zygomycetes, from the order of Mucorales. It occurs more commonly in immunocompromised patients. Several forms have been identified, out of which cutaneous mucormycosis is less common, which occurs after trauma or breach of skin, by direct inoculation of the organism. Risk factors include intramuscular injection in sub-optimal healthcare facility (42%), open wound trauma (21%), motor vehicle accident (3-33%), surgery (8-30%), contaminated dressings (8-15%), burns (5-11%), natural disasters (5%), animal bites and scratches (9%) which enable direct inoculation of the organism into the skin.¹ Early identification could aid in appropriate treatment and prevention of complications. Following are 2 cases which

presented with wounds caused by burns and trauma, infected with mucormycosis.

CASE REPORT

Case 1

A 32-year-old male, with a history of electric contact burn over the right side of chest wall, referred after 47 days of burn injury with high grade fever and severe pain in the wound site. Patient underwent two debridements and multiple courses of antibiotics at a private hospital elsewhere. The wound is shown in Figure 1. At our hospital, ZN staining was negative, Gram stain showed few pus cells, multiple bacterial cultures were sent, IV antibiotics were administered as per the sensitivity, but the wound showed no improvement. There was characteristic three zones seen- subcutaneous necrosis,

gangrenous changes in overlying skin and inflammatory changes in surrounding tissue (Figure 2). This prompted us to perform KOH preparation by tube which then revealed the presence of thick, broad, Aseptate hyphae suggestive of Mucormycosis, (Figure 3) and hence Inj. Amphotercin B 0.75 mg/kg body weight BD was started. On POD 3, patient was taken up for surgical debridement and the subcutaneous necrotic material was removed completely. The gangrenous skin was not removed, it gradually healed with the anti-fungal treatment, as shown in Figure 4. Following this, he was taken up for two sittings of SSG (Figure 5). He then recovered well and was discharged.



Figure 1: Electric burn wound over right arm and chest wall.



Figure 2: Showing 3 zones of subcutaneous necrosis, gangrenous skin changes and zone of inflammation.

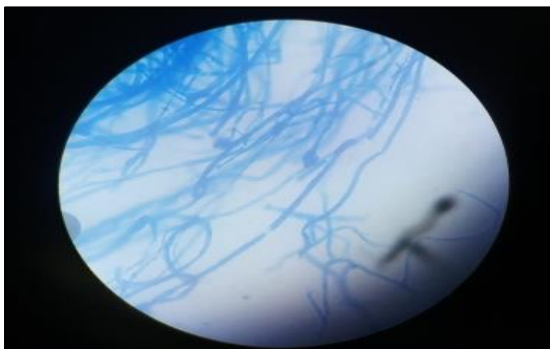


Figure 3: KOH mount showing aseptate hyphae.



Figure 4: Improvement of wound and necrotic changes resolving after debridement and anti-fungal treatment.



Figure 5: SSG cover after improvement of wound in 2 sittings.

Case 2

A 45-year-old male, with an alleged history of traumatic bilateral pneumothorax and right clavicle fracture, which was treated elsewhere, came with an open wound in the frontal region, for which daily dressings and antibiotics were administered, but the wound did not improve. This wound also, as mentioned above, showed the characteristic three zones of subcutaneous necrosis, necrotic skin changes and inflammatory changes in surrounding tissue (Figure 6). Immediately, Fungal KOH mount was done which showed presence of thick broad aseptate hyphae suggestive of mucormycosis. He was then treated with Amphotercin B, 1.5 mg/kg OD, following which after 48 hours, he was taken up for surgical debridement and all necrotic tissue was removed, leaving behind the gangrenous skin, which healed

excellently (Figure 7). He was then taken up for rotational flap with SSG cover to obtain good closure (Figure 8).

The common feature in both the wounds which prompted immediate fungal KOH mount was the characteristic three zones namely: (a) Zone of subcutaneous necrosis; (b) Zone of gangrenous skin and (c) Zone of inflammatory changes in surrounding skin.

These zones have rarely been mentioned about in previous studies, which if identified earlier can help us treat post traumatic mucormycosis at the earliest. The treatment protocol for both the patients involved immediate initiation of anti-fungals- IV Amphotericin B is the drug of choice, followed by surgical debridement after 48 hours of treatment aiming to remove all subcutaneous necrosed tissue, leaving the rest of the zones to heal through systemic treatment. Amphotericin B was continued to a period of 14 days. Wound was then closed using SSG and flap techniques.



Figure 6: traumatic wound over forehead showing 3 zones: subcutaneous necrosis, gangrenous skin and inflammatory zone.



Figure 7: Significant improvement of wound after surgical debridement and anti-fungal therapy.



Figure 8: Wound closure with rotational forehead flap cover and SSG.

DISCUSSION

Primary cutaneous mucormycosis occurs through direct inoculation of the mould spores over injured skin. The infection is more common in immunocompromised patients.² Trauma patients developing cutaneous mucormycosis has been reported infrequently and the pathogenesis is still not clear. The irony is that in spite of being immunocompetent, they still develop mucormycosis in the setting of trauma, combat injuries, burns, Road Traffic Accidents via contamination of the open wounds by the *Rhizopus* spores.³ Here we report two patients who developed Cutaneous Mucormycosis post traumatic injury and burns.

There can be multiple presentations of cutaneous mucormycosis ranging from simple erythematous macules to severe gangrenous necrosis causing hematogenous dissemination.⁴ Both our patients had the characteristic zones of subcutaneous necrosis, gangrenous skin changes and inflammatory changes of surrounding skin, which has hardly been described in other case reports on invasive cutaneous mucormycosis. This was the key feature prompting for early diagnosis and management of this condition.

Various methods can be utilized for the diagnosis of cutaneous mucormycosis, these being, microscopy, culture, serology, molecular methods, etc. For both our patients, KOH mount and microscopic analysis was the key to the diagnosis of this fungal infection, which showed aspetate hyphae, though Skin biopsy is the gold standard. Fluorescent microscopy has better sensitivity than culture and the hyphae can be identified easily.⁵ Rapid diagnosis of mucormycosis can also be done using Ex vivo Confocal Microscopy, which is faster and a newer modality in this field and is better when compared to the conventional microscopy and histopathological examination.⁶ Effective treatment of this condition involves initiating systemic anti-fungal medications at the earliest and surgical debridement within 48 hours of initiating anti-fungals, aiming to remove all the necrotic tissue, in order to reduce the mortality and morbidity. Recent studies showed a mortality rate of almost 83% in disseminated cases and this can be prevented with appropriate treatment of the condition at the earliest.⁷ Eliminating the predisposing factors is one of the key steps to managing mucormycosis. Initial therapy should

be given with IV Amphotercin B. The daily dose is 5 mg/kg/daily of Liposomal or lipid complex Amphotercin B. Combination therapy with Posaconazole and Echinocandin was recommended earlier, but there were no convincing results about the same and hence it is not recommended as a routine therapy regimen.⁸ In case of resistance to Amphotercin B, IV Posaconazole or Isavuconazole can be tried as a salvage therapy. The duration of therapy is usually until the clinical symptoms resolve up to a minimal period of 14 days.⁹ Both our patients responded well to a 14 day regimen of Amphotercin B with cautious monitoring of Renal Function Test, to ensure there was no impending Renal Failure, since this is the most dreaded adverse effect of Amphotercin B.

In addition to anti-fungal therapy, serial surgical debridements are definitely required to ensure recovery from this disease. The idea is to remove all possible necrotic tissue, usually through multiple sittings, depending on the extent of the wound. Recurrence is a possibility if inadequate surgical excision is done. Intra operative frozen sections can be used and histopathological examination can be done to confirm adequate excision, however the sensitivity of frozen section is only around 68.4%.¹⁰ Both our patients did not undergo intra-op frozen section. They underwent debridement until all subcutaneous necrotic tissue was removed, following which they underwent wound closure using rotational flap and split skin grafting techniques.

CONCLUSION

Thus, cutaneous mucormycosis is an extremely invasive fungal disease that calls for a prompt clinical diagnosis in order to improve survival. Features in any wound of rapidly spreading subcutaneous necrosis inspite of serial debridements with characteristic 3 zones seen and having no response to IV antibiotics should prompt for Fungal KOH preparation. With recent advances in the administration of Liposomal Amphotericin B, the adverse effects have reduced. Hence, early diagnosis and aggressive treatment can prevent devastating morbidity and mortality associated with this disease.

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