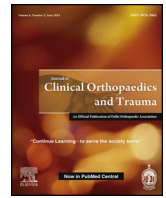




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## Case report

# Invasive fungal infection in immunocompetent trauma patients – A case series

Senthil Loganathan, Ajay Gowtham.A.E\*, U. Thyagarajan, Gokul Raj.D

Department of Orthopaedics, Sri Ramachandra University, India

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## ABSTRACT

Zygomycosis is the third leading cause of invasive fungal infection after candidiasis and aspergillosis. Although zygomycosis mostly affects immunocompromised individuals trauma may potentiate infection in immunocompetent individuals. The mortality rate of Zygomycosis is around 50% due to angioinvasion. Here we report a series of 5 cases of angio invasive fungal infection in immunocompetent individuals who sustained trauma in urban areas, out of which only one patient survived following high above knee amputation.

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## 1. Introduction

Zygomycosis also known as mucormycosis is an aggressive fungal infection commonly found in patients with traumatic injury. Although Zygomycosis is found in immunocompromised individuals, it has also been reported in immunocompetent patients.<sup>1–3</sup> The predisposing factors may include systemic immunosuppressive therapy, hematological malignancies, uncontrolled diabetes mellitus and prolonged neutropenia.<sup>4</sup> Once the infection is established the mortality rate is greater than 50%.<sup>2</sup> Successful treatment depends on adequate debridement and antifungal therapy. In this paper we report a series of 5 cases of zygomycosis, out of which only one case survived after high above knee amputation.

## 2. Materials and methods

All the five cases presented to us with open fractures following road traffic accidents in urban areas. One case initially went to an outside hospital where above knee slab was given and regular wound dressings were done and presented to us two days after the injury. Blood investigations showed elevated total count, ESR, CRP and their serology was negative for HIV, one case had low Hb of 8.2. Blood and urine cultures were negative in all the cases. All the cases were taken up for emergency wound debridement and external fixator application. They were started on broad spectrum

antibiotics. One developed pseudomonas infection in culture and was started on meropenam. Cultures were also done to rule out anaerobic infection using chocolate, macconkey, blood agars and incubated in an anaerobic jar, some times Robertson cook media was used a transport media. Also x-rays did not show any soft tissue gas suggestive of anaerobic infection. All of the cases developed rapid tissue necrosis, four of the cases developed blackened necrotic areas with foul smelling discharge on the second day post debridement and one case on the 4th day post debridement and were suspected to have necrotizing fasciitis. They were taken for second debridement and the histological finding of non-suppurative necrosis of subcutaneous fat raised the suspicion of fungal infection. The debrided tissues were sent for fungal culture. Culture on Sabaroud's agar showed a white colony of growth and 10% KOH mount showed broad aseptate hyphae. Lactophenol cotton blue test of the culture showed broad aseptate hyphae with champagne glass appearance of sporangial sack consistent with Zygomycosis. All the patients were started on Amphotericin B. Due to progressive necrosis they were taken for repeated debridements (4 debridements in one case, 3 debridements in 3 cases and two debridements in one case) at an interval of 2 days each. When further debridement was not possible they were taken up for high above knee amputation. One case immediately after amputation developed severe hypokalemia and died due to cardiac arrest in the ICU. Post amputation two cases developed atelectasis of the lung and severe hypoxemia along with stump infection. The patients were put on ventilator support and bronchoalviolar lavage was done to relieve hypoxemia and the bronchial washings were sent for culture which came

\* Corresponding author.

E-mail address: [ajaygowthamae3@gmail.com](mailto:ajaygowthamae3@gmail.com) (G.A.E. Ajay).



**Fig. 1.** CASE1: A 14 years old female with open injury to the right femur-showing wound at initial presentation.

positive for zygomycosis. Despite of antibiotic therapy the patient general condition deteriorated and died from septic shock. One post amputation patient developed stump infection on third post op day and also bilateral pneumonia and pulmonary edema following myocardial ischemia and died. Post operatively the patient was kept in the ICU and she was hemodynamically stable. The one patient which survived went in for hypokalemia twice in the ICU following amputation and correction was given but she was hemodynamically stable. Following amputation the stump

was put on vaccum assisted closure dressing. Wound size gradually reduced and secondary closure was done 3 weeks post amputation and sutures removed two weeks later. Amphotericin B was continued for 3 weeks followed by oral posaconazole for 3 months duration. Wound was completely healed after 3 months. Chest x rays taken at 6 months and 1 year interval were normal. After that there was no recurrence of infection in a time period of 3 years follow (Fig. 1).

### 3. Results

A total of 5 cases of invasive fungal infection were evaluated in our hospital. The age of the cases ranged from 14 to 55 (mean 38 years). None of our patients were immunosuppressed. All of them sustained motor vehicle road-side accidents and 4 of them had Gustilo Anderson Grade III B injury and one of them had Grade II. Four of our cases had femur fractures and one had foot involvement. Out of the five cases taken up for high above knee amputation three developed stump infection inspite of vaccum assisted closure dressing and wound care. Two cases developed hypokalemia out of which one case recovered with correction and the other went in for cardiac arrest. Two cases went in for severe stump infection and subsequently septic shock and one case went in for bilateral pneumonia and pulmonary edema following myocardial ischemia. Only one case survived after high above knee amputation and vacuum assisted closure application (Tables 1 and 2).

### 4. Discussion

The fungal class Zygomycetes is divided into two orders: Mucorales and Entomophthorales. The order Mucorales are capable of causing a fulminant angioinvasive infection with high rates of morbidity and mortality and this type of infection is termed either mucormycosis or zygomycosis (Fig. 2).

Zygomycosis is the third leading cause of invasive fungal infection after candidiasis and aspergillosis.<sup>6</sup> Zygomycosis clinically presents as either superficial or deep infection. Superficial

**Table 1**  
Case details.

Si no	Age/sex	Site	Grade of compound fracture	Immune status	Time to initial debridement	Number of debridements	Complications	Survival
1	14/F	Rt Thigh (Femur #)	Grade III B	Immunocompetent	2 days	4	Hypokalemia	Survived
2	45/M	Rt Thigh (Femur #)	Grade III B	Immunocompetent	7 h	3	Septic shock	Died
3	40/M	Rt Foot	Grade III B	Immunocompetent	18 h	2	Hypokalemia Cardiac arrest	Died
4	36/M	Lt Thigh (Femur #)	Grade II	Immunocompetent	9 h	3	Septic shock	Died
5	55/M	Rt Thigh (Femur #)	Grade III B	Immunocompetent	11 h	3	Pneumonia Pulmonary edema	Died

**Table 2**  
Microbiological details.

SL NO	AGE/SEX	SITE	Anaerobic culture	KOH mount (Hyphae)	Fungal Culture
1	14/F	Rt Thigh (Femur #)	No growth	Aseptate	<i>A. elegans</i>
2	45/M	Rt Thigh (Femur #)	No growth	Aseptate	Mucor
3	40/M	Rt Foot	No growth	Aseptate	Mucor
4	36/M	Lt Thigh (Femur #)	No growth	Aseptate	Mucor
5	55/M	Rt Thigh (Femur #)	No growth	Aseptate	<i>A. elegans</i>

*A. elegans*–*Apophysomyces elegans*.

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