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CASE SERIES

Sinonasal Mucormycosis: A Series of Seven Cases

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ABSTRACT

Mucormycosis is the disease caused by the fungus of the order mucorales. *Rhizopus* species are the most common causative organisms. It is often associated with compromised immunity and poor prognosis. Farmers constitute the high risk group and peak incidence is observed during the monsoons which correspond to the agricultural practices in South India. Preventive measures such as the use of a face mask during agricultural activities may decrease the risk of acquiring this debilitating illness. We present series of seven cases of sinonasal mucormycosis.

Keywords: Mucormycosis, Mycosis, Fungal infestations.

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INTRODUCTION

Mucormycosis is the disease caused by the fungus of the order Mucorales. *Rhizopus* species are the most common causative organisms. It is often associated with compromised immunity and poor prognosis. Most infections are life-threatening and diabetic ketoacidosis and neutropenia are commonest predisposing conditions. Pathologically, the fungus has a remarkable affinity for arteries. It dissects the internal elastic lamina from the media, resulting in extensive endothelial damage and thrombosis. Successful treatment requires correction of the underlying risk factors, antifungal therapy with amphotericin B and aggressive surgery. We present series of seven cases of sinonasal mucormycosis.

MATERIALS AND METHODS

A retrospective analysis was done for patients who were diagnosed to have sinonasal mucormycosis at RL Jalappa Hospital from 2006 to 2009, a 4-year period. Data was assessed regarding age, occupation, presenting symptoms, clinical features, month of presentation and associated systemic illness.

RESULTS

Our study consists of seven patients, six male and one female, age ranging from 26 to 85 years with mean age of 53.8 years. All patients had uncontrolled diabetes mellitus which was diagnosed for the first time. All patients were from poor socioeconomic status.

Six of our patients were agriculturists and one patient was a roadside fast food vendor. All of them presented with foul smelling nasal discharge and nasal obstruction. Palatal ulceration was seen in three (42.8%) of them (Figs 1 and 2). Diplopia was observed in two (28.5%) patients, headache in two (28.5%), facial pain in two (28.5%), septal perforation in two (28.5%), cellulitis of the face in one (14.2%) and one patient (14.2%) had lower cranial nerves palsy. All patients had more than one symptom. On examination, all patients had black necrotic debris in the nose (Fig. 3). All patients presented between the months of May and August.

Fig. 1: Palatal ulcer

Fig. 2: Closer view of palatal ulcer

Fig. 3: Black necrotic debris involving middle turbinate

The diagnosis was confirmed by histopathological examination in all patients (Fig. 4). Culture of the nasal discharge yielded *Rhizopus oryzae* in four patients and no growth in remaining three patients. All patients were treated for diabetes and normal blood sugar levels attained. All patients were administered intravenous infusion of amphotericin-B. Four out of seven patients were subjected to debridement under general anesthesia. Initially, 0.5 mg/kg/day of amphotericin-B was given as an intravenous infusion in 5% dextrose. The dose was later adjusted based on response to treatment and patient tolerance.

One patient died in the hospital due to intracranial complications, one patient had permanent loss of vision in right eye, one patient had residual disease, one is lost for follow-up and remaining patients were disease-free at recent follow-up.

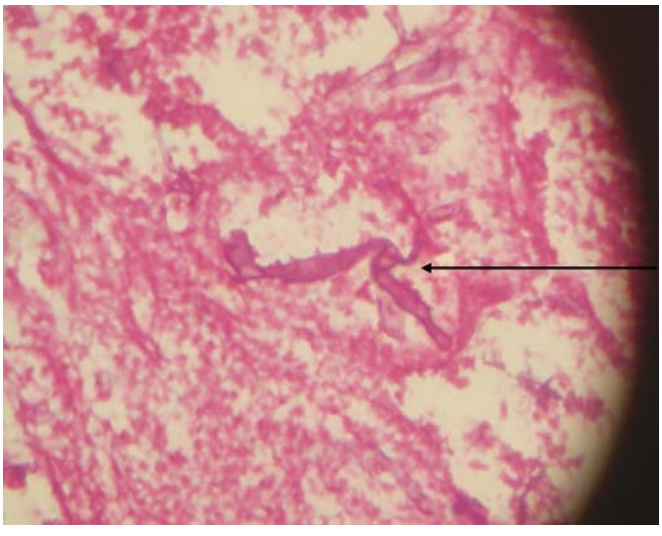

Fig. 4: Microphotograph showing broad based aseptate fungal hyphae with right angled

DISCUSSION

We would like to highlight two observations in our series that the sinonasal mucormycosis was more commonly observed in farmers and seen in the months between May and August. More interestingly the incidence of the disease coincides with the agricultural practices practiced in Southern India. It will be premature to conclude that the farmers are at higher risk or to declare the disease has seasonal variation. Further research involving multiple centers is suggested in this regard. However, we wish to discuss the probable explanation for our observations.

Seasonal variation of air fungal spore is well known but seasonality in the incidence pattern of sinonasal mucormycosis is not yet evaluated. The seasonality was first noted by Talmi et al in Israel.[1]

Mucorales are found abundantly in soil, animal excreta, decaying vegetables and foodstuffs. They grow rapidly in these substances, more so in humid conditions. Sporangiospores are released into environment as airborne propagules. The nose and lungs can be infected by inhaling these airborne sporangiospores.[2]

The organisms are ubiquitous in nature and more prone for infecting in temperate climates.[3] The concentration of air fungal spore in India is known to increase during transition from summer to rainy season as it is ideal for fungal growth.[4] In a study by Thomas Shpitzer et al from Israel, there was increased incidence of this disease in summer, which was attributed to the use of air conditioners.[5] England et al cultured the organism from air conditioner filter, which has perfect conditions for fungal growth.[6]

In our study, seasonal variation of the disease corresponds to hot and humid months in India. Seasonal variation in India can also be attributed to occupation, which is agriculture. Herrero in 1997 observed seasonal peak in the colonies of fungi and attributed agricultural factors as the cause for seasonal peak.[7]

Rainfall increases moisture levels in the atmosphere and soil. Plant debris in moist soil decay quickly, providing optimum condition for fungal growth.[4] Farmers begin to prepare their fields by manual ploughing after first monsoon showers. This ploughing activity may disturb the soil and releases fungal spores into the atmosphere from where it can be inhaled. Hence, the farmers are exposed to this organism more frequently and in high concentrations making them susceptible for disease.

The other cause for high risk in farmers may be that in the later months of the rainy season farmers put organic manure to young crops. Six of our patients were using organic manure for their crops. Organic manure contains

decayed substance and animal excreta which has high concentrations of mucorales. During the process of applying manure also they may inhale fungal spores. Working in proximity to the source of fungus will greatly increase the chances of inhaling fungal spores and acquiring the disease.

Farmers with undiagnosed and uncontrolled diabetes mellitus may be at risk to acquire this dreaded disease. Six (85.7%) of our patients were farmers with undiagnosed and uncontrolled diabetes mellitus. One patient was a street vendor of fast food who works in proximity to a dustbin containing decayed food substance—a good source of mucorales especially in humid conditions.

We feel that the reason for increased incidence of mucormycosis in our study from May to August is due to the pattern of agricultural practices combined with favorable environmental factors for mucorales. Although there is an increase in the concentration during monsoons, whether the virulence of the fungus increases during the same period is yet to be ascertained.

While reviewing the available literature we did not find mention of either season of the presentation or the occupation of patients. Seasonality and occupational predisposition of mucormycosis can be evaluated more widely by doing so. We are aware of the fact that the number of cases in this series is less but the incidence of sinonasal mucormycosis is less as well.

We suggest a multicentric study involving not only sinonasal but also pulmonary mucormycosis, which can offer data regarding occupation and season of presentation. We also feel that role of occupational factors contributing to the seasonality of mucormycosis should be further investigated; as Thomas Shpitzer attributed it to usage of air conditioners in summer.[5] Identification of risk factors and suggesting preventive measures can reduce the incidence of this life-threatening condition.

CONCLUSION

We feel that farmers constitute the high-risk group and peak incidence are observed during the monsoons which correspond to the agricultural practices in South India. Preventive measures, such as the use of a face mask during agricultural activities may decrease the risk of acquiring this debilitating illness.

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