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CASE REPORT

Aspergillus Niger Causing Eumycetoma in an Immunocompetent Host: Report of a Case and Review of the Literature

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ABSTRACT

Mycetoma is a chronic granulomatous infection of skin and subcutaneous tissues. It is a neglected disease with severe physical and psychological comorbidity burden as many cases end up with amputations. Proper diagnosis with tissue culture is lacking because of unavailability of facilities in remote areas. Eumycetoma by different Aspergillus species has already been reported in the literature for decades. But here, we are reporting a case of eumycetoma caused by Aspergillus niger, which is the first ever case-report to the best of our knowledge and search. Treatment with voriconazole 400 mg/day was successful without any major side-effects, and saved patient from amputation.

Keywords: Mycetoma, Eumycetoma, Aspergillus niger, Voriconazole.

INTRODUCTION

Mycetoma is an uncommon, chronic granulomatous infection of skin and subcutaneous tissues with involvement of underlying fasciae and bones in majority of cases. The disease has a classical triad which consists of formation of multiple draining sinuses, presence of discharging grains and tumefaction of affected tissues.[1] Feet are the most common site involved. Causative agents are divided into two groups; actinomycetes and fungi. When it is caused by a fungus it's termed as eumycetoma, while the one caused by actinomycete is called as actinomycetoma. Eumycetoma by different Aspergillus species in immunocompetent and immunocompromised patients is not new but we are reporting a case of eumycetoma caused by Aspergillus niger, which is the first ever case-report to the best of our knowledge and literature search.

CASE REPORT

A 49-year-old male, farmer by profession, presented to the Dermatology department of The Indus Hospital, Karachi with 8-year history of formation of nodules and recurrent discharging sinuses in his right foot. He had history of trauma to right foot 8 years back in fields. After 2-3 months of trauma he noticed formation of nodules on sole of right foot. These ruptured to release pus and black-coloured grains. Later-on similar nodules and sinuses were formed on dorsum and medial aspect of the foot. He received multiple treatments from different places including terbinafine, itraconazole, fluconazole, and co-trimoxazole. Minimal improvement was noticed and condition relapsed as soon as the treatment was stopped. On examination, he had firm nodules and active discharging sinuses (Figures 1a & 1b). Spores were extracted from sinuses and nodules, and examined under microscope. Fungal hyphae were seen on KOH mount. Deep skin biopsy and cultures were sent to laboratory and terbinafine 500 mg/day was started. On examination all spores were black in colour; small-sized, soft & fragile, and surface was smooth. This is in contrary with typical black-spores of Madurella species which are rough, hard and slightly larger than spores which we extracted, although our prime diagnosis was eumycetoma with one of the Madurella species.

Biopsy report showed hyperplastic stratified squamous epithelium along with hyperkeratosis and parakeratosis. Dermis showed dense lymphoplasmacytic infiltrate along with hyaline budding, septate fungal hyphae and spores surrounded by multinucleated giant cell reaction, neutrophils and eosinophils (Figure 2). These colonies were highlighted by special stain; Periodic acid-Schiff (PAS) stain. Features were suggestive of eumycetoma due to Aspergillus species. Later-on culture also showed Aspergillus niger species. A second culture also confirmed the same species in Potato dextrose agar culture medium.

Routine labs and sugars were normal. Hepatitis B, C and HIV serology were negative. After 1 month when cultures confirmed the species and patient had no improvement on terbinafine 500 mg/day, we decided to switch to Voriconazole 400 mg/day. MRI at the start of therapy showed dot-in-circle sign in right medial cuneiform bone. Rest of the bones were spared. Within 1 month his sinuses were started to heal. So, we continued the drug in the same dose. After 6 months of treatment he became culture negative, all sinuses were healed, edema was reduced and he was pain free. We continued voriconazole in same dose for 12 months. Repeat MRI after 1 year of therapy did not show any enhancement or active signs of inflammation in medial cuneiform bone.

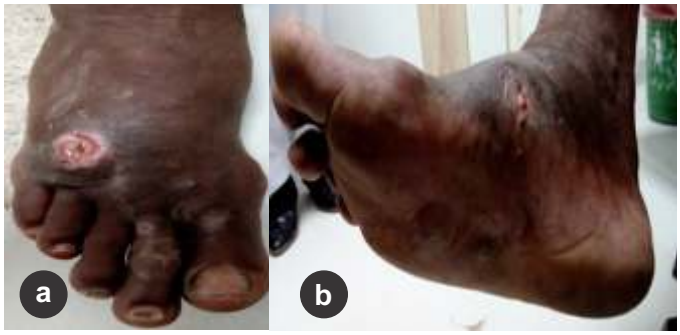

Figure 1: (a) Nodule was excised for biopsy and cultures, showing black grain at the base, (b) Sinus showing discharge of black grains

During treatment, he reported repeated flu like symptoms, oral ulcers, burning in eyes and gastrointestinal upsets but his all labs were remained under control and no serious side effect from voriconazole was reported. After completing one-year therapy he was symptom free and clinically there was no finding besides post inflammatory hyperpigmentation (Figures 3a & 3b). So, his therapy was discontinued. Six months after discontinuation of therapy he was symptom-free and no relapse was appreciated.

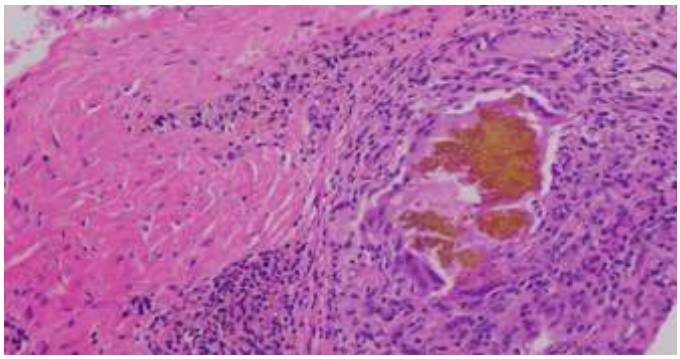

Figure 2: Septate fungal hyphae and spores with hyaline budding surrounded by multinucleated giant cells, neutrophils, eosinophils and lymphocytes

DISCUSSION

Mycetoma (Madura foot) was first described by Gill in 1842 in Madura district of Tamil Nadu in Southern India.[2] It commonly presents between 20 to 50 years of age, with a male to female ratio of 2.2:1.[3] Foot is the predominant site involved that's why the term "Madura foot" was given by Gill.[2] Mycetoma foot is prevalent in almost all parts of the world, but the highest incidence is reported between latitude 15°S and 30°N, the so called "mycetoma-belt".[4] Depending upon the aetiology, the disease is classified into two types; actinomycetoma and eumycetoma. The eumycetoma is classified into black grain eumycetoma and white grain eumycetoma. The black grain eumycetoma is most commonly caused by Madurella mycetomatis, Madurella grisea, Exophiala jeanselmei, and Curvularia geniculate species. The white grain eumycetoma is caused by various species from genus Acremonium, Pseudoallescheria, Aspergillus, Fusarium and Scedosporium.[4]

Aspergillus fungi are ubiquitous, opportunistic, filament forming moulds, comprises of over 180 different species. These are globally distributed and present in water, soil, air, plants, dust, fields, deserts etc.[5] Many species are responsible for causing infections in humans. Aspergillus niger (also known as Black Mould) belongs to the Section Nigri which includes 15 related black-spored species which shared many physical and chemical properties.

In the literature Aspergillus fumigatus, A. flavus, A. nidulans, A. terreus, and A. ustus had been reported with human eumycetoma infections.[1,5-11] However, Aspergillus niger is reported to be responsible for mycetoma of maxillary sinus and lungs, but not outlined as a cause of eumycetoma foot to the best of our literature search and knowledge.[12-13]

Eumycetoma due to Aspergillus species is considered as most difficult to treat as most species of Aspergillus are

Figures 3a & 3b: Showing complete recovery and healing of all sinuses after 12-months therapy with voriconazole

naturally azoles and terbinafine resistant.[11] The same occurred in our case. He received many treatments but all in vain. The decision to start voriconazole was made after thorough literature (medical, surgical, paediatric, oncology and infectious diseases) search for drugs used against Aspergillus infections and especially A. niger infections. Our patient responded very well to voriconazole and his foot was saved from amputation. He experienced no serious side effects and his labs were always remained in normal limits during therapy.

CONCLUSION

Mycetoma is a disease mostly concentrated in tropical and subtropical countries. Detection of organism by tissue culture and PCR analysis is cornerstone in the management of these cases. Early referral to tertiary care centers, identification of species by proper tissue culture and adequate treatment might decrease the disease-related morbidity in mycetoma cases. Furthermore; this case also enlarges the list of organisms from Aspergillus group which are causing human eumycetoma.

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