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Case Report

Unusual Cause of Onychomycosis, *Chaetomium globosum*, in a Hilly State of North India: A Case Report

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ABSTRACT

Onychomycosis, the fungal infection of nail is a common occurrence. The conventional fungi implicated are dermatophytes and *Candida* species. Non-dermatophytic moulds account for few cases and *Chaetomium globosum* is an exceptional agent. This characteristically involves the toe nails which are dystrophic and discoloured yellow-brown. Direct microscopy shows brown septate hyphae. Isolate is rapidly growing, grey-brown mould with characteristic osteolate perithecia surrounded by brown septate setae. Perithecia discharge lemon shaped, brown ascospores. *Chaetomium* being a soil saprophyte may escape identification as a pathogenic agent. We describe the case of a 50 years old female with onychomycosis of toenails by *Chaetomium globosum*.

Key words: onychomycosis, *Chaetomium globosum,* nail, perithecia.

INTRODUCTION

Onychomycosis, the invasion of nail plate, is classically caused by dermatophytes and occasionally by yeasts. A different category of fungi, the filamentous moulds are associated in 2% to 17% of nail infections. [1,2] Amongst these non-dermatophytic moulds, *Scytalidium*, *Scopulariopsis*, *Aspergillus terreus*, *Fusarium* spp., *Acremonium*, *Curvularia* and *Onychola* are implicated. [3,4] *Chaetomium* spp. are recently recognized as a cause of onychomycosis in humans. [1] *Chaetomium globosum* nail infection is characterised by dystrophic, yellow-brown discolouration of toenails. The direct microscopy of specimen reveals brown septate hyphae and culture grows a grey-brown mould with characteristic osteolate perithecia surrounded by brown septate setae. Ascospores are lemon shaped and brown in colour. [5] *Chaetomium* spp. is a soil saprophyte and is invariably ignored as a contaminant thus knowledge about its pathogenic role is essential and recognition of regions of occurrence is significant. With this aim we report the first case of onychomycosis due to *Chaetomium globosum* from the hilly state of northern India.

CASE REPORT

A 50-year-old housewife presented with yellow-brown discolouration toe nail of right foot. There was history of prior trauma 9 months back while working in the fields which was the patient's part-time occupation. She was apparently healthy with no previous chronic illnesses; diabetes mellitus, cardiovascular disease or immune insufficient conditions. Examination revealed thickened, yellowish, lustreless nail

plate of right great toe. The nail plate was dystrophic and demonstrated subungual hyperkeratosis. There was no evidence of inflammatory response, onycholysis or surrounding skin involvement. General physical examination was unremarkable with absence of cutaneous disease on any other part of the body including scalp.

Figure1. Thickened yellowish dystrophic nail plate of big toe

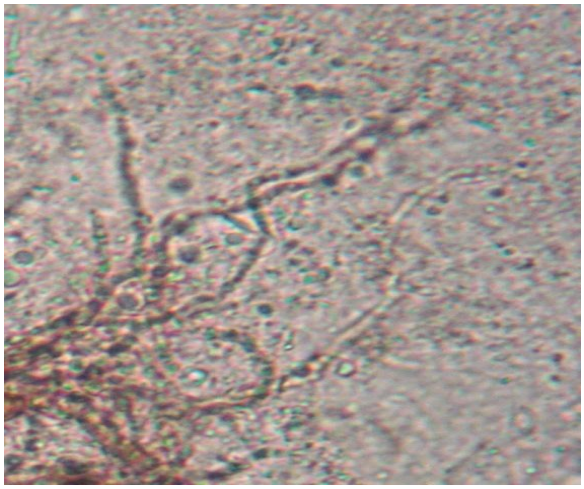

Figure 2: Microscopic examination showing branched, septate, brown fungal hyphae. [10% KOH wet mount, X 400]

The dystrophic nails were sampled with a sterile nail clipper and subjected to overnight digestion in 10% KOH. Dematiaceous branched and septate hyphae were seen in wet preparation [Figure 1]. Cultures on Sabouraud's Dextrose Agar (SDA) supplemented with chloramphenicol incubated at 25^0C grew tan to brown, low floccose mould in the first week of incubation [Figure 2]. Growth matured to a brown fungus with black speckled appearance and a wine red to tan reverse. There was no growth on SDA with cycloheximide. Lactophenol cotton blue wet mount of slide culture demonstrated olive-brown perithecia ranging from 100µm to 200µm in size with multiple brown, septate setae radiated from perithecia. Mature perithecia showed characteristic ostia discharging typically lemon shaped ascospores [Figure 3,4]. Spores were concavo-convex from side to side. The isolate was morphologically identified as *Chaetomium globosum*. A repeat sample was obtained, fungal cultures performed and re-isolation of same mould excluded contamination. Oral terbinafine 250mg twice a day, one week per month for three months was instituted as pulse therapy coupled with amorolfine lacquer for local application. The patient showed satisfactory response at review after three months.

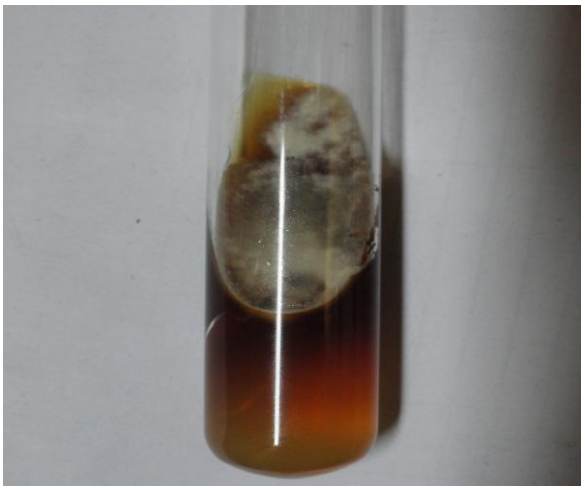

Figure 3: Tan to brown, low floccose mould seen in one week of incubation at 25^0 C on SDA culture media

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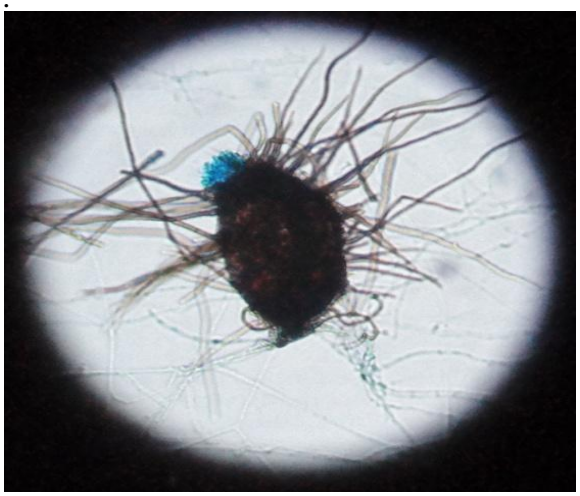

Figure 4: Photomicrograph of fungal isolate showing perithecia with ostia. [Lactophenol blue wet mount, X 400]

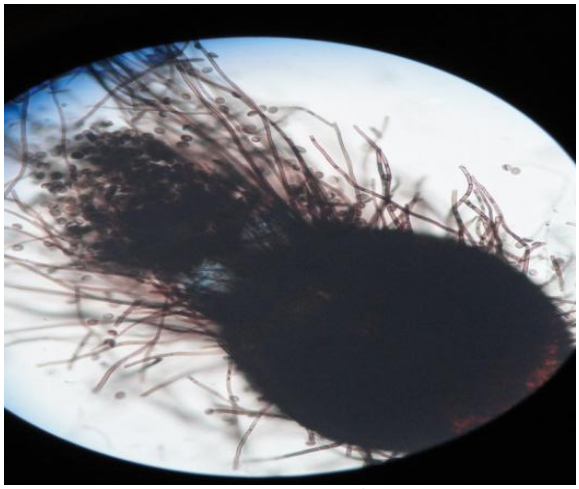

Figure 5: Microscopic examination of slide culture showing perithecia with setae discharging ascospores. [Lactophenol blue wet mount, X 400]

DISCUSSION

Onychomycosis is largely a disease of the adults. Dermatophytes are common pathogens of onychomycosis and considerable number of cases is attributed to yeasts. The non-dermatophytic moulds are implicated in 1.45% to 17.6% of cases that encompass species of *Scytalidium*, *Scopulariopsis*, *Aspergillus*, *Fusarium*, *Curvularia*, and *Chaetomium*. [1-4] presently, the genus *Chaetomium* comprises 105 species ever since its first description by Kunce in 1817. [6] Few species are identified as human pathogens which include *C. atrobrummeum*, *C. strumarium*, *C. perlucidum*, *C. funicolum* and *C. globosum.* [1,5]

C. globosum predominantly infects nails though rare cases of cerebral phaeohyphomycosis and peritonitis in a patient with renal failure on chronic ambulatory peritoneal dialysis are documented. [7,8] The infrequent number of reports is associated with the ubiquitous nature of the fungus which accounts for its customary recognition as a contaminant in mycological cultures. *Chaetomium* spp. inhabits soil, straw, bird feathers, paper, plant debris and seeds. [9] It is isolated from infected nails many-a-times along with dermatophytes in cases of mixed infections. [2] In such circumstances again their pathogenic role may be disregarded due to co-occurrence of a known agent of nail infection. Lately, onychomycosis due to *C. globosum* is documented from India, [10,11] Spain, [12] Korea, [1]Canada [2,13] and Japan. [14]

Nails that have been traumatized or have slow linear growth, as in the elderly, are unduly susceptible to infection. [2,13,14] The lateral nail fold or free edge is first to be invaded by fungi presenting as the commonest pattern of distal and lateral superficial onychomycosis (DLSO). [2,3] An infected nail shows streaks or patches of yellow to brown discolouration, is thickened, cracked and dystrophic. [1,2,11] Our patient sustained trauma preceding the onset of nail discolouration and dystrophy analogous to observations made by previous workers. [2,11] The fungi elaborate a network of channels and lacunae into the nail and subsequent soft subungual hyperkeratosis lifts the nail plate. [3] *Chaetomium globosum* usually involves the toe nails starting from a single nail and progressively affecting multiple toes as reported in earlier accounts. [1,2,6,12-14]

The presence of dematiaceous fronding hyphae in direct examination of nail is evidence of onychomycosis due to non-dermatophytic filamentous fungus. [1,3,10,11] This may be overlooked as laboratory physicians are on the lookout for hyaline arthroconidia representative of dermatophytes. A white to brown mould growing over a week and subsequently maturing to brown-black with a tan reverse indicates *Chaetomium globosum.* An etiological correlation is established by isolation of identical mould from a duplicate sample. We succeeded in isolating the same agent from two toenail clipping taken separately. The preliminary identification was done morphologically and perithecia sized 175 to 280 µm with characteristic brown, septate setae were demonstrated. The species *C. globosum* was distinguished on the basis of brown, lemon shaped ascospores size of 9-12x7-9 µm and absence of growth at temperature of 42^0C. [5,9]

In-vitro antifungal susceptibility studies have shown resistance to 5-

fluorocytosine and fluconazole but onychomycosis consequent to non-dermatophytes has shown successful response to terbinafine and itraconazole. [1,14] Pulse therapy with terbinafine 250mg twice a day for a week per month for three months was curative together with local application of amorolfine lacquer in our patient. The success with terbinafine was also achieved in cases of *C. globosum* nail infection by Aspiroz *et al* [12] and Kim *et al.* [1]

CONCLUSION

Onychomycosis is a common condition of the nails. Dermatophytes and Candida spp. are the usual causative agents. Non-dermatophytic moulds may be encountered in some cases but are disregarded as contributing fungus due to lack of awareness. These must be considered pathogenic if there is clinical evidence and laboratory reports suggest a fungal cause and managed with antifungal therapy.

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