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Case report/Cas clinique

Onychomycosis due to *Achaetomium strumarium*

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ABSTRACT

Onychomycosis is the most common infection of the toe-nails or finger-nails and it may be caused by a large variety of fungal species. *Achaetomium* species which belong to the phylum Ascomycota (Family *Chaetomiaceae*), are usually soil saprophytes or endophytic fungi which have been rarely reported as human or animal pathogens. Here, we report a case of onychomycosis caused by *Achaetomium strumarium* in a healthy person who showed involvement of all fingers of both hands with yellowish brown discoloration. The causative agent isolated was identified as *Achaetomium* species by morphology, colony morphometry and growth at high temperature and as *A. strumarium* from DNA sequence of ITS region. Onychomycosis from this case responded satisfactorily with per os (P. O.; oral) and topical application of Terbinafine.

1. Introduction

The ascomycetous family of Chaetomiaceae (class Sordariomycetes) consist of melanised fungi isolated from soil and are known to be saprotrophic or endophytic in nature [1,2]. The members of this family also show flexibility in their adaptation to various growth conditions and living niches and some of them are pathogenic to plants and animals. Among them, the genus *Chaetomium* is represented by many species which have been isolated from a variety of pathological conditions in human [3–5]. Conversely, the genus *Achaetomium* which comprises of six species of melanised fungi [6] has not been described as a pathogen except its isolation from fatal cerebral mycosis [7]. The taxonomy of genus *Chaetomium* and *Achaetomium* has been the subject of some confusion as these genera are morphologically similar with only few differences and therefore it is very difficult to discriminate between these two genera [4,8,9]. However, these characters have become largely irrelevant due to the availability of molecular data like DNA sequences of the internal transcribed spacer (ITS-1 and -2) regions of ribosomal DNA (rDNA) region.

The genus *Achaetomium* is best described by morphological features that mainly include tomentose mycelium, ostiolate fruiting bodies, globose to pyriform ascomata; thick peridium; cylindrical asci; and opaque, dark brown ascospores with an apical germ pore [9]. *Achaetomium* species have the ability to grow at high salt concentrations and high temperatures [10] Colonies of *Achaetomium* are typically pale white or yellow with the reverse turning to dark reddish brown at maturity because of the secretion of reddish brown exudates [6]. *Achaetomium* species are usually isolated from different soil samples and water bodies like mangrove swamps. In this case study, we have isolated *Achaetomium* as a causative agent of nail infection and have confirmed its identity by growth conditions and nucleotide sequence of ITS regions.

2. Case

A 52-year-old laborer who was digging and excavating mud and sludge, presented himself with complain of itching and discoloration of fingernails at Dermatology department of Bharati Hospital, Pune. Initially he had discoloration of two fingers, however after about six months all his both hand nails were affected. There was gradual brownish yellow discoloration and drying of nails (Fig. 1a). Both little fingers and index fingers had dystrophic changes with subungual hyperkeratosis. There was no local lymphadenopathy and paronychia but erythematous changes were seen around thumb nails distally due to inflammatory reaction. There was no involvement of toenails of both feet. He had no major illness in past which could account as a predisposing factor. Physical examination, vital parameters as assessed by

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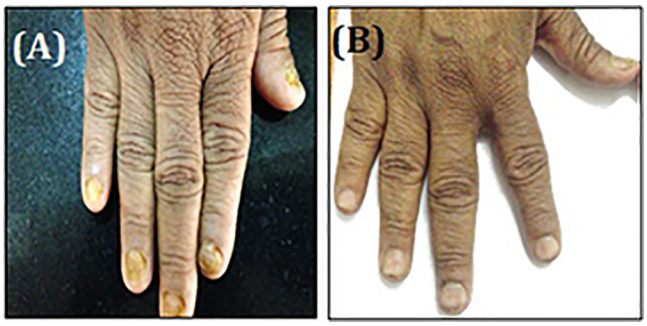

Fig. 1. Photographs of the hands of this 52-year-old manual labourer showing brittle nails with a brownish yellow discoloration throughout the nail bed (A) and the complete recovery after oral and topical treatment (B).

hematological and biochemical tests and general health were found normal.

A provisional diagnosis of onychomycosis was established. Multiple nail scrapings after cleaning with alcohol were obtained from all finger nails separately. Nail scrapings were placed on a slide with a 20% potassium hydroxide (KOH) solution and gently heated. This KOH mount was examined by direct microscopy which showed few, slender, septate, branching, and filamentous light brown colored hyphae. Two nail samples, one each from both hands were cultured onto Sabouraud's Dextrose agar (SDA). Mould grew moderately fast with central heaped and peripheral spreading colonies with aerial filamentous mycelial growth, following 4 days of incubation at 25°C (Fig. 2a). Both samples showed similar results excluding possibility of contamination. Microscopic examination of the fungus after mounting in lactophenol cotton blue revealed septate, phaeoid hyphae, without any sporulation. Hence, subcultures were done on to potato dextrose agar (PDA) to ensure purity and to induce sporulation by incubating at 37°C. Plates were examined at 7-day intervals for up to 5 weeks. After 2 weeks, cultures on PDA yielded white buffy colored colonies with brown colored exudates (Fig. 2b). Growth on slants showed areas of pinkish tinge on obverse with brownish color on reverse (Fig. 2c). Microscopically plain saline mount showed abundant septate pinkish brown hyphae (Fig. 3a). A few pyriform to oval olive-brown colored ascocarp namely perithecia,

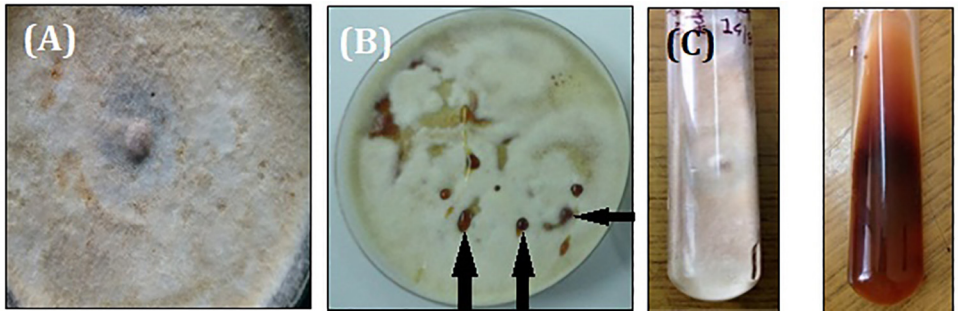

Fig. 2. Characteristic growth of *A. strumarium* on solid medium showing buffy coloured colonies on potato dextrose agar after 10 days of incubation (A). Further incubation of *A. strumarium* cultures shows progressive accumulation of a red brownish exudate until day 14 (B). 14-day-old cultures of A. strumarium on PD Agar slant incubated at 37°C, showing central heaped and peripheral spreading filamentous growth on obverse side with a pinkish brown color at the reverse (C).

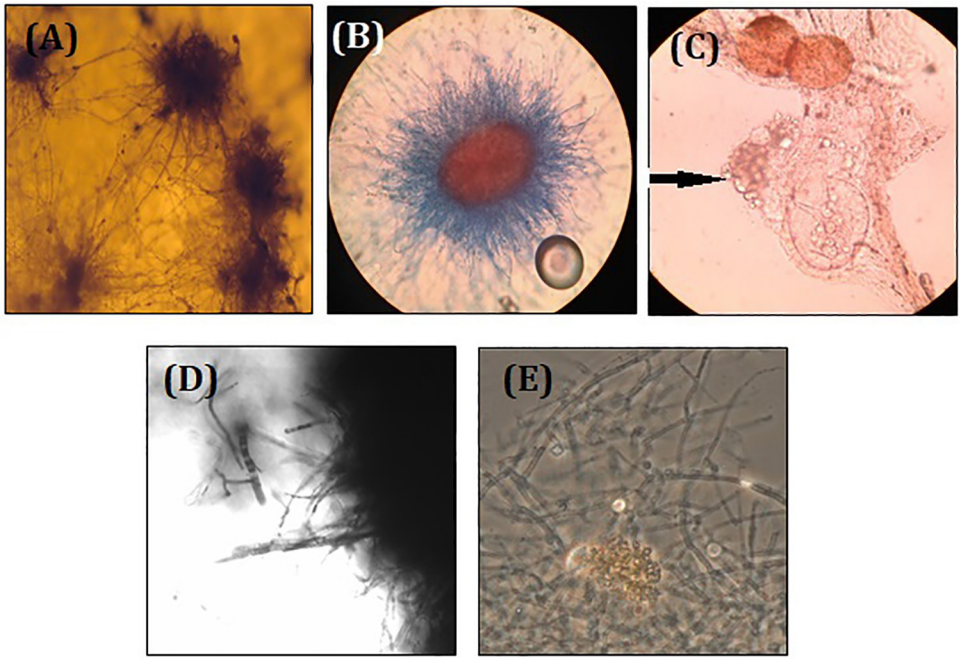

Fig. 3. Pyriform to oval structures with characteristic long, unbranched hair-like setae characteristic of *A. strumarium* can be seen under microscope (40×) (A) with a mature perithecia (40×) (B). One of the mounts showed mature perithecia containing oval-shaped ascospores (C). On day 35 small blackish brown eruptions in the mould were seen to be covered with hair like setae (D). Few vegetative hyphae show secretion of crystalline material as seen under microscope (40×) (E).

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