Aspergillus flavus onychomycosis in the right fourth fingernail related to phalynx fracture and traumatic inoculation of plants: A vegetable vendor case report

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ABSTRACT

Aspergillus genus is responsible of post-traumatic fungal infections like mycetomes and onychomycosis. A 30 year-old male vegetable vendor by occupation presented in our institution with brownish black discoloration of 1 year duration. On examination the right fourth fingernail was brownish black in color with loss of texture and dystrophic changes. Direct mycological analysis combined to inoculation of nail scraping on Sabouraud medium revealed Aspergillus flavus as causative agent of onychomycosis. Opportunistic fungi such Aspergillus flavus are not keratinolytic pathogens, they usually grow on damaged keratin, our patient reported previous finger fracture and sustained traumatic inoculation of plants. This case was managed by oral terbinafine administered 250 mg/day in addition to the local application of amorolfine 5% nail lacquer. To our best Knowledge this is the first report of onychomycosis secondary to both phalynx fracture and traumatic inoculation of plant.

KEYWORDS: Aspergillus flavus, onychomycosis, superficial infection, nail trauma, phalynx fracture, vegetable vendor

INTRODUCTION

Aspergillus flavus has a worldwide distribution. This probably results from the production of numerous airborne conidies. It grows and thrives in hot and humid climates (1). Aspergillus flavus causes a broad spectrum of disease in humans, ranging from hypersensitivity reactions to invasive infections associated with angioinvasion. The most common clinical forms associated with Aspergillus flavus include chronic sinusitis, keratitis, cutaneous aspergillosis, wound infections and osteomyelitis following inoculation and trauma (1).

Onychomycosis usually caused by dermatophytes and nondermatophytic mold and yeast, accounts for approximately 50% of ungual diseases (2).

The incidence rate of onychomycosis caused by Aspergillus sp has been described as 2.6% to 6.1%, varying depending upon the reporter (3,4,5).

onychomycosis affected toenails (59.1%) more often than fingernails (38.3%), probably due to toenails’ slow growth, which facilitates the invasion of the fungus and is perhaps supported by factors such as trauma and poor circulation (6).
Repeted trauma is a common cause of onychomycosis due to Aspergillus species (7,8,9).

Opportunistic onychomycosis is seen more among individuals with occupational exposures such as vegetable vendors (8) and among babassu coconut breakers (7).

In this case report, we describe the clinical and mycological features of an onychomycosis due to *Aspergillus flavus* following fingernail fracture and traumatic inoculation of plants.

**Case report**

A 30 year-old male vegetable vendor by occupation presented in our institution with brownish black discoloration of the right fourth fingernail of 1 year duration (figure 1), and history of traumatic fracture of the distal phalynx 2 years ago. The patient sustained a penetrating plant injury to his finger while working, the area became infected.

Physical examination, determined his general physical condition to be well with no specific findings other than an ungueal lesion.

There were no lesions on his hands, feet, or toenails and past medical history and family history were unremarkable.

Direct microscopic examination of nail scraping specimens showed the presence of dichotomous septate hyphae. Cultures were subsequently grown in 2 Sabouraud’s dextrose agar (SDA) slants without cycloheximide that were incubated at 25°C for one week. At day 5 large number of the same colonies were observed to grow rapidly in the 2 slants (figure 2). Initially the growths appeared whitish but turned green and granular with time. There was no colony growth on SDA slants with cycloheximide.

Microscopic characterization of the fungal isolate was carried out by preparing a lactophenol cotton blue mount from the growth, revealing *Aspergillus flavus*, hyphae were septate

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**Figure 1:** onychomycosis of the 4 fingernail (tichened and brown dark discoloration)

**Figure 2:** macroscopic features of *Aspergillus flavus* culture on SDA medium
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and hyaline, conidiophores were rough and colorless, and phialide were biseriates (figure 3). Repeated culture of the nail samples yielded the same organism.

Likewise, in our case, oral terbinafine was administered 250 mg/day in addition to the local application of amorolfine 5% nail lacquer.

Discussion

There are approximately more than 900 species in the complex Aspergillus which are common in the soil and decaying vegetation throughout the world, but are also found in all types of organic debris (9). Aspergillus flavus has a worldwide distribution. This probably results from the production of numerous airborne conidia, which easily disperse by air movements and possibly by insects (1), its a fast growing, filamentous and opportunistic fungi (10).

Onychomycosis is a fungal infection of the nail, that is largely underdiagnosed in developing countries, it is caused by dermatophytes, yeasts and opportunistic non dermatophytic molds (NDM) (10).

The main risk factors of mycosis include warm, damp conditions, and trauma (11,12). The severity of the fungal infections depends on the type of injury (perforating, trauma, presence of foreign material), the body localisation and the general condition of the patient (13). Furthermore, mycetomes are known to be post-traumatic fungal infections, including Aspergillus as a etiological agent (13). Moreover, Aspergillus flavus has been already described as etiological agent of otomycosis induced by auricular trauma (12).

Onychomycosis is more common in the immunocompressed and the elderly (5,14,11). However, Aspergillus onychomycosis is seen more among individuals with occupational exposures such as vegetable vendors (8) and among babassu coconut breakers (7), which is consistent with our case report.

Moreover, in kim and al. (9) case report, the patient had grown bean sprouts for a long period of time and thus her hands were regularly exposed to water. As such, her job is presumed to be closely related to the disease pathogenesis, which is in accordance with our findings. The regular exposure of vegetable vendors to geophilic fungi and phytopathogens like Aspergillus flavus predisposes them to fungal superficial mycosis. The right sided infection could be promoted when handling contaminated plants.

Kim and al. (9) case involved women’s fingernails, while our case occurred in a man’s fingernails.

In the recent literature, onychomycosis cases related to Aspergillus had no tinea pedis or tinea manus (15,9), which is consistent with our results.

Fungal melanonychia is characterized by dark brown to black pigmentation of the nail, this discoloration is caused by the black conidia of Aspergillus in nail keratin (9), this coloration was suggesting onychomycosis in our case. Black pigment were obseved in the toenails and fingernails lesions of previous onychomycosis reports (9,15).

The most commonly described species of NDM are
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Scopulariopsis sp, Fusarium sp, Acremonium sp and Aspergillus sp. Repeated sample collection is required to prove opportunistic onychomycosis. In the Aspergillus flavus species, phialides are both uniseriate (arranged in one row) and biseriates. Conidia are typically globose to subglobose, and conspicuously echinulate (1), these features were observed in our cultures.

It is known that onychomycosis caused by non-dermatophytic mold does not respond well to common treatment (16), however, in Tosti and Piraccini’s cases, oral terbinafine was administered 250 mg a day for 3 months leading to a complete cure (15).

The aim of this case report is to emphasize on onychomycosis etiopathogenesis, with regard to physical exposure related to job task, especially manuals jobs like vegetable vendors.

Aknowledge

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Conflicts of interest

None to disclose

References


