



A CASE OF BIG TOE ONYCHOMYCOSIS CAUSED BY *ASPERGILLUS FLAVUS*.

Microbiology

Dr Manjula Mehta	Associate Professor, Department of Microbiology, Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.
Dr Sonia Bhonchal Bhardwaj*	Assistant Professor, Department of Microbiology, Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh. *Corresponding Author
Dr Jyoti Sharma	Assistant Professor, Department of Microbiology, Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.
Dr Harsimran Kaur Boparai	Assistant Professor, Department of Oral Surgery, Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.

ABSTRACT

Non dermatophyte moulds (NDM) such as *Aspergillus* species is now considered as emerging pathogens of toenail infections. They are saprophytic moulds often isolated from soil, air and plant materials. In this study a 37 year old male with no underlying disease was examined for fungal big toe nail infection. The infection followed a typical pattern of distal-lateral subungual onychomycosis (DLSO). KOH preparations from nail clippings showed hyaline septate branching mycelium with conidiophores, phialide and conidia. LCB slides revealed conidial heads with phialides borne directly on the vesicle, the typical pattern of *Aspergillus flavus*. Diagnosis was confirmed by cultures from samples which repeatedly yielded several colonies of *A. flavus*. Prolonged exposure to soil, mud and water contaminated with fungi increases the susceptibility of aspergillus infection in toe nail. Early identification of the aspergillus infection is advisable as it is progressive in nature and also adequate fungal therapy can be implemented.

KEYWORDS

Non dermatophyte moulds (NDM) ; Onychomycosis; *A. flavus*.

INTRODUCTION

Non dermatophyte onychomycosis is caused by aspergillus species, scopulariopsis species, alternaria species, acremonium species and fusarium species and constitutes 2 to 25% of all causes of onychomycosis [1]. *Aspergillus* species are rare and emerging causative agents of Non dermatophyte onychomycosis as they are difficult to diagnose, have a clinical presentation similar to *Tinea unguium* and also little is known about their ability to invade nail plate [2]. Onychomycosis due to aspergillus species has a geographical variation, is related to underlying co-morbid conditions of the host and predisposing factors. [3] *Aspergillus* species are not sensitive to most of the topical and systemic antifungals which are used to treat onychomycosis leading to resistance in aspergillus spp. [4] *Aspergillus* infections need proper clinical diagnosis, investigations and adequate fungal treatment.

Case report

A 37 year old male with chronic onychomycosis associated with yellowish black discolouration of the right big toe nail was presented to the Department of Microbiology, Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.

The onychomycosis was accompanied by paronychia and hyperkeratosis showing a pattern of DLSO (distal lateral subungual onychomycosis). Patient history revealed there was no trauma to the nail, no discolouration of other nails and no underlying disease. Nail clippings were collected from the deepest part of the affected toe nail (fig-1) after cleaning with 70% alcohol with sterile nail cutter. The nail clippings were put in 20% KOH solution for 10-15 minutes and slide examined. The clinical specimen was cultured on Sabourauds Dextrose agar (SDA) with chloramphenicol (0.05g/l) and cycloheximide (100mg/l) and incubated at 25-27°C yielded yellowish green colonies after 5 days (fig-2). LCB was used for the preparation of microscopy slide from the sample (fig-3). Septate branching mycelium, conidiophores, phialide and conidia of *A. flavus* was seen in the slides.

DISCUSSION

Aspergillus species are emerging agents of toenail onychomycosis. *Aspergillus* nail infection starts at the outer edge of the nail where spores get accumulated and the nails become thick, discoloured and flaky. It follows a typical pattern of distal-lateral subungual onychomycosis (DLSO) which was also seen in our case study. The patient continuously worked with plant materials and wet soil where the spores thrive. These could be the pre-disposing factors to

aspergillus infection. An association between onychomycosis and use of footwear has been reported [5]. In our study the footwear used by the male patient was, "clogs". The use of occlusive footwear which obstructs ventilation and does not absorb perspiration contributes to increased incidence of onychomycosis [6,7]. In addition it has been reported that aspergillus species onychomycosis is more predominant in males compared to females [8]. This could be due to gender related differences in occupation and sports activities [9].

Although aspergillus species is considered as a laboratory contaminant but now non dermatophyte moulds (NDM) can be concluded as a pathogen of onychomycosis when hyphae and spores observed in direct microscopy correlate with culture [10]. For NDMs to be the etiological agents for onychomycosis Gupta *et al* [1] proposed that at least 3 of the 6 criteria should be observed: 1) KOH positive 2) culture of NDM 3) 3 repeat cultures of NDM with no dermatophyte isolated 4) histopathology using periodic acid-schiff staining positive for fungal elements 5) culture of NDM from 5 of 20 inoculated nail fragments 6) NDM identification through molecular techniques. In our study a positive direct microscopy correlating with culture result, no dermatophyte isolation in repeat direct microscopy correlating with culture result diagnose it as NDM due to aspergillus species. Slide culture showing conidial heads consisting of a vesicle and radially arranged conidia suggested onychomycosis due to *A. flavus*.

Conclusion-

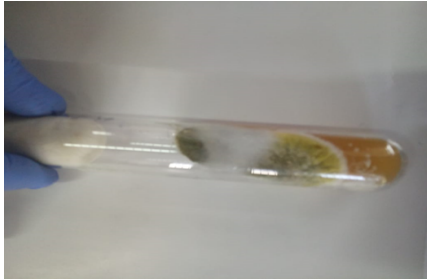
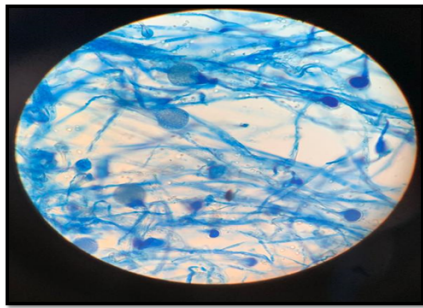
Prolonged exposure to soil, mud and water contaminated with fungi increases the susceptibility of aspergillus infection in toe nail. Identification of the fungal agent is helpful in giving antifungal treatment and preventing complications. *Aspergillus* infection is progressive in nature therefore early identification and intervention is advisable.

Conflict of Interest

We have no conflicts of interest concerning the work reported in this article.

Fig 1- Clinical picture at presentation: Hard and brittle nail with discoloration.



Fig II- Colonies after two weeks of incubation at 25°C in SDA.**Fig III-LCB preparation showing *Aspergillus flavus*: Conidial heads with phialides borne directly on the vesicle.****REFERENCES.**

- 1) Gupta AK, Drummond-Main C, Cooper EA, Brintnell W, Piraccini BM, Torti A; 2012. A systematic review of nondermatophyte mold onychomycosis: diagnosis, clinical types, epidemiology and treatment. *J Am Acad Dermatol*; 66:494-502. <https://doi.org/10.1016/j.jaad.2011.02.038>.
- 2) Motamedi M, Ghasemi Z, Shidfar MR, Hosseinpour L, Khodadadi H, Zomordian K et al; 2016. Growing incidence of non-dermatophyte onychomycosis in Tehran, Iran. *Jundishapur J Microbiol*; 9:e4053.
- 3) Bongomin F, Batac CR, Richardson MP, Denning DW; 2018. A review of onychomycosis due to aspergillus species. *Mycopathologica*; 183:485-493. <https://doi.org/10.1007/s11046-017-0222-9>.
- 4) Bowyer P, Moore CB, Rautemaa R, Denning DW, Richardson MD; 2001. Azole antifungal resistance today: focus on aspergillus. *Curr Infect Dis Rep*; 13:485-491.
- 5) Thomas J, Jacobsan GA, Narkowicz CK, Peterson GM, Burnet H, Sharpe C; 2010. Toenail onychomycosis: An important global disease burden. *J Clin Pharm Ther*; 35:497-519.
- 6) Araujo AJ, Bastos OM, Souza MA, Oliveira JC; 2003. Occurrence of onychomycosis among patients attended in dermatology offices in the city of Rio de Janeiro, Brazil. *An Bras Dermatol*; 78:299-308.
- 7) Kafaie P, Noorbala MT; 2010. Evaluation of onychomycosis among diabetic patients of Yazd diabetic center. *J Pak Assoc Dermatol*; 20:217-21.
- 8) Sigurgeirsson B, Baran R; 2014. The prevalence of onychomycosis in the global population: A literature study. *J Eur Acad Dermatol Venereol*; 28:1480-91.
- 9) Wejjesuriya TM, Kottachchi J, Gunasekara T, Bulugahapitiya U, RanaSingha K, Weluka Fernando SS et al; 2015. *Aspergillus* species: An emerging pathogen in onychomycosis species among diabetics. *Indian J Endocr Metab*; 19:811-16.
- 10) English MP; 1976. Nails and fungi. *Br J Dermatol*; 94:697-701.