

FIRST CASE REPORT OF WHITE SUPERFICIAL ONYCHOMYCOSIS DUE TO FUSARIUM OXYSPORUM IN IRAN

F. Zaini, and J. Chabavi Zadeh

*Department of Medical Mycology & Parasitology School of Public Health, Tehran University of Medical Sciences
Tehran, Iran*

Keywords: Onychomycosis, Fusarium Oxysporum

Abstract

This paper presents for the first time the isolation of *Fusarium oxysporum* from the toenails of a man from Tehran. The fungus was demonstrated in KOH mounts and was isolated repeatedly from his nail scrapings over a 2 month period. Published reviews on onychomycosis in Iran have not revealed any cases of white superficial onychomycosis due to *Fusarium oxysporum* to date.

Introduction

Onychomycosis is caused by several species of dermatophytic and non-dermatophytic (yeasts and filamentous saprophytic) fungi. White superficial onychomycosis is an invasion of the nail plate on the surface of the nail which is produced by *T. mentagrophytes*, species of *Cephalosporium*, *Aspergillus* and *Fusarium oxysporum* fungi.

Records contain few reports of *Fusarium* species as a causal agent of onychomycosis [2,3,7,8,9,10,11,12] and it is believed that the following case is the first report of white superficial onychomycosis due to *Fusarium oxysporum* in Iran [1,5 unpublished].

Case Report

A 41 year-old man was admitted to the Medical Mycology Laboratory School of Public Health in October, 1988 with opaque, white, well-demarcated spots on the surface of the great, forth, and third toenails of the left foot. The surface of the infected nails were rough and softer than normal nail plate, crumbling easily. No inflammatory reaction was presented on any bordering of subunguinal skin (fig 1).

The right great toenail showed abnormal yellow colour and thickness which was surgically excised 3 years ago following a diagnosis of fungal infection and trauma. (Probably dermatophytic onychomycosis according to the patients description).

No lesions of superficial white onychomycosis were seen in the other toenails or fingernails.

This healthy, active male has a history of trauma to the toenails caused by mountain-climbing shoes, beginning approximately 25 months ago.

Laboratory Investigation

Toenail samples were obtained by scraping the surface of the nails separately. In spite of the abnormal yellow pigmentation of the feature of the right great toenail no fungal elements were seen or isolated in direct microscopic or cultural examination.

Numerous septate branched hypha 2-3 μm wide which were accompanied by arthroconidia-like chlamydoconidia were observed only in KOH mounts on the toenails of left foot. (fig.2).

Cultures were made from the sample material on Sabouroud's dextrose agar (s) and Sabouraud's dextrose agar plus chloramphenicol (0.05 mg ml⁻¹) and

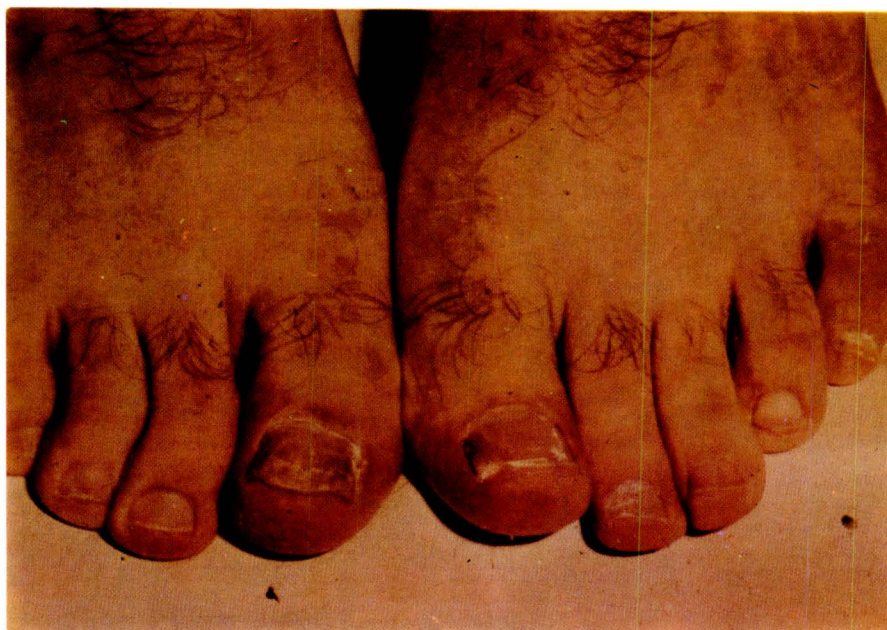


Fig.1. Toes with superficial white onychomycosis

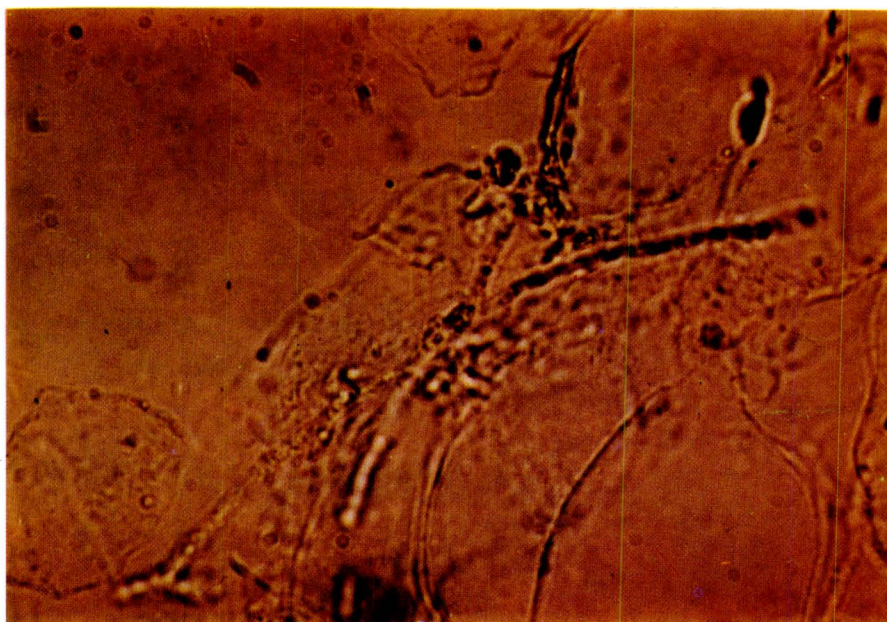


Fig.2. Fungal elements in scrapings, from toenails in KOH mount $\times 400$.

Cycloheximide (0.5 mg ml^{-1}) (Sc), Sabouraud's dextrose agar with chloramphenicol (0.05 mg ml^{-1}) (Sc) and incubated at 26°C .

Fungal colonies appeared after 4-7 days on s,sc medium (fig.3), and the fungi formed white fluffy colonies and developed pinkish-violet pigmentation with a yellowish-brown reverse.

Slide cultures revealed abundant, predominately double-celled elliptic to oval microconidia ranging from 3.5×7 to $5.25 \times 17.5 \mu\text{m}$ and formed in groups on long

conidiophores (7 to $10 \mu\text{m}$). A large number of crescent-shaped macroconidia were found. Most of the macroconidia had 3-4 septa and measured 2.8×31.5 to $4.2 \times 42 \mu\text{m}$. (fig. 4). Large rounded chlamydoconidia were also found.

As *Fusarium oxysporum*, the so-called «contaminant» fungus, was isolated, repeated isolation attempts were made at weekly intervals for 8 weeks. The fungus was demonstrated in KOH mounts and isolated repeatedly from the nail samples over that period of time.

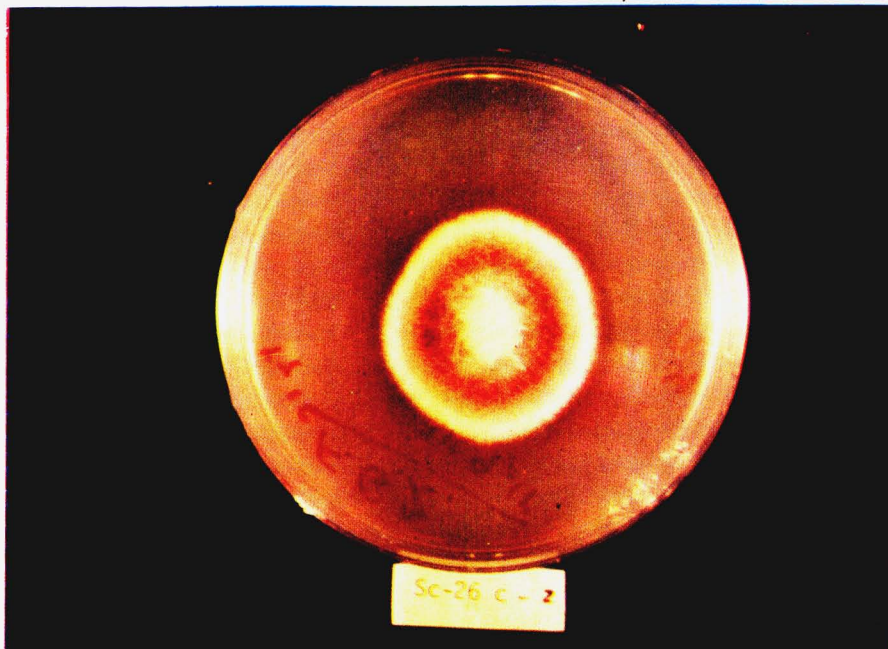


Fig.3. A colony of *Fusarium oxysporum* obtained from infected nails, Sc medium, 5 days at 26°C.



Fig.4. Microphotograph of macroconidia and microconidia of *Fusarium oxysporum*.

Discussion

White superficial onychomycosis named leukonychia trichophytica by Jessner in 1922 [4] and leukonychia mycotica by Rost [6], in 1926, was first described in Germany and occurs as commonly as the distal subungual type. Clinically it appears as opaque, white well-demarcated islands on the surface of toenail plates. These lesions, beginning as punctate forms randomly distributed, may coalesce and gradually

involve the whole surface. Older lesions may have a yellow colour. The surface of the toenail is rough and its consistency is softer than normal nail plate, crumbling easily. A variety of moulds including *Aspergillus*, *Fusarium* and *Cephalosporium* spp. may cause infection of the surface of the nail or may invade nails that have been damaged by disease or trauma.

Fusarium species are common in soil and are most commonly known as plant pathogens. Walshe and English [9] reported two cases of *Fusarium*

onychomycosis, while Zaias and others in three publications, reported five cases of infection with this agent [10,11,12], Rush-Munro et al. reported a series of over 50 cases of onychomycosis due to *F. oxysporum* [7]. Disalvo and Fickling reported a case of onychomycosis caused by *F. oxysporum* [2] and finally Velez and Diaz [8] in 1985 reported ten cases (40%) of onychomycosis due to *Fusarium* spp. among the 25 cases of non-dermatophytic onychomycosis due to saprophytic fungi. As these authors have pointed out, there is an increased likelihood of susceptibility to infection with soil saprophytes as a result of trauma to the toes. Our patient also suffered repeated trauma to the toenails caused by mountain-climbing shoes while practicing this sport. The organism from the toenails of the left foot grew in culture on repeated opportunities. The potassium hydroxide preparation of the specimens from the infected toenails revealed septate hyphae and arthroconidia-like chlamydoconidia compatible with *Fusarium* spp.

In spite of the abnormal yellow pigmentation and deformation of the feature of the toenails of the right foot, no fungal elements were seen or isolated in repeated direct microscopic or cultural examinations.

It has long puzzled mycologists and clinicians why many seemingly diseased nails have failed to show evidence of fungal infection.

Most laboratories employ chloramphenicol cycloheximide agar as the sole medium for selective isolation of fungi causing lesions in skin and nails. This medium will not recover *Fusarium* spp. and hence inclusion of a medium without cycloheximide in routine cultures might reveal a greater frequency of infection

due to this fungus or other non-dermatophytic fungi in tropical countries.

Acknowledgment

We wish to thank the Audiovisual Department for the photography.

References

1. Andalib, A. Study of causative agents of Onychomycosis in Esfahan, Msc Thesis, University of Tarbiat Moddares. (1987).
2. Disalvo, A.F., Fickling, A.M., A case of nondermatophytic toe onychomycosis caused by *Fusarium oxysporum*. *Arch. Dermatol.* 116: 699-700, (1980).
3. English, M.P. Nails and Fungi. *Brit. J. Dermatol.* 94: 697-701, (1976).
4. Jessner, M. Uber eine neue form von Nagelmykosen (leukonychia trichophytica). *Arch. Derm. Syph (Berlin)* 141:1-8, (1922).
5. Moghadami, M., Shidfar, M. Study of the causative agents of onychomycosis in Iran. Research project of the Mycology unit, School of Public Health, (1987).
6. Rost G.R. *Hautkrankheiten*. Berlin, Springer-v-erlag. P:74, (1926).
7. Rush-Munro F.M., Black, H., Dingley, J.M. Onychomycosis caused by *Fusarium oxysporum*. *Aust. J. Derm.* 12:18-29, (1971).
8. Velez, H. and Diaz, F. Onychomycosis due to saprophytic fungi. Report of 25 cases. *Mycopathologia*, 91: 87-92, (1985).
9. Walshe, M.M. and English, M.P. Fungi in nails. *Brit. J. Dermatol.*, 78: 198-207, (1966).
10. Zaias, N. Onychomycosis. *Arch. Dermatol.* 105: 263-274, (1972).
11. Zaias, N. Superficial white onychomycosis. *Sabouraudia*, 5:99-103, (1966).
12. Zaias, N., Oertel, I., Elliot, D.F. Fungi in toenails. *J. Invest. Derm.* 53: 140-142, (1969).