Frequency of onychomycosis by using direct microscopy

Fauzia Sadiq,[1] Saadia Chaudary,[1] Sonia Tahir[1]

Abstract

Background: An estimated over 3 million people in Pakistan are affected by serious fungal infections. Onychomycosis is a common fungal infection of nails in dermatologic clinics that is caused by dermatophyte. Laboratory diagnosis of Onychomycosis must be confirmed before beginning a treatment regimen.

Objective: To assess the frequency of Onychomycosis by using direct microscopy.

Methodology: An observational cross sectional study was conducted on all the patients who were referred for suspicion of Onychomycosis to the indoor microbiology laboratory in Lahore Medical and Dental College from October 2017 to October 2018. In total, 80 patients with suspected Onychomycosis were sent to college Microbiology laboratory for diagnosis. The clinical examination of the nails included damaged nail plates with color change (yellow or gray-black) and nail plate thickening. Their nail scrapings were examined in 10% KOH preparation. Data was entered and analyzed in SPSS version 20.

Results: A total 80 patients with suspected Onychomycosis were enrolled in this study. Among these, 73% patients were females and 27% were males. The age range of the patients was from 8-81 years. Out of 80 samples, 56 (70%) were diagnosed positive by Light microscopy, and 24 (30%) were diagnosed as negative for onychomycosis. Presence of spores and mycelia are considered as diagnostic factor for a specimen to be positive for fungal nail infection.

Conclusion: This study showed that 10% KOH smear and direct microscopy is of great diagnostic value in the early diagnosis and management of fungal nail infections with limited resources in a tertiary care setting with lesser economic burden on the patients from low socioeconomic status.

Keywords: Onychomycosis, KOH smear, Nail scrapings.

Introduction

Most of the cutaneous fungal infections are due to a group of fungi known as dermatophytes.[1] The three most important genera of dermatophytes are Epidermophyton, Trichophyton and Microsporum. These infections are also commonly called Tinea infections[2] and the one that affects especially nails is commonly called Tineaunguim. Fungal Dermatophytes usually effects skin, hair and nails. The cutaneous fungal infection of nails is clinically called Onychomycosis.[3] Among all the species, Trichophytonrubrum is the major cause of onychomycosis. Onychomycosis is a common fungal infection routinely presented in dermatologic clinics more commonly in adolescents and adults with dystrophic toe and hands nails. These are presented in addition to the common distal subungual form, which is characterized by thickened, brittle, discolored nails.[4] It is a common condition affecting 5.5% of the population worldwide and represents 20-40% of all onychopathies and about 30% of cutaneous mycotic infections.[5] A lot of patients daily come to outdoors with this clinical condition. Fungal infections are common in Pakistan, but are grossly under diagnosed.[1] An estimated over 3 million people in Pakistan are affected by serious fungal infections as revealed in a new first-ever study that estimated the burden of serious fungal diseases. Pakistan is one of the worst-affected countries across the globe.[2] Early diagnosis of fungal infection is critical to effective treatment.[3] The commonly used mycological tests include direct microscopic examination with 10% potassium hydroxide (KOH) and fungal culture.[6] Direct microscopy of potassium hydroxide (KOH) preparation and fungal culture has been the mainstay for the diagnosis of onychomycosis, but because of their less than ideal reported sensitivities, histologic analysis using periodic acid Schiff (PAS) stain has emerged as the preferred diagnostic test in recent years.[7-8] Laboratory diagnosis of onychomycosis must be confirmed before beginning a treatment regimen. With the help of simple microscopy, mycelia and spores are easily identified. Patients usually present with disfigured nails but the diagnosis of

1. Department of Pathology, Lahore Medical & Dental College Lahore, Pakistan.

Correspondence: Dr. Fauzia Sadiq, Associate Professor, Department of Pathology, Lahore Medical & Dental College Lahore, Pakistan.

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onychomycosis can never be confirmed without microscopic examinations as many other clinical conditions also sometimes present with similar features and hence a mycological examination is mandatory. We conducted this study to assess the frequency of Onychomycosis by using direct Microscopy.

Methodology

This cross sectional Study, was conducted at Microbiology laboratory of Lahore Medical and Dental College (LMDC). Patients with clinical diagnosis of onychomycosis were sent from dermatology outdoor of Ghurki Trust and Teaching hospital to Microbiology laboratory of LMDC where their nail scrapings were taken. An observational study was conducted on all the patients who were referred for suspicion of Onychomycosis to the microbiology laboratory in Lahore Medical and Dental College from October 2017 to October 2018. In total, 80 patients with suspected Onychomycosis were sent to college Microbiology laboratory during this time period of one year. Nail scrapings are then first put in 10% KOH and incubated for 24 hrs so that nail parts are softened. After 24 hours, a direct slide is prepared from these nail scrapings and observed under Microscope. Characteristic spores and mycelia was seen in case a dermatophyte is responsible for nail disfiguration.

This is the simplest method to diagnose the presence of fungal infection in nails that can easily be done with just a simple microscope at even a resource poor setting. Patients coming to Ghurki trust teaching hospital are usually from peripheral villages and are very poor. So this facility of microscopy of nail scrapings is provided to them at a very meager rate of one hundred rupees only and diagnosis is provided to patients without any financial burden. Ethical approval was sought from ethical committee of hospital. Data was analyzed by using SPSS version 20 and frequency of Onychomycosis was presented as percentage.

Results

In this study, 80 patients were included 73% females and 27% males. The age range of the patients was from 8-81 years. Most patients were in the 28-55 years age group.

Out of 80 samples, 56 (70%) were diagnosed positive by Light microscopy, and 23 (30%) were diagnosed as negative for onychomycosis as shown in table I. Presence of spores and mycelia are considered as diagnostic factor for a specimen to be positive for fungal nail infection.

Table I: Frequency of onychomycosis patients

Nail scrappings	Positive cases	Negative cases	Total
80 cases of Onchomycosis	56	24	80
	42 females	17 females	59 Females
	14 males	7 males	21 Males

Discussion

Most of the clinics in our set ups start the treatment of onychomycosis on the basis of clinical diagnosis only. Also our public has a habit of self-diagnosis and self-treatment. Antifungal oral treatment is a six months long procedure and the treatment is not only very expensive, it also can have serious adverse effects in some patients so it is compulsory to diagnose it first as a case of onychomycosis before the start of treatment. [7,8,9]

Role of microscopy has been confirmed as a basic diagnostic method for fungal nail infections in many studies. Light microscopy with KOH preparation provides an early and easy diagnosis for patients with fungal infections in any clinical care setting with little resources.[5] The set-up required for this diagnostic method is not very expensive (KOH and a microscope), and the procedure can be performed quickly at the point of care. Although Culture is the criterion standard test used to determine the presence of a fungal infection but in a resource poor setting and especially in a scenario where poor patients can't pay thousands of rupees for culture results at least simple microscopy should be done and also culture results require more than a week for diagnosis while microscopy provide results within 24 hours. Our study points towards the sensitivity of direct microscopy which depends on the skills and experience of the person performing microscopy. With practice, the sensitivity of direct microscopy may reach that of PAS stain as emphasized in a study who claims that becoming proficient in this office-based technique should also be emphasized during dermatology residency, for prompt fungal diagnosis so the patient should bear less burden of being undiagnosed.[9] Similarly, another study reported that Ten percent KOH wet mount preparation of the corneal scrapings is a simple and sensitive method for diagnosis of fungal keratitis.[10] Studies reported that diagnosis of onychomycosis cannot be made relying on clinical grounds alone and emphasize the

need to rely on tools such as KOH examination, culture and dermoscopy.[11,12,13] In our Institute we provide quick diagnosis to the poor patients in only 100 rupees within our minimal resources. It is safe, simple, repeatable and non-traumatic procedure. It gives quick results and does not require expensive equipment's.

The patients do not wander between dermatologist and physician to rule out the presence or absence of fungal infections.In sum, KOH preparation by an experienced person in a pathology laboratory has a sensitivity equivalent to that of culture or Periodic acid Schiff (PAS) stain and should be considered first line over the more costly PAS stain.[14]

Conclusion

This study showed that 10% KOH smear and direct microscopy is of great diagnostic value in the early diagnosis and management of fungal nail infections with limited resources in a tertiary care setting with lesser economic burden on the patients from low socioeconomic status.

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