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Effect of Topical Curcumin on Tinea Unguim

Kawther Mohammed Radah Ali

Directorate of Education in Holy Karbala, Iraq
Corresponding author

E-mail address: - Kawthrmohammed@gmail.com

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Abstract

Onychomycosis is one of the prevalent fungal infections that occur in the nails, and this paper has straight forwardly discussed this fungal infection. Fungal infection of the nail is a worldwide infestation caused by a specific fungal family known as tinea unguim. Although it is not a serious condition, its treatment may be prolonged with an optimal medical approach and, if not treated well, may induce disseminated fungal spread to other skin sites and cause cosmetic deformities. Curcumin is a well-known plant extract that has been used for many centuries for many purposes like cooking and coloring agent and recently used for many clinical conditions as it has pleiotropic biological effects like anti-inflammatory, antioxidant, immune modifier and many other effects.

Aim of the study: to evaluate if Curcumin has an additive effect when used with terbinafine (a traditional anti-fungal agent used for this condition) when applied topically.

Patients and method: 312 patients were randomly selected and separated into two groups. Group I used terbinafine only, and group II used terbinafine and topical Curcumin for one week for both groups.

Results: there was a significant cure rate in group II compared to group I am suggesting that Curcumin has a potential anti-fungal effect.

Introduction

Onychomycosis is a fungal infection of the nails and accounts for up to 20% of all nail diseases [1]. As recollected from resources, it has been found that Onychomycosis has been referred to as the non-dermatophytic infection that is present in the nail. The term Onychomycosis can be used nowadays to indicate any fungal disease. In this reference, it can be said that the tinea unguim is noted, especially a dermatophyte infection presents in the human body's nail plate [2]. Onychomycosis can be referred to as a cosmetic problem that has been given minor significance. It can be said that the issue might have acute adverse effects on the "emotional, social and occupational functioning" of human bodies. Human beings affected by human

immunodeficiency virus or HIV might have to face much more health issues if they had been affected by Onychomycosis [2]. Interaction with bacteria is also possible in the toe gap [3]. This mixed dermatophyte-bacterial infection is clinically more severe and has multiple microbial etiologies (co-infection). “Tinea unguium is a common chronic fungal infection of the nails” [4]. As recollected from reliable resources, it can be said that the Tinea unguium can be differentiated into four different medical types that depend on the mode of penetration of the fungal infection in the nail plate of the body [5]. The first one is the “distal lateral subungual onychomycosis” (DLSO), the second one is known as the “proximal subungual onychomycosis” (PSO), the third one is the “proximal subungual onychomycosis” (PSO), “white superficial onychomycosis” (WSO) and total “dystrophic onychomycosis” (TDO) [5]. Several epidemiological studies have addressed the frequency with which the disease occurs with other cutaneous mycoses in hospital outpatient departments or mycological laboratories. Studies addressing the prevalence of this disease in population groups have only recently emerged [6]. Although hospital and mycological laboratory studies provide valuable information on the prevalence of tinea unguium in specific clinics, there are inherent confounding factors in the different individuals attending individual clinics. Due to factors, comparisons with other studies are impossible [7]. In population-based studies, the prevalence of “tinea unguium” ranges from 2% to 8%. “Tinea unguium” increases steadily with age. Although rare, it is seen in children [8]. “With increasing life expectancy in the western world, the prevalence of tinea unguium may continue to increase without adequate prevention and treatment” [9].

Curcumin is a natural food color and aromatizer obtained from the rhizome of turmeric (*Curcuma longa*) [10]. The biological properties of Curcumin include antibacterial, anti-inflammatory, antioxidant, and anticancer actions [11]. Breast, liver, lung, stomach, and prostate cancers are only a few of the tumors for which Curcumin has demonstrated anticancer properties. For instance, Curcumin increased the generation of “reactive oxygen species” (ROS), which hindered the development of breast cancer MDA-MB-231 cells and caused them to undergo apoptosis [12]. Additionally, Curcumin prevented the growth, invasion, and metastasis of HepG2 liver cancer cells by stifling the signaling between “heat shock protein 70 (HSP70) and toll-like receptor 4” (TLR4) [13].

Patients and Method:

This study was carried out from January 2021 to April 2022. A total of 312 patients were randomly chosen from the consultant department of dermatology in Al-Hussein Medical City in Holy Karbala, complaining of Onychomycosis for at least 3 weeks. Mixed bacterial infections, diabetic persons, past drug use history and previous dermatological lesions at the site of current fungal insults were excluded. Afterward, an ethical consult was obtained from each patient before the study initiation. The 312 patients were divided equally into 2 groups. The 1st group received topical terbinafine (The enzyme squalene epoxidase, which catalyzes the conversion of squalene to lanosterol, is inhibited by terbinafine, which prevents the production of ergosterol). The 2nd group received topical Curcumin (about 95% purity of Curcumin was dissolved in 10 percent ointment with Vaseline) 2 hours after applying topical terbinafine. Both categories received the treatment 4 times daily for 1 week, after which a second examination by a dermatologist was done to assess the efficacy of both protocols.

Results

After one week of treatment, the results were obtained, as clarified by the following table (1).

Table (1) shows the number of patients that engaged in the study before treatment and those who were still not completely cured of Onychomycosis after 1 week of therapy. The data were analyzed by using the Q-square test at $p < 0.05$.

	Group I	Group II	Raw total
Before treatment	156 (170.59) [1.25]	156 (141.41) [1.50]	312
After treatment	113 (98.41) [2.16]	67 (81.59) [2.61]	180
Column total	269	223	492 (Grand Total)

The p-value of group II is .0061, which is highly significant compared to group I, suggesting that Curcumin played a significant role in eliminating the fungal infection.

Discussion

To combat fungal infections and spoilage, substances and extracts from various natural resources, particularly plants, have historically been powerful armaments [14]. Due to the widespread traditional usage of turmeric in food items, several studies have been conducted to examine the effects of Curcumin and turmeric on fungi-related spoilage and microbial infections [15]. In plant tissue culture, adding turmeric powder exhibited noticeable inhibitory action against fungal contaminations at concentrations of 0.8 and 1.0 g/L. With MIC values of 128 and 256 g/mL, respectively, the methanol extract of turmeric showed anti-fungal activity against *Cryptococcus neoformans* and *Candida albicans* [16]. According to several studies, Curcumin is effective in treating Onychomycosis as a photosensitizer. This strategy may benefit from the potential use of vehicular Curcumin in various forms (gel and emulsion) [17]. The novel formulation, when used in conjunction with the pre-treatment of the nail bed, can help Curcumin penetrate the lesion. The sessions were repeated weekly, and the patients reported no discomfort before, during, or after the therapy [18]. The distinction between this novel strategy for treating Onychomycosis and traditional therapies, which call for a greater number of sessions and may result in treatment discontinuation, has been demonstrated by the good outcomes obtained with a limited number of treatment sessions [19].

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