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Original Article

Recurrent dermatophytosis, new treatment modality

Dooha Alhamdi, Khalil ALHamdi

Department of Medicine, College of Medicine, University of Basra, Iraq.

Abstract

Introduction Dermatophytosis is a superficial fungal infection, which is limited to the fully keratinized layer of the skin (stratum corneum), nails and hair. A noticeable increase in number of patients with recurrent dermatophytosis was observed during the last few years, which differs from the classical mode of presentation of this infection by being symptomatic, more inflammatory, widespread ,running a recurrent course and highly resistant to conventional treatments.

Objective To evaluate the outcome of using Q-switched Nd:YAG laser (1,064-nm) as a new treatment modality for this vexing problem.

Methods Twenty patients with thirty-three lesions of localized recurrent dermatophytosis with positive mycological study were collected, all of them were treated with Q-switched Nd:YAG laser (1,064-nm) 4 sessions, one week apart. The patients were followed up weekly until the end of first month, then monthly for 6 months.

Results All patients showed excellent response to treatment with clinical cure rate of (100%). One patient had relapse (3.03%).

Conclusion Q-switched Nd:YAG laser (1,064-nm) was found to be a safe and effective treatment of recurrent dermatophytosis that has been failed to respond to different types of systemic and topical antifungal drugs with excellent result and remarkable reduction in recurrence rate.

Key words
Recurrent dermatophytosis; Dermoscopy; Q-switched; Nd:YAG laser.

Introduction

Dermatophytosis is a superficial fungal infection caused by three genera of fungi that are limited to the fully keratinized tissues (skin, hair, and nails).[1] A noticeable increase in number of patients with recurrent dermatophytosis was observed during the last few years, which differs from the classical mode of presentation of this infection by being symptomatic, more inflammatory, widespread, running a chronic recurrent course and highly resistant to conventional treatments. As systemic and topical antifungal drugs failed to cure these conditions and preventing their recurrence, so many new modalities had been tried to achieve the goals of complete cure. Muhammad H. *et al.* had used itraconazole 200mg twice a day with isotretinoin 20mg daily for a week per month for three successive months that induced clinical cure rate in 90% of the cases with a relapse rate of 15%.[2] On the other hand Alhamdi *et al.* reported a clinical cure rate of 97.5% with a relapse rate of 12.8% after using itraconazole 200mg once a day for one week per month for two successive months plus isotretinoin 10mg every other day for two months too.[3] Khalifa E. *et al.* treated chronic recurrent dermatophytosis by using a combination of multi systemic and topical antifungal drugs with promising results.[4]

Address for correspondence
Dr. Dooha Alhamdi
Department of Medicine, College of Medicine,
University of Basra, Iraq.
Email: doha.ismail@uobasrah.edu.iq

Dermoscopy can also aid in the diagnosis of dermatophyosis by its characteristic features including background of erythema with white peripheral scales with characteristic inward to outward direction, wavy hair, broken hair, morse code hair, follicular micro pustules and brown dots mainly at the active border of the lesion.[5] KOH wet preparation can confirm the diagnosis. Skin biopsy is not needed except in suspicious cases.

The Q-switched Nd:YAG laser (1,064-nm) yttrium aluminum garnet laser, that emit extremely high pulse with a very short pulse duration and minimal epidermal damage.[6] It penetrates the skin, its energy change to heat that cause fungal cellular damage and death.[7] Some studies, that had been assessed the in vitro growth inhibition of Trichophyton rubrum using Q-switched 1,064 Nd:YAG laser, suggested that the melanin within the cell wall of these fungi, acts as a chromophore for Nd-YAG laser at (1,064-nm) wavelength, which make these fungi as a target of this wavelength.[7,8]

Methods

Study is a prospective pilot clinical therapeutic trial, which was conducted at private clinic from January 2022 to January 2023; interventional studies/ quasi experimental.

Inclusion criteria Where twenty patient with thirty-three lesions of recurrent localized (involving less than 5% of the body surface area, ranging from 1 to 3 lesions) dermatophytosis including different types of dermatophytosis, that treated previously with topical and systemic antifungal drugs with recurrence. The patients age range from 12-65 years. All the patients were on no treatment for the last 8 weeks.

Exclusion criteria Pregnant women; patients on conventional treatment for the last 8 weeks.

Collection of data Patients with localized recurrent dermatophytosis consulting private clinic during a period of one year were interviewed and detailed history were taken. The patients were examined clinically by dermoscope and the wet KOH preparation were done to confirm the diagnosis. The lesions were treated with Q- switched Nd:YAG laser (Maria, Picolor, Gorey, CO. Wexford, Ireland) one session a week for four sessions (0.80 J per cubic centimeter, 8-mm diameter spot size and repetition rate of 5 Hz).

The patients were followed up weekly for the first months then monthly for six months. In each visit, the conditions were assessed clinically, dermoscopically, microscopically, by photos and asking about any possible side effects in addition to the patients satisfaction score. The clinical assessment was done depending on three parameters namely erythema, scales and itching as the following scale: 0 no, 1 mild, 2 moderate, 3 severe. The summation of the previous three-parameter scales is considered as the clinical improvement score.[2] The patient's satisfaction score as 0-not satisfied, 1-partially satisfied, and 2-fully satisfied.

Results

Twenty patients with thirty-three lesions of different types of dermatophytosis were enrolled in this study, their age ranged from 12-65 year, one male and the remaining nineteen were females. At the end of the study period (4 weeks) complete clinical, dermoscopical and microscopical cure were reported in all patients 20 (100%) without post inflammatory hyperpigmentation or any other complications as shown in **Figures 1-8**. It is worthy to mention that partial improvement was detected after first session in all patients. In addition, tinea faciei showed earlier and the best response to this

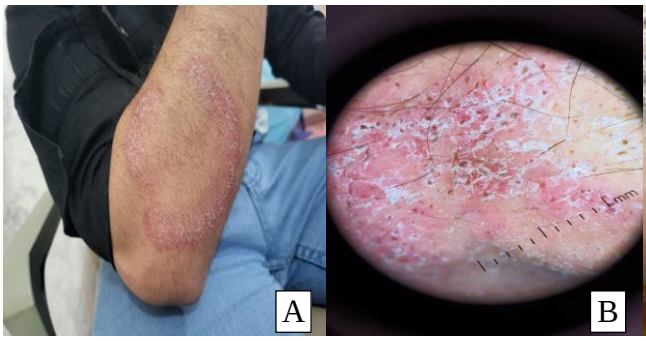

Figure 1 A, Clinical photo showed annular erythematous scaly plaque with active border. B, dermoscopical photo revealed Background of erythema, scales, brown dots. Before the treatment. (Authors photos).

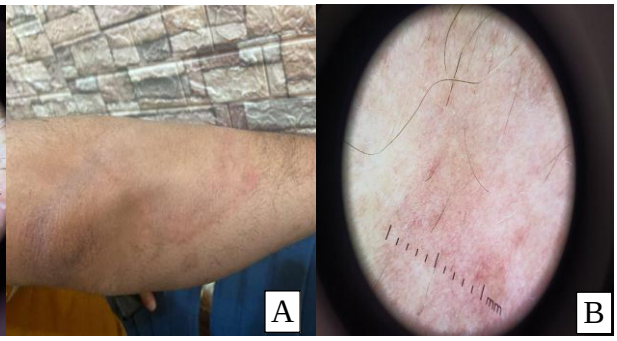

Figure 2 After the treatment. (Authors photos).

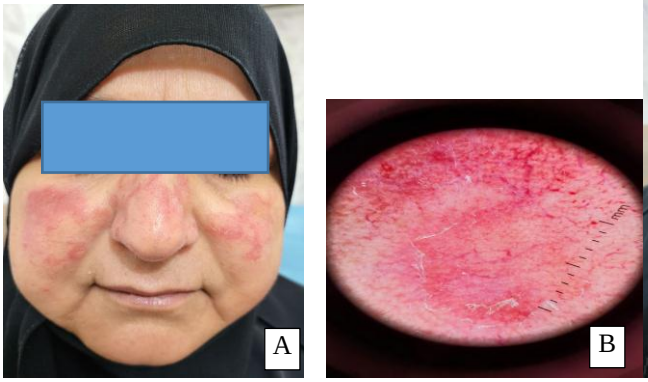

Figure 3 Before treatment. A, clinical photo showed erythematous scaly annular plaques on the nose and cheeks. B, dermoscopical photo revealed background of erythema with peripheral outward to inward scales. (Authors photos).

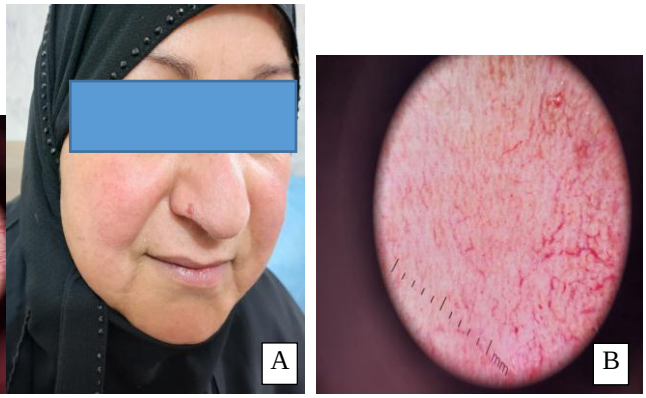

Figure 4 After the treatment. (Authors photos).

modality of treatment, while tinea cruris showed later response where additional 1 to 2 sessions was needed to complete the cure in two patients only. On the follow up period, no relapse was seen except in one patient, where one lesion, out of three that she had, was recurred after two months and retreated with the same regimen of treatment. At the end of the study course, no significant side effects were reported in any of the included patients apart from simple burning sensation during the procedure time only. All patients were fully satisfied at the end of the treatment and follow up period.

Discussion

The dermatophytosis, which was recalcitrant or recurrent few weeks after treatment course of antifungal drugs, were increased in our daily practice that can be explained by the long hot humid summer in our locality and a trend of having domestic imported cats and dogs, which may carried new species of dermatophytes. In the absence of susceptibility test, we cannot explain if these infections are true resistant to common available antifungal drugs or it is recurrent cases, but the point against that is the response of the skin lesions and complete cure to be recurred after treatment course completion. Therefore, we start to think in another curable treatment modality to help these suffering distressed patients. It is thought, that Q-switched Nd:YAG laser (1,064-nm) induces its beneficial therapeutic action in treating recurrent dermatophytosis through destruction of fungal cells, eradicating them from infected skin by

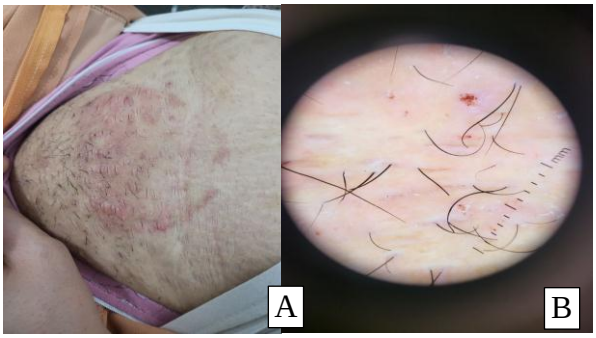

Figure 5 A, clinical photo showed erythematous scaly annular plaques on the lower abdomen. B, dermoscopical photo revealed peripheral outward to inward scales with brown dots. (Authors photos).

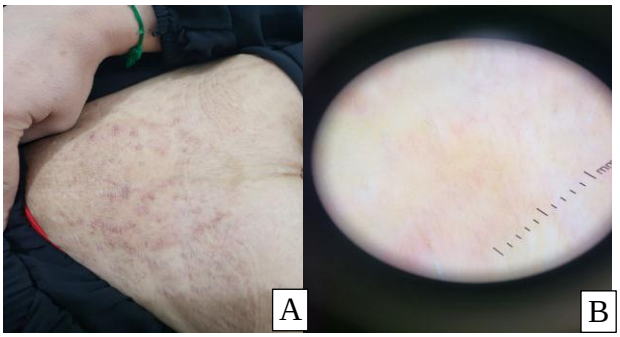

Figure 6 After the treatment. (Authors photos).

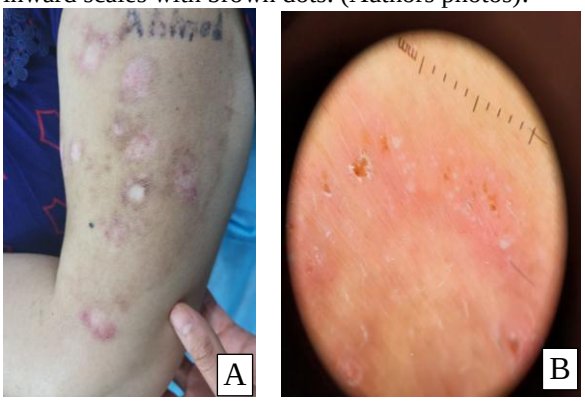

Figure 7 A, clinical photo showed erythematous scaly annular plaques on the upper aspect of the arm. B, dermoscopical photo revealed background of erythema with peripheral outward to inward scales with brown dots. (Authors photos).

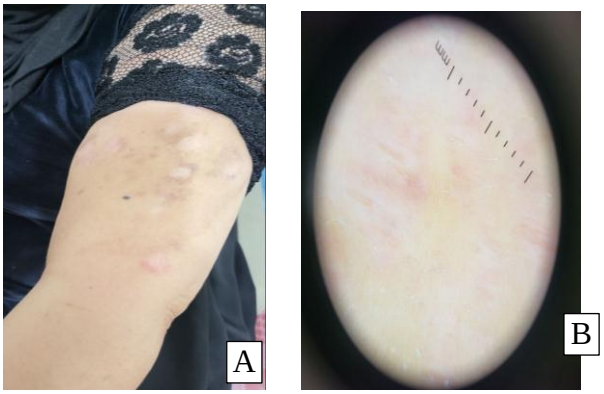

Figure 8 After the treatment. (Authors photos).

photothermolysis where melanin in the fungal cell wall act as a chromophore for laser wavelength,[6-8] thus we believed that this type of laser is not only helpful in treating of these recalcitrant cases, but also reduce or prevent the recurrence by clearing the skin from fungal cells. Zawar *et al.*, used the Q-switched Nd:YAG laser for treatment of patient with severe onychomycosis not responded to antifungal treatment with clinical and mycological cure.[9] Rachel Bertolani *et al.*, used 1,064-nm Nd:YAG laser for treatment of patients with onychomycosis with good results.[10] In this work, we used Q-switched Nd:YAG laser (1,064-nm) with great hope to obtain better result than that of onychomycosis since the skin is consisting of soft keratin and can be penetrated deeper and easier by the laser wave length.

All our patients showed excellent response. The results were promising with no any reported side effects during treatment period. In addition, the predominance of females among the studied group is mostly attributed that those females did not consult male dermatologist as majority of lesions were at hidden sites. It is worthy to mention, that the post inflammatory hyperpigmentation, which is a common sequelae of dermatophytosis, was not seen in any of the treated patients with Q-switched Nd:YAG laser, because the target of laser is the melanin pigment within the fungal cell wall.[6-8] On the other hand, tinea faciei was the best type in response to laser, while tinea cruris took slightly longer time to cure, this can be explained by the

groin is wet occluded area, which is an ambient environment for fungal growth and persistence.

Conclusion

Q-switched Nd:YAG laser (1,064-nm) was found to be a safe and effective treatment of recurrent dermatophytosis that has been failed to respond to different types of systemic and topical antifungal drugs with excellent result and remarkable reduction in recurrence rate with high rate of patient's satisfactions. A further study on larger sample size is recommended.

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