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Original Research Article

Incorporating salicylic acid peel as an adjuvant in treatment of superficial dermatophytosis: a new therapeutic approach

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ABSTRACT

Background: Dermatophytosis has acquired an epidemic-like magnitude at the present times. The prevalence of the dermatophytosis is reported to be as high as 61.5% in some parts of the country. Hence, to address the management of the situation, we therefore studied 30% salicylic acid as a peeling agent for the treatment of dermatophytosis.
Methods: 40 patients (25 males & 15 females) having dermatophytosis with positive potassium hydroxide (KOH) mounts were enrolled and Salicylic acid 30% application was done over the lesions weekly upto 4 weeks, and then followed up weekly upto 4 weeks.
Results: 5 patients were treatment-naive, and 30 was receiving antifungal treatment in the past 6 months. A total of 30(85%) patients had achieved clinical and microbiological cure 1 week after the last salicylic acid application. Clinically, the lesions appeared to have significantly resolved with reduction in hyperpigmentation and size of the lesions. 5 patients (15%) were still KOH-positive at the end of the study period and showed clinical activity; but these patients reported symptomatic improvement.
Conclusions: 30% Salicylic acid both keratolytic and anti-inflammatory effects shows it's effect on tinea, which prevent drug resistance and facilitating fast cure of superficial dermatophytoses. Salicylic acid peels can be used successfully as an adjuvant in the treatment of tinea infections and to enhance the activity of antimycotic drugs.

Keywords: Tinea, Dermatophytosis, KOH mount, Salicyclic acid peel

INTRODUCTION

The superficial cutaneous fungal infections (dermatophytes) is the most common causes of skin disease in many tropical countries. Dermatophytes (name based on the Greek for 'skin plants') are a common label for a group of three types of fungus that commonly causes skin disease in animals and humans.[1] The disease is caused by fungi belonging to genera Trichophyton, Minosporum and Epidermatophyton.[2] Dermatophytosis is defined as "fungal infection of the keratinized tissue of the hair, nail and stratum corneum of the skin".[3] The fungal infections of the skin and its appendages are more common in tropical countries like India due to environmental factors like heat and humidity.[4] Humans are the normal hosts for this group and transmission may occur by direct contact or indirectly by fomites, however, host factors such as immunologic status (cell mediated immunity) and local factors such as trauma, excessive moisture or occlusive clothing may constitute risk factors when combined with exposure to the etiologic fungi. Dermatophytosis has acquired an epidemic-like magnitude in the present times. The prevalence of the disease is reported to be as high as 61.5% in some parts of the country (in India it ranges from

36.6% to 78.4%).[5] Most antifungal drugs target ergosterol, which is unique to the fungal cell wall and absent in mammalian cells. The disadvantage of targeting a single molecule is that an alteration in the target by natural selection can render antifungal drugs ineffective. Since the keratinophilic dermatophytes reside in the stratum corneum, peeling of this superficial layer should remove the fungus. Chemical peeling is a safe, efficacious, and cost-effective procedure for treating various skin disorders and for enhancing cosmetic appearance. Salicylic acid (SA) is a member of a group of compounds known as hydroxy acids, which are widely used for a number of cosmetic indications because of their many important properties. Its mechanism of action being desmolytic rather than true keratolytic, and its safety among dark skinned people.[6] We therefore studied 30% salicylic acid as a peeling agent for the treatment of dermatophytosis. The aim of this study was to study the efficacy of salicylic acid peel in superficial dermatophytosis.

METHODS

Study design, location and duration

This is a prospective observational study. Study was conducted at department of dermatology, venereology, leprology, Mamata medical college, Khammam, Telangana state. Study was conducted for the duration of 6 months from September 2022 to February 2023.

Sample size

A total of 40 (25 males & 15 females) patients were recruited in our study and five were left out of the study due to irregular adherence to study protocol. In all, 35 patients (20 males and 15 females) were included for analysis.

Selection criteria

Patients suffering from active tinea infections with positive potassium hydroxide (KOH) mounts who were ready to participate in the study were included. Pregnant females, children (< 18 years) and those with a negative KOH mount for fungus were excluded.

Procedure

Salicylic acid 30% was prepared by adding acetone to 30 grams of salicylic acid powder to make it 100 ml, giving a 30% w/v salicylic acid. Salicylic acid 30% application was done over the lesions. The maximum quantity of salicylic acid used during a single treatment session was 10 ml (3 grams of salicylic acid). While applying salicylic acid in the inguinal area, care was taken to protect the scrotum. The treatment was repeated every week for 4 weeks. Thereafter, the patients were followed up weekly for four visits by the same set of investigators for all visits. KOH mounts was done at the baseline visit for confirming the diagnosis and repeated at the end of fifth visit (1 week after the last application) for the assessment of the response, and then after 4 weeks after the last application. This study protocol was approved by institutional ethics committee, Mamata medical college, Khammam.

Statistical analysis

All data was recorded in Microsoft Excel sheet an all-categorical variables were represented as frequency and percentage. Chi-square test used to identify the differences in baseline characteristics. SPSS software version 23.0 was used for statistical analysis (IBM, Chicago, Illinois), p value less than 0.05 was considered as significant.

RESULTS

There were majority of females were noted in this study (Figure 1).

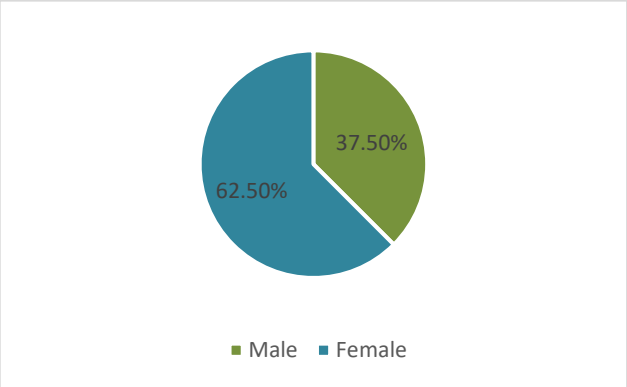

Figure 1: Gender distribution of dermatophytosis.

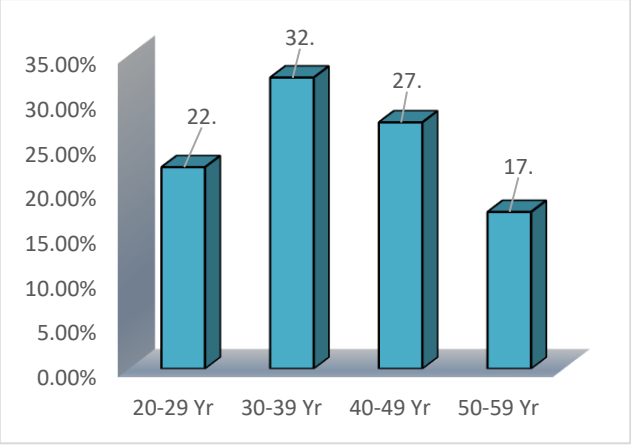

Figure 2: Age distribution of dermatophytosis.

Patient's age ranged from 20 to 60 years with a mean age of 35 years. All the patients except one had more than one anatomical site involved (Figure 2). According to the above results, the study showed majority of involvement in the groin area, followed by buttocks, axillae, abdomen and face (Figure 3). Five patients were treatment-naive, while the remaining 30 was receiving antifungal treatment in the past 6 months. A total of 30(85%) patients had

achieved clinical and microbiological clearance 1 week after the last salicylic acid application.

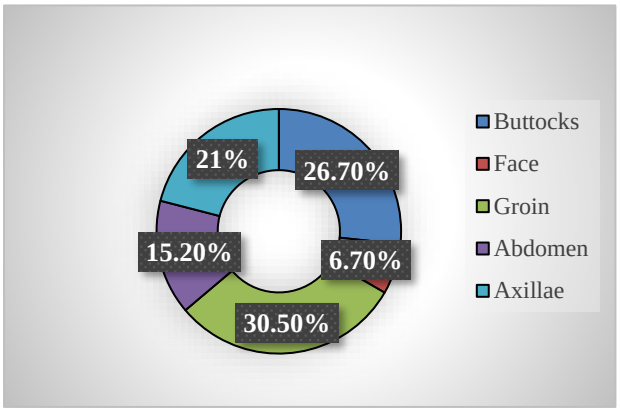

Figure 3: Distribution of dermatophytosis according to the sites involved.

Figure 4: Photographs of case of tinea corporis with tinea cruris at baseline, and immediately after salicyclic acid application and 1 week after 4th week application.

Figure 5: Axilla region before and after 3 weeks of salicyclic acid application.

Clinically, the lesions appeared to have significantly resolved with reduction in hyperpigmentation and size of the lesions. Five patients (15%) were still KOH-positive at the end of the study period and also showed clinical activity; but these patients reported symptomatic improvement. Sequential photographs of patient taken at baseline, immediately after salicyclic acid application and 1 week after 4th application, in a case of tinea corporis with tinea cruris (Figure 4). The (Figure 5) depicts the infection severity at axilla region before and after 3 weeks of Salicyclic acid application. The (Figure 6) shows pretreatment and post treatment images of tinea corporis and cruris after salicyclic acid peel (1 week of last application).

Figure 6: Buttocks images of pretreatment and post treatment images of tinea corporis and cruris after salicyclic acid peel (1 week of last application).

DISCUSSION

Skin is a mechanically protective layer as well as a visually noteworthy anatomical component. These superficial cutaneous fungal infections affect the skin's outermost covering, including appendages such as hair and nails. The causative fungus populate just the cornified layer of the epidermis or supra-follicular parts of hair and do not penetrate deeper anatomical areas.[7] Dermatophytosis' clinical pattern has changed dramatically in recent years.[8] Salicylic acid 30% is considered a superficial chemical peeling agent because it does not penetrate the skin beyond the stratum corneum (or granulosum at most).[9] Desmosomes, which contain several proteins, including desmogleins, are responsible for the cohesion of epidermal cells in the skin. Salicylic acid, an organic acid, has been discovered to remove desmosomal proteins such as desmogleins. As a result of this activity, the cohesiveness of epidermal cells is destroyed, resulting in exfoliation. In terms of mechanism of action, Salicylic acid should now be considered a desmolytic agent rather than a keratolytic agent, because it functions by disrupting cellular junctions rather than breaking or lysing intercellular keratin filaments. Dermatophyte spores have been found in hair follicles, including vellus hair, and are accountable for non-response to standard therapy. It promotes protein denaturation and stratum corneum exfoliation by

enhancing the penetration of topical antifungals and assisting in the clearance of dermatophytes. Systemic toxicity caused by cutaneous salicylic acid absorption is extremely rare, but it should be kept an eye out for. The clinical manifestations of salicylic acid intoxication include nausea, vomiting, dizziness, psychosis, stupor, and, ultimately, coma and death. It should not be used in children under the age of two years, or during pregnancy. Salicylic acid is designated as a pregnancy category C medicine by the US Food and medicine Administration.[10] Although the protocol limit for the greatest amount of salicylic acid administered during any visit is 10 ml, most of our patients required 3-5 ml. Because salicylic acid has no direct effect on the fungus, it is unlikely to cause resistance. peeling of superficial skin with salicylic acid 30% was found to be safe and may be an effective therapeutic option for resistant tinea infections.

Limitations

Limitation of this study is that it included small sample size and lack of long-term follow-up.

CONCLUSION

The 30% salicylic acid have both keratolytic and anti-inflammatory effects that may enhance the action of antifungals in tinea, aiding in the prevention of drug resistance and facilitating speedier cure of superficial dermatophytoses. Salicylic acid peels are inexpensive and can be used successfully as an adjuvant in the treatment of tinea infections and to enhance the activity of antimycotic drugs.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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