

Original Article

Determination of cost effective topical therapy for pityriasis versicolor

Fawad Muzaffar*, Amer Ejaz**, Khalid Mahmood†

* Dermatology Department, Combined Military Hospital, Kohat Cantonment, Pakistan.

** Dermatology Department, Combined Military Hospital, Kharian Cantonment, Pakistan.

† Dermatology Department, PAF Hospital Islamabad, Pakistan.

Abstract *Objective* To compare the cost, efficacy and compliance between shampoo (2.5 % selenium sulphide), soap (3% salicylic acid-10% sulphur), and gel (2% ketoconazole) in the treatment of pityriasis versicolor.

Patients and methods This comparative, randomized, single-blind clinical trial study was carried out at Combined Military Hospital Multan from May 2005 to September 2005. After randomization and assessment of inclusion criteria, patients with diagnosis of pityriasis versicolor were divided into three groups. Group I applied shampoo for 10 minutes daily for 1 week. Group II applied soap for 5 minutes daily for a period of 4 weeks. Group III applied gel for 5 minutes daily for 5 days. Cure was defined as negative skin scrapings for fungal hyphae at the end of treatment period. Cost of treatment was defined as cost of treatment for the group at baseline divided by the number of cured patients in each group at the end of treatment period. Efficacy was defined as the percentage of cure rate achieved at the end of treatment period. Compliance was defined as the number of patients completing treatment in each group. Patients were evaluated at presentation, at the end of treatment, and followed up at 4 weeks post treatment.

Results 90 patients were enrolled, 63 patients completed the treatment period, and 44 patients completed the follow up period. In group I, compliance was 66.6% and efficacy was 60%. The total cost incurred, per cured patient, Rs 275. In group II, compliance was 60% and efficacy 50%. The total cost per cured patient was Rs. 350. In group III, compliance was 83% and efficacy 92%. The cost incurred was Rs. 262 per cured patient. P value was >.05 for all three parameters.

Conclusion 2% topical ketoconazole gel resulted in better compliance, efficacy and lower cost than keratolytic soaps and selenium sulphide shampoo in treating pityriasis versicolor.

Key words

Ketoconazole gel, selenium sulphide shampoo, sulphur-salicylic acid soap, pityriasis versicolor.

Introduction

Pityriasis versicolor, caused by *Pityrosporum ovale*, is a very common skin disease in hot and humid climates around the world. It is especially common during the summer season in Pakistan because excessive sweating coupled with

an increased sebum production makes it easier for the fungus to penetrate the skin.¹⁻

³ Usually it is treated with an array of topical agents with a variable success and relapse rate.

The topical modalities of treatment for this disease include the non-specific and specific antifungal agents. The non-specific agents are the older treatments. These include selenium sulphide, propylene glycol and sulphur-salicylic

Address for correspondence

Col. Dr. Amer Ejaz,
Consultant Dermatologist,
Combined Military Hospital,
Kharian Cantonment, Pakistan.
E mail: amer_ejaz@yahoo.com

acid combination soap.⁴ Specific topical antifungal agents include haloprogin, zinc pyrithione, tolclate, ciclopirox olamine and azoles.⁴ These are the newer agents which cause cell membrane alterations resulting from inhibited ergosterol synthesis.⁵

Being a climate dependent condition, recurrence is quite common. The problem is compounded by partial response to most of the therapies used. The ideal therapy for such a recurrent problem should, therefore, be effective, easy to use thus increasing compliance, and cost-effective. We, therefore, sought to compare the most prevalent therapies in our country. Scanty data exist about the cost-effectiveness of various topical products in treating this condition. Since selenium sulphide is considered the first line therapy in treating this disease; it was sought to compare the results of keratolytic soaps, selenium sulphide shampoo, and topical antifungal gel in treating this ailment and at the same time note compliance and cost incurred for each cured patient.

Patients and methods

A randomized, comparative clinical trial was carried out at the dermatology department of Combined Military Hospital, Multan, Pakistan. The study was of five months duration from May, 2005 to September, 2005. Written informed consent was obtained from all the participating patients. The medical ethics and scientific committee of the concerned hospital approved the study.

Male soldiers aged between 18 and 40 years who presented with hypopigmented or hyperpigmented patches with bran like scaling of not more than 4 weeks duration

were assessed for pityriasis versicolor. Patients were diagnosed on the basis of microscopic examination of skin scrapings from the affected area for fungal hyphae using standard procedure and included in the study. Patients who had already taken any treatment for their condition or were known to have a disorder of immune system or undergoing immunosuppressive treatment were excluded.

Patients included in the study were randomized into three groups using block randomization technique to keep the groups similar in numbers. Due to different nature of treatment modalities, double blinding was not possible, so single blinding was planned and the investigator responsible for reviewing the slides for fungal hyphae was blinded to the therapy. Clinical charting of the lesions was done and approximate size noted. Patients were then subjected to baseline laboratory tests including complete blood count, platelet count, urea, creatinine, liver function tests and blood glucose fasting levels.

Group I comprised patients treated with 2.5% selenium sulphide shampoo. A commercially available brand (Selsun Blue®, Abbott Laboratories, Pakistan) was used which was purchased by the patients. This was applied locally once daily left on for 10 minutes and then washed off. The treatment was continued for 1 week. At the end of treatment period patients were again examined for regression of lesions in size and microscopic examination of the scales for fungal hyphae. At the end of 4 weeks patients were again assessed for recurrence.

Group II consisted of patients treated with 10% sulphur and 3% salicylic acid soap. A

commercially available soap (Sastid bar®, Stiefel Laboratories, Pakistan) was used and purchased by the patients. This was applied locally once daily left on for 5 minutes and then washed off. This treatment was continued for 4 weeks. One bar of soap was sufficient for the entire treatment period. Patients were examined at the end of treatment period and all the parameters were recorded as for group I.

Group III patients were treated with 2% ketoconazole gel. This was applied locally once daily left on for 5 minutes and then washed off. This treatment was continued for 5 days. A commercially available brand was recommended and purchased by the patients (Nizoral gel®, Janssen Laboratories, Pakistan). At the end of the treatment period patients were again examined for all the parameters as explained for group I.

Cure was defined as negative microscopy of skin scrapings from the representative lesions at the end of treatment period. Cost was defined as the cost of treatment for the group at baseline divided by the number of patients cured at the end of treatment period. Efficacy was defined as the percentage of cure achieved at the end of treatment period. Compliance was defined as the percentage of patients completing treatment and follow up in each group. In an attempt to maximize patient compliance with the protocol, patients were educated on how to use the study medication and were asked to bring back the used medication at the end of treatment period.

The statistical analysis of the data was done using statistical program for social sciences (SPSS version 12.0). Descriptive analysis and percentages were reported for the variables. Chi square test was used to

calculate *p* value regarding comparison of cost, compliance, and efficacy of the three groups. Significance was tested at a level of <0.05 .

Results

Ninety patients entered the study. Thirty were randomized to each group. Mean age was 29 years (range 19-38 years). Sixty three (70%) patients completed the treatment phase. Forty four (55.5%) patients completed the follow up phase. **Table 1** summarizes the study outcome.

In group I, 20 (66.6%) patients completed the treatment. Out of these 12 (60%) achieved cure whereas 8 (40%) were still positive for fungal hyphae. At the end of follow up period only 12 patients were left in the group out of which 10 were still positive for fungal hyphae. Cost per bottle of shampoo was Rs. 110 making cost of treatment per cured patient Rs. 275.

In group II, 18 (60%) patients completed the treatment. Out of these, 9 were still positive for fungal hyphae, with a cure rate of 50%. At the end of follow up period 12 patients were left in the group out of which nine were still positive for fungal hyphae. Cost per bar of soap was Rs 105, making cost of treatment per cured patient Rs. 350.

In group III, 25 (83.3%) patients completed the treatment. Out of these 2 were still positive for fungal hyphae, making a cure rate of 92%. At the end of follow up period, 20 patients were left in the group. One patient was still positive for fungal hyphae at the end of follow up period. Cost per bottle of gel was Rs. 245, with cost of treatment per cured patient of Rs. 262.

Table 1 Study parameters and outcome measures

Weeks of therapy	Group I (2.5% selenium sulphide shampoo)		Group II (Sulphur salicylic acid soap)		Group III (2% ketoconazole gel)		P value (chi square)
	No. of patients	Positive microscopy	No. of patients	Positive microscopy	No. of patients	Positive microscopy	
Baseline	30	30	30	30	30	30	
Treatment end	20	8	18	9	25	2	
Follow up	12	10	12	9	20	1	
Cost	Rs. 275		Rs. 350		Rs. 262		<0.05
Efficacy	60%		50%		92%		<0.05
Compliance	66.6%		60%		83.3%		<0.05

Discussion

Pityriasis versicolor has a high tendency to recur after being treated successfully. Treatment options, therefore, should have all the qualities tested in this study. Selenium sulphide shampoo is considered the first line therapy,⁶ whereas, ketoconazole gel is widely used specific therapy available in Pakistan, and sulphur-salicylic acid soap is older though preferred by patients.⁷ The best treatment option out of these should therefore be considered the first line therapy in third world countries.

Regarding efficacy, we used only microscopic cure as outcome measure, disregarding Wood's light examination and clinical improvement. This was because of late resolution of pigmentary change and unpredictable nature of Wood's light examination.^{8,9} We found ketoconazole gel to be effective in 92% of our patients, better than the other options tested. These findings are consistent with other studies. Even single application of 2% ketoconazole gel has been found to be effective but without comparison.⁸ A randomized, double-blind, placebo controlled trial found an efficacy rate of 73% when used for three days as compared to our 92% when used for 5

days.¹⁰ Another study while evaluating topical 2% ketoconazole shampoo for three days concluded successful treatment in 90% of the patients.¹¹ The authors have also shown advantages of shampoo, namely its ease of application over larger area of involvement (unlike topical antifungal creams) and shorter duration of treatment. A comparative study between 2% ketoconazole and selenium sulphide shampoo showed 95% cure rate for 2% ketoconazole when used topically, once a week for three weeks, as compared to 85% for selenium sulphide.¹² Another study has found no significant difference between oral and topical ketoconazole.¹³

Cost of treatment is an important factor dictating the prescription choice, since most products work well regardless of the mechanism of action.¹⁴ Fungicidals are to be preferred as they cure the infection in shorter period of time hence reducing the cost and increasing compliance. In this regard our study shows lowest cost for 2% ketoconazole, when we calculate the number of cured patients, rather than the cost of each single treatment. As far as we have searched, we could not find any study comparing the cost effectiveness of various topical products per cured patient. We think further studies with larger

sample size are needed to establish our findings further.

Compliance is a problem with topical treatment of pityriasis versicolor. In our comparison, using soap for one month obviously resulted in least compliance, hence increasing the cost of treatment per cure achieved. Shortest duration of treatment resulted in best compliance i.e. 2% ketoconazole gel. Though no comparisons of this nature have been done previously, as far as we have searched, the general principle of short treatment duration is acknowledged.¹⁵

Recurrence is a known problem with treatment of pityriasis versicolor. Though our follow up period was too short to be of significance as far as recurrence is concerned, we still saw two patients in group I, and one each in group II and III recur within one month of stopping therapy. Some earlier studies have shown similar relapse rates.¹⁶ Others have shown higher relapse rates, favoring prophylaxis.¹⁷ We think studies with longer follow up are needed in topical therapy to clearly establish the relapse rate.

Conclusion

We conclude that 2% ketoconazole is better than selenium sulphide shampoo and sulphur-salicylic acid soap in the treatment of pityriasis versicolor in terms of efficacy, cost and compliance. Systemic therapy should be reserved for extensive cases and patients with some underlying immune problem.

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