

A comparison of efficacy of single topical permethrin and oral ivermectin in the treatment of scabies

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Abstract **Background** Scabies is a common health problem worldwide. Among available topical treatment modalities, 5% permethrin is the most effective scabicide with few side effects. Ivermectin is the only oral scabicide available. It is effective, inexpensive and easy to administer with no known drug interactions and limited side effects.

Objective To compare the efficacy of topical permethrin and oral ivermectin in treatment of scabies.

Patients and methods In this quasi-experimental study, a total of 120 patients of scabies were enrolled and randomly divided in 2 groups of 60 each. Topical 5% permethrin whole body application for 10-12 hours and oral ivermectin as 200µg/kg were used in groups A and B, respectively. In both groups, history, examination and microscopy were carried out at day 0, 7 and day 14. Response to treatment was judged on following parameters: decrease in severity of pruritus, nonappearance of new lesions and absence of burrows. Each parameter was scored and sum total of individual scores was used to determine the efficacy.

Results Mean age in group A (permethrin) was 29.45±9.72 years and in group B (ivermectin) was 31.45±12.78 years. In both groups, 66.7% patients showed complete cure.

Conclusion There is no significant difference regarding efficacy of topical permethrin and oral ivermectin when used in treatment of scabies.

Key words

Scabies, permethrin, ivermectin.

Introduction

Scabies is a contagious ectoparasitic infestation affecting all races and social classes, with a higher prevalence in underdeveloped countries.¹ Possible reasons are overcrowding and poor hygiene, facilitating its spread.^{2,3,4,5} However with the emergence of HIV, its prevalence has increased in developed countries.^{1,5}

Clinical diagnosis is made on history of generalized itch with nocturnal worsening and presence of similar symptoms in contacts.⁴ Pathognomonic lesions are slightly raised tortuous burrows. Nonspecific lesions consist of prurigo-like or urticarial papules, itchy excoriations and crusts. Diagnosis confirmation is either by detection of burrow or microscopic finding of scabies mite, its egg shells or feces.^{1,4}

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Most treatment modalities available are topical e.g. lindane, permethrin, benzyl benzoate, crotamiton, or other agents.^{6,7,8} They are cumbersome, messy and time consuming,

leading to poor patient compliance.^{9,10} Permethrin 5% is an effective topical scabicide used commonly.^{5,11} Limiting factors are its high treatment cost along with emerging drug resistance.⁸

Ivermectin is the only available oral scabicide.^{2,5,6} It is a synthetic, macrolide antihelminthic being used in various parasitic disorders like onchocerciasis and filariasis.^{1,7} Although it is yet not approved by FDA for scabies, it has been used in crusted scabies or scabies in patients of pemphigus, connective tissue disorders and HIV infections, where topical therapy is difficult to tolerate.^{1,8,9} It has also been used successfully in epidemics of scabies in institutional settings.^{3,4} It is effective, inexpensive and easy to administer with no known drug interactions and transient and mild toxic effects e.g. fever, headache, muscle and joint pain, maculopapular rash, hypotension, tachycardia, nausea, vomiting, abdominal pain, pruritus and lymphadenopathy. It is not recommended for use in pregnancy, lactation or in children <15 kg and in age < 5 years.^{4,6,9} Contraindications are hypersensitivity and CNS disorders.⁶

Usha and Nair⁵ have shown its efficacy to be equivalent to topical 5% permethrin when given in a dose of 200µg/kg.

Our clinical trial aimed to compare the efficacy of oral ivermectin in a single dose of 200µg/kg with that of once topical 5% permethrin.

Patients and methods

It was a quasi-experimental study, carried out at Department of Dermatology, Unit I, Jinnah Hospital, Lahore. The study was completed in 11 months. Patients of either sex with a confirmed diagnosis of scabies, aged 18-60

years were enrolled. Confirmation was done by burrow detection by ink method and microscopic evidence of *Sarcoptes scabiei* mite in any of its development stage or its feces called scybala. Exclusion criteria included: pregnant or lactating patients, hypersensitivity to permethrin or ivermectin, prior use of topical or systemic scabicide in last 4 weeks, patients on radiotherapy, steroids or other immunosuppressive drugs for any systemic or cutaneous indication. Patients with any chronic debilitating disorders, neoplasias, with neurological, hepatic or renal dysfunction were also not included.

A total of 120, otherwise healthy, patients with scabies were enrolled study and randomly divided in 2 groups of 60 each.

After written informed consent by patients or care takers, a detail of history and examination and burrow detection and microscopy for mite was recorded on a pre designed pro forma on the first day, before starting treatment was noted.

In group A, topical permethrin 5% in lotion form was used. Patients received explicit written instructions about topical application. It had to cover the entire body (from neck to toe) and be kept there for 10-12 hours followed by a bath.

In group B, ivermectin tablets were taken by the patient in the presence of the investigator.

In both groups patients were advised not to use any other antiscabietic medicine during the study period. Bed covers and personal clothes had to be washed with soap and water after completion of therapy. All the patients were given antihistamines at bed time during 1st week. Secondary infection, when present, was treated with a 7-day course of antibiotic.

Table 1 Baseline characteristics of the patients in group A (permethrin) and group B (ivermectin).

Parameters	Group A	Group B	p value
Mean age (years)	31.45±9.78	29.45±9.72	0.14
Nocturnal pruritus (%)	88.3	83.3	0.432
Similar symptoms in contacts of patients (%)	75	66.7	
No. of contacts	155	107	
Severity of itching, mild/moderate/severe (%)	20/70/10	30/53.3/16.7	0.72/0.06/0.16
Positive microscopy (%)	33.3	36.7	0.57
Socioeconomic status, upper/middle /lower (%)	10.0/53.3/36.7	1.7/68.3/30.0	

Table 2 Comparison of response in group A (permethrin) and group B (ivermectin) at follow-ups.

Response	Day 7		P value	Day 14		P value
	Group A	Group B		Group A	Group B	
Cure	73.4%	68.3%	0.54	66.3%	66.3%	1.0
Very effective	23.3%	30%	0.40	25.0%	20%	0.51
Poor effect	3.3%	1.7%	0.55	3.7%	8.7%	0.17
No effect	0%	0%	1.0	5%	5%	1.0

Table 3 Overview of response in group A (permethrin) and group B (ivermectin) in term of efficacy.

	Response			
	Effective treatment (Cure+Very effective)		Treatment failure (Poor effect+No response)	
	1 week	2 week	1 week	2 week
Permethrin	96.7%	91.3%	3.3%	8.7%
Ivermectin	98.3%	86.3%	1.7%	13.7%

The contacts of the patients of both groups were treated at the same time with same treatment. However, children under 5 years of age and pregnant or lactating women in the contacts were treated with 5-10 % sulphur ointment.

Evaluation

All the patients were followed up at day 7 and 14. Photographs were taken at day 0 and day 14. Itching was graded as mild, moderate or severe based on daily activity and sleep disturbance. For efficacy, three parameters were used: i) itching, ii) cutaneous lesions/burrows, and iii) microscopy. In case of presence, a score of 1 was given to each of the above 3 parameters, and score 0, if otherwise. Grading of response was done based on total score of three parameters as: score 0=cure; score 1=very effective; score 2=poorly effective; and score 3=no response.

SPSS version 10 was used for analysis.

Results

A total of 120 patients both male and female between 18-60 years of age with signs and symptoms compatible with scabies, confirmed by burrow detection and/or microscopy for mite were enrolled. All 120 patients completed the study. All statistical comparisons at baseline were nonsignificant between the 2 groups except that the history of scabies in contacts was present more in group A than in group B, and the difference was statistically significant (**Table 1**).

At day 7, cure rate was similar in two groups ($p=0.54$) [**Table 2**]. Marginally, more patients in group B had very good response as compared to group A. Treatment failure was not seen in any patient. Final assessment was made at day 14. Results revealed 40 patients (66.7 %) in both groups had cure. Treatment failure was also equal in both groups.

Table 4 Comparison with other studies.

No.	Study	n=	Efficacy 1 week Pm	Efficacy 1 week Ivm	Efficacy 2 week Pm	Efficacy 2 weeks Ivm
1	Present study	12	96.7%	98.3%	91.3%	86.3%
2	Usha and Nair [5]	85	97.5%	70%		
3	Abiden <i>et al.</i> [18]	84			22 failures in 6 months	2 failures in 6 months
4	Khan and Yasmin [20]	30	100%	100%	100%	100%

Pm= Permethrin, Ivm= Ivermectin

Treatment efficacy after 2 weeks was categorized as effective in 91.3% and 86.3% in permethrin group and ivermectin group, respectively (**Table 3**). There were 4 relapses after two weeks in each group

Discussion

In our study no statistically significant difference in the efficacy of permethrin and ivermectin was found when used as a single therapy in scabies treatment. About two-thirds of patients responded to respective therapies in both groups. A total of 8 patients in our study became reinfested with *S. scabiei* two weeks after treatment, n=4 in each group. This relapse may be due to development of increasing resistance against both drugs.¹⁶ There was 68.3% cure at 1 week and 66.7% cure at 2 weeks in the ivermectin group. In permethrin group, these values were 73.3% and 66.7%, respectively. These results are similar to the earlier reports of Madan *et al.*¹⁵ and Meinking *et al.*¹⁷ The results of the study done by Abedin *et al.*¹⁸ are also comparable with our results, in terms of its efficacy.

On follow up at 2 weeks our results compared well with those by Akhtar *et al.*¹⁹ In 2007, they used ivermectin in multiple doses at a dose of 300µg/kg in 60 patients, regardless of age and the reported efficacy was 100%. The result persisted 2 months after treatment.

Aubin and Humbert reported the effectiveness of a single 12-mg dose of ivermectin in two patients in France with crusted scabies as well.²⁰

When we compared our results with other similar studies we found them comparable with those shown by Khan and Yasmin in which efficacy was 100% in all 30 patients studied.²¹

However, in the study conducted by Usha and Nair⁵ at day 7, 70% of patients in the ivermectin group cured as compared to 97.5% in the group treated with permethrin. Their results showed that topical permethrin was superior to oral ivermectin. Response of ivermectin in terms of cure at day 7 (70%) is similar to that of our study (73.3%); however, we found no statistically significant difference between the two groups which may be due to difference in compliance. In ivermectin group, tablet was taken by the patient under direct supervision. In permethrin group, patients applied the lotion by themselves, which may lead to improper application. Also there might be increase in the prevalence of emerging resistance against permethrin which may not be so a few years ago.²²

In 1995, Meinking *et al.*¹⁷ did an open label study and had 2 follow up visits, as in our study. They reported 45% success with ivermectin at 2 weeks and 100% success at 4 weeks using a single oral dose of 200µg/kg in patients of

scabies.

Like our study, most of the researchers using ivermectin did not go for any laboratory investigations after single dose of ivermectin.^{4,7,15,17,19,21}

The main limitation of our study was that ivermectin was not given to children below 5 years of age (or <15kg) and to pregnant or lactating women due to concerns regarding its use in these conditions keeping in mind possibility of increased penetrance of drug through the immature blood-brain barrier. Another limitation was inability to trace all the contacts and treat them. Further studies are required to evaluate efficacy and safety of this drug in children.

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