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Original Article

Oral Ivermectin versus Single Topical Permethrin in the Treatment of Scabies

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ABSTRACT

Background: *Scabies is a highly contagious and intensely pruritic parasitic infestation. It is a re-emerging infection in the new millennium especially in developing countries. Various treatment modalities have been used and topical treatment i.e. 5% permethrin is the most effective scabicide with few side effects. Ivermectin is the only oral scabicide available.* ***Objectives:*** *This study compares the efficacy of oral ivermectin with topical permethrin cream in the treatment of scabies.* ***Methods and materials:*** *This observational study was conducted at the out-patient department of Dermatology and Venereology at Sher-E-Bangla Medical College Hospital, Barishal over a period of 8 months. A total of 130, otherwise healthy, patients with scabies, aged 18-65 were* Institutions such as nursing homes, extended-care facilities, and prisons are often sites of scabies outbreaks. Child care facilities also are a common site of scabies infestations[2,3]*enrolled study and randomly divided in 2 groups of 65 each receiving either topical 5% permethrin (group A) or oral ivermectin (200 µg/kg/dose) in a single dose (group B). All the patients were followed up at day 7 and 14.* *Assistant Professor, Department of Paediatrics, Sher-E-Bangla Medical College, Barishal, Bangladesh.* ***Results:*** *At day 7, cure rate was similar in two groups (p=0.49)*

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[Table 2]. Marginally, more patients in group A had very good response as compared to group B. Final assessment was made at day 14. Results revealed 67.9% patients in group A and 65.3% patients B had cure (p=0.87). Treatment failure was also similar in both groups (p=0.9) ***Conclusion:*** *Both permethrin and ivermectin in both single and single dose regimen are equally efficacious and well tolerated in scabies. However, permethrin has a rapid onset of action.*

Keyword: *scabies, pruritus, parasite, ivermectin.*

INTRODUCTION

Scabies is a common ectoparasitic infection caused by a mite, Sarcoptes scabiei var. hominis. It is a common condition affecting all races and social classes, with a higher prevalence in underdeveloped countries[1]. Scabies can spread easily under crowded conditions where close body and skin contact is common. Institutions such as nursing homes, extended-care facilities, and prisons are often sites of scabies outbreaks. Child care facilities also are a common site of scabies infestations[2,3]. If left untreated It can lead to secondary infections and post-infective complications such as acute post-streptococcal glomerulonephritis causing severe morbidity[4].

Scabies frequently occurs in body crevasses such as those between the fingers and toes, the buttocks, the elbows, the waist area, the genital area, the flexor aspects of the forearms, axillary folds, nipple areola, the periumbilical area and under the breasts in women. The face, neck, palms, soles and lips are usually not affected, except in infants or very young children[5,6,7,8]. Clinical diagnosis is made on history of Severe generalized itching (pruritus), especially at night and presence of similar symptoms in contacts is the earliest and most common symptom of scabies. A pimple-like (papular) itchy (pruritic) "scabies rash" is also common[9, 10,11].

Pathognomonic lesions are slightly raised tortuous burrows, tiny gray specks or both. 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[12].

Several modalities of treatment are available but most consists of creams and lotions. Patients usually apply the medication all over the body from the neck down, and leave the medication on for at least eight hours. A second treatment is needed if new burrows and rashes appear. All people in the household who have had close skin-to-skin contact with a scabies affected person during the past month must be treated[13,14,15].

The mainstay of therapy in the present era is topical, and includes permethrin, benzyl benzoate, crotamiton and gamma benzene hexachloride (lindane), and[3].In addition, oral anti-parasitic agent ivermectin 200 µg/kg has been found to be an effective scabicidal agent as a single or two dose regimens given at 2 weeks interval[16].

Topical treatments are cumbersome, messy and time consuming, leading to poor patient compliance. Permethrin 5% is an effective topical scabicide used commonly.

Limiting factors are its high treatment cost along with emerging drug resistance[17,18, 19, 20].

Ivermectin is an oral medication shown by many clinical studies to be effective in eradicating scabies, often in a single dose. It is the treatment of choice for crusted scabies and is often used in combination with a topical agent[17]. It is more suitable where topical therapy is difficult to tolerate[1, 8, 9]. It has also been used successfully in epidemics of scabies in institutional settings. It is effective, inexpensive and easy to administer[21].

It has not been tested on infants and is not recommended in pregnancy, lactation or children under six years of age. Side effects such as neurotoxicity is very rare in such small and single dose used in scabies[18, 22].

The aim of the study was to compare the efficacy of a single oral dose of 200µg/kg body weight of ivermectin with once topical application of 5% permethrin cream in the treatment of patients with scabies.

METHODS AND MATERIALS

This observational study was conducted at the out-patient department of Dermatology and Venereology at Sher-E-Bangla Medical College Hospital, Barishal over a period of 8 months, from January 2021 to August 2021.

Patient selection

A total of 130, otherwise healthy, patients with scabies, aged 18-65 were enrolled study and randomly divided in 2 groups of 65 each. Informed consent was obtained from all patients who participated in the study. The entire project was presented to the hospital ethical committee, and formal sanction was obtained for the study. Pregnant and lactating women, patients with immunodeficiency or severe systemic disease, heavily crusted or nodular lesions, secondary infection or eczematization, coexisting dermatological disease and known hypersensitivity to the trial drugs were excluded from the study. finallya total of 100 patients with scabies were enrolled in the study. They were randomized into two groups: group A Ivermectin (n=50) and group B Permethrin (n=50).

Diagnosis and intervention

The diagnosis of scabies was made by the presence of at least 3 of the following clinical criteria confirmed independently by 2 consultants: (1) demonstration of burrow, (2) presence of scabietic lesions at the classical sites, (3) nocturnal pruritus, and (4) family history of similar illness. Confirmation was done by burrow detection by ink method and microscopic evidence of *Sarcoptes scabiei* mite. A detailed systemic and dermatologic examination was made, and weight was recorded to determine the dose of the drug. The intensity of pruritus was recorded with the visual analogue scale and graded as mild, moderate, or severe. The severity of skin lesions was also graded.

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. The contacts of the patients of both groups were treated at the same time with same treatment.

Evaluation

All the patients were followed up at day 7 and 14. Photographs were taken at day 0, 7 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.

The results of the study were statistically analyzed using SPSS version 16. To account for statistical differences in the two groups, a $\chi 2$ test or Fisher's exact test was used, as appropriate. Student's t-test was used for numerical data. $P < 0.05$ was considered significant.

RESULTS

A total of 100 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 and completed the follow-up were analyzed. All statistical comparisons at baseline were non-significant 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**).

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

Parameter	Group A (n=50)	Group B (n=50)	P value
Mean age (years)	34.45±8.52	32.29±9.52	0.44
Gender (male/female)	27/23	24/26	
Nocturnal pruritus (%)	89.2	87.1	0.72
Similar symptoms in contacts of patients (%)	75	66.7	
No. of contacts	143	111	0.03
Severity of itching, mild/moderate/severe (%)	22/66/12	30/53.3/16.7	0.62/0.15/0.2
Positive microscopy (%)	33.3	36.7	0.63
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-up.

Response	Day 7		P value	Day 14		P value
	Group A	*Group B*		*Group A*	*Group B*	
Cure	73.8%	72.3%	0.49	67.9%	65.3%	0.87
Very effective	23.0%	23.07%	0.37	23.40%	22.2%	0.81
Poor effect	3.07%	4.6%	0.61	4.7%	7.5%	0.17
No effect	0%	0%	1.0	4%	5%	0.91

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	96.8%	91.3%	3.07%	8.7%
Ivermectin	95.37%	87.5%	4.6 %	12.5%

At day 7, cure rate was similar in two groups (p=0.49) [**Table 2**]. Marginally, more patients in group A had very good response as compared to group B. Final assessment was made at day 14. Results revealed 67.9% patients in group A and 65.3% patients B had cure (p=0.87). Treatment failure was also similar in both groups (p=0.9).

Treatment efficacy after 2 weeks was categorized as effective in 91.3% and 87.5% in permethrin group and ivermectin group, respectively (**Table 3**). There were 3 relapses after two weeks in each group.

DISCUSSION

It was found in this study that both permethrin and ivermectin had similar efficacy when used as a single agent in the treatment of scabies. About three fourths of patients responded to respective therapies in both groups. A total of 6 patients in our study became re-infested with *S. scabiei* two weeks after treatment (3 in each group). Growing resistance to all antimicrobial agents could be attributed as the cause of the relapse[23].

There was 72.3% cure at 1 week and 65.3% cure at 2 weeks in the ivermectin group. In permethrin group, these values were 73.8% and 67.9%, respectively. Meinking et al found that ivermectin results in 77% cure rate in 1st week. These findings are similar to our findings[24].This study concurs with the excellent cure rates (90–100%) observed in the initial studies with permethrin[25]. In a study done by Madan *et al at* NSCB Medical College, Jabalpur, India. found that 82.6% of the patients in the ivermectin group showed marked improvement after a single dose. This finding also echoes our findings[26]. The results of the study done by Abedin *et al* are also comparable with our results, in terms of its efficacy[27].

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[28]. In a RCT done in University College of Medical Sciences and GTB Hospital, University of Delhi, Delhi, India by Sharma et al compared topical 5% permethrin (group A) or oral ivermectin (200 µg/kg/dose) in a single dose (group B) or double dose regimen (group C) repeated at 2 weeks interval. It was found that Cure rate in three treatment groups at the end of 4 weeks was 94.7% (A), 90% (B), 89.7%(C), and thus all three treatment modalities were equally efficacious. These findings are similar to our findings[29].

In our study the lack of efficacy of a single dose of ivermectin in some patients may be due to the lack of ovicidal action of ivermectin[30]. In a prospective, non-randomized study conducted at the out-patient department of Dermatology and Venereology of Shaheed Suhrawardy Medical College & Hospital over a period of 6 months Mohsena Akhter et al found that The cure rate was more in case of single application of topical Permethrin than single oral Ivermectin at the end of 1st week, which was significant (p=<0.001). At the end of 2nd week, topical Permethrin had better cure rate than oral Ivermectin. This was also statistically significant (p=<0.001)[31].

However, in the study conducted by Usha and Nair found that A single dose of ivermectin provided a cure rate of 70%, which increased to 95% with 2 doses at a 2-week interval. A single application of permethrin was effective in 97.8% of patients. Their results showed that topical permethrin was superior to oral ivermectin. Response of ivermectin in terms of cure at day 7 is similar to this study (72.3%); however difference between the two groups was not significant statistically which may be attributed to difference in compliance e.g. improper application in ivermectin group vs. supervised tablet ingestion in ivermectin group[32]. The following limitations are mentionable e.g. 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.

CONCLUSION

Topical permethrin being both ovicidal and miticidal theoretically appears to be more efficacious. In our study, the outcome was similar after 2 weeks after treatment, although ivermectin was as effective as permethrin; it has few outweighing advantages over topical permethrin. It is cost effective and can be given to masses with better compliance with or without supervision. It can also be given safely to patients of scabies with secondary eczematization, erosions or ulcers where topical therapies such as permethrin, lindane and benzyl benzoate can cause serious cutaneous and systemic side-effects in addition to the problem of compliance. Complication like.

RECOMMENDATIONS

Following recommendations are made based on the study findings:

- This study consists of small number of patients & shorter durations. Further evaluation is needed in larger number of patients with longer duration.
- More follow up should be done too.

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