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ORIGINAL ARTICLE

Comparison of Efficacy of Single Application Topical 5% Permethrin versus Single Dose Oral Ivermectin in the Treatment of Scabies

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ABSTRACT

Aim: To compare the efficacy of a single application of topical 5% permethrin versus a single dose of oral ivermectin in the treatment of scabies.
Methodology: Randomized controlled trial. Department of Dermatology, Pak Emirates Military Hospital (PEMH), Rawalpindi, from January 1, 2021, to June 30, 2021. Sixty scabies patients of both genders were included. 30 patients for 5% permethrin cream (group A), and 30 patients for the oral ivermectin group (group B). Follow-up with patients was done at weeks 1 and 2 after treatment. Age in this study was > 5 years.
Results: The mean of age was 27.700±8.43 years, duration of disease was 5.133±1.71 weeks, and weight was 71.366±11.31 kg in Group A, while in Group B, age was 30.366±9.37 years, duration of disease was 4.700±1.55 weeks, and weight was 73.433±10.82 kg. Efficacy was observed in 22 (73.3%) patients in group A and 21 (70%) patients in group B (P = 0.775).
Conclusion: There is no significant efficacy difference between topical permethrin and oral ivermectin in treatment of scabies.
Keywords: Efficacy, Permethrin, Ivermectin, Scabies

INTRODUCTION

Scabies is a very contagious, ectoparasitic infection of the human skin caused by the itch mite, Sarcoptes scabiei var. hominis[1-3]. The accurate prevalence of scabies is difficult to ascertain, but the estimated number of people affected worldwide is 100–300 million[1,2,5]. In 2009, the World Health Organisation (WHO) classified scabies as one of the most neglected skin diseases, and it is a serious health issue in many impoverished nations[5]. The mite infects the population through skin-to-skin contact from an infected individual to a healthy individual; however, indirect transmission via fomites can also occur, especially in crusted scabies[1].

The characteristic clinical feature is intense pruritus, especially at night [6]. The diagnosis is made clinically, depending upon the history of severe pruritus and the physical examination of the patient. Pathognomonic lesions are slightly raised tortuous burrows, especially at the webs of fingers, the flexure surfaces of wrists, the elbow, the axillae, the genitalia and buttocks, and the breasts of women[1]. Diagnosis is confirmed by the extraction of mites, eggs, or scybala (scabies mite faeces) and then microscopic examination[2,4]. Scabies can spread easily in crowded conditions such as schools, nursing homes, extended-care facilities, and barracks. Since delays can result in higher morbidity and a greater economic burden, it is important to identify infected people and start treating them early[3,4].

For scabies, there are numerous treatment options. Evidence suggests that the effectiveness of conventional treatment methods is comparable when drugs are used as prescribed. These include topical applications, e.g., permethrin, lindane, benzyl benzoate, crotamiton, and the systemic drug ivermectin[7]. Topical 5% permethrin is an effective scabicide used most commonly. The drug is usually applied twice, one week apart. But infrequently, this therapy is linked to resistance, improper application, poor patient compliance, and uncommon allergic responses[5]. Ivermectin is the only available but non-FDA-approved systemic scabicidal drug. It affects the parasite by inhibiting the conduction of nerve impulses in nerve-muscle synapses and neurons. Glutamate-gated chloride channels are specifically targeted by this endectocide. By boosting chloride ion influx, the drug hyperpolarizes the parasite's neurons and muscles, ultimately leading to the parasite's demise. Humans are not harmed by ivermectin unless they have a history of having shunt procedures due to the fact that it cannot pass the blood-brain barrier and that these channels are located in the central nervous system.8 It is given as a single dose at a dose of 200µg/kg in patients of >5 years of age and >15 kg[1,9].

A study by Chhaiya et al[10] has shown that the efficacy of 5% permethrin lotion was 74.8% and 99% at the first and second weeks after treatment, respectively, and the efficacy of oral ivermectin was 30% and 63% at the first and second weeks after medication, respectively. 9 A study by Usha and Nair10 has shown that the efficacy of 5% permethrin lotion was 97.8% and oral ivermectin was 70%. Currently, topical permethrin is the drug of choice used for scabies treatment. However, poor patient compliance, improper application, and allergic reactions are the main drawbacks of therapy. Oral ivermectin is a cost-effective drug with good patient compliance and easy administration. This study was therefore designed and carried out to get further information about the effectiveness of oral ivermectin in treating scabies and to compare it to 5% permethrin cream, which is currently available as a first-line drug.
Clinical Implication: Topical 5% permethrin is the most commonly used very effective scabicide, and ivermectin is only available as an oral scabicide. The efficacy of both drugs is almost equal, so oral ivermectin could be used in the treatment of scabies as effectively as topical permethrin.

MATERIALS AND METHODS

The study was conducted after ethical committee permission in the Department of Dermatology of Pak Emirates Military Hospital, Rawalpindi, from January 1, 2021, to June 30, 2021. A randomised controlled trial was performed with a sample size of 60 patients (two groups with each group of 30 patients). The sample size was calculated using the WHO calculator with a power of test of 80% and a 5% level of significance. p1 = 97.8% and p2 = 70% (where expected efficacy in population 1 was p1 and p2 was the expected efficacy in population 2). 10 non-probability consecutive samplings were performed in which scabies patients> 5 years and >15kg from both genders were sampled. Patients treated in the last month for scabies, patients who are immunocompromised or using immunosuppressive drugs, patients using any antibiotic therapy in the last week, history of allergy to any of the study drugs, secondary bacterial infection, pregnant women, and Norwegian scabies patients were excluded.

The study was registered as a randomised controlled trial in the Iranian Registry of Clinical Trials with the IRCT ID

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"IRCT20221222056891N1. Patients fulfilling the scabies definition of "having pathognomonic lesions and itching confirmed by clinical and microscopic examination" and inclusion criteria were included in the study after permission was obtained from the ethical committee and research department of the hospital. The participants of the study were explained in detail about the trial, and written consent was obtained from each patient. Basic demographics were noted, like age, gender, weight, and disease duration. Randomization was performed using a computer-generated random list for both groups. The group assignments were put into sealed envelopes, which were opened when the patient was included in the procedure. 30 patients were sampled for the 5% permethrin cream group (Group A), while 30 patients were sampled for the oral ivermectin group (Group B).

Permethrin 5% cream was given to the patients in group A. They were instructed to apply the medication to the body from neck to toe. It was mentioned to them that the cream had to be applied to the skin for at least 12 hours. Additionally, it was suggested that they take a warm bath no earlier than 12 hours following the application. The patients included in the second group (group B) were prescribed oral ivermectin in a single dose at a dose of 200µg/kg. All patients were prescribed orally hydroxyzine 10mg or 25mg once daily at bedtime for symptom relief of pruritus for 7 days. Patients were followed up at weeks 1 and 2 after treatment. Data regarding efficacy "described as complete clinical cure, which was reduction of clinical lesions and pruritus by more than 50% as compared to baseline and negative microscopy" from both groups was noted as per the operational definition at 2 weeks after treatment. A statistical analysis programme was used to analyse the data in SPSS-23. A chi-square test was used to examine efficacy in both groups, with a significance level of p 0.05.

RESULTS

The mean and standard deviation of age were 27.700±8.43 years, duration of disease was 5.133±1.71 weeks, and weight was 71.366±11.31kg in Group A, while in Group B, age was 30.366±9.37 years, duration of disease was 4.700±1.55 weeks, and weight was 73.433±10.82kg. Frequency and percentage of age for Group A were 5-40 =26(86.7%) and >40 =4(13.3%), while for Group B it was 5-40 =23(76.7%) and >40 =7(23.3%). The male gender was dominant in both groups, i.e., 86.7% and 83.3%, respectively. Efficacy was observed in 22(73.3%) patients in group A as compared to 21(70%) patients in group B (P=0.775). A comparison of efficacy was done in both groups with regard to age, gender, duration of disease, and weight, as shown in tables 1,2,3 and 4 respectively.

Table 1: Comparison of efficacy with respect to age in both groups

Age (years)	Group	Efficacy		P value
		Yes	No	
5-40	A	19(73.1%)	7(26.9%)	0.551
	B	15(65.2%)	8(34.8%)	
>40	A	3(75%)	1(25%)	0.658
	B	6(85.7%)	1(14.3%)	

Table 2: Comparison of efficacy with respect to gender in both groups

Gender	Group	Efficacy		P value
		Yes	No	
Male	A	19(73.1%)	7(26.9%)	0.931
	B	18(72%)	7(28%)	
Female	A	3(75%)	1(25%)	0.635
	B	3(60%)	2(40%)	

Table 3: Comparison of efficacy with respect to duration of disease in both groups

Duration (weeks)	Group	Efficacy		P value
		Yes	No	
1-6	A	17(73.9%)	6(26.1%)	0.947
	B	19(73.1%)	7(26.9%)	
> 6	A	5(71.4%)	2(28.6%)	0.477
	B	2(50%)	2(50%)	

Table 4: Comparison of efficacy with respect to Weight in both groups

Weight (kg)	Group	Efficacy		P value
		Yes	No	
≤ 65	A	6(85.7%)	1(14.3%)	0.604
	B	6(75%)	2(25%)	
> 65	A	16(69.6%)	7(30.4%)	0.920
	B	15(68.2%)	7(31.8%)	

DISCUSSION

Permethrin and ivermectin did not exhibit any statistically significant difference in their abilities to cure scabies in our investigation. In each group, almost two-thirds of the patients were cured with their particular treatment[10]. Patients in our study remained symptomatic with scabies two weeks after treatment, 8 from group A and 9 from group B. This could be due to increased resistance against drugs or other factors[11]. Efficacy was observed in 22(73.3%) patients in group A as compared to 21(70%) patients in group B (P=0.775). The results were comparable to the previous reports of Madan et al[12] and Meinking et al[13]. The results of the study done by Abedin et al[14] have also shown similar efficacy. Chhaiya et al have shown that the efficacy of 5% permethrin lotion was 74.8% and 99% at the end of the first and second weeks, respectively, and the efficacy of oral ivermectin was 30% and 63% at the end of the first and second weeks, respectively. Usha and Nair[10] have also shown that the efficacy of 5% permethrin lotion was 97.8% and oral ivermectin was 70%.

At 2 weeks follow-up, our trial results were compared well with those by Akhtar et al[15]. Ivermectin was administered to 60 patients in 2007 in several doses at a dose of 300µg/kg and the claimed effectiveness was 100%. The outcome was sustained after two months of therapy. In addition, Aubin and Humbert[16] reported that two patients with Norwegian scabies responded favourably to a single dose of 12 mg of ivermectin.

However, at day 7, Usha and Nair[10] reported that in the ivermectin group, 70% of patients were cured, as opposed to 97.5% in the group receiving permethrin treatment. Topical permethrin was preferable to oral ivermectin. In terms of cure, the ivermectin response is comparable to that of our trial (73.3%); nevertheless, we did not find a statistically significant difference between the two groups. In the ivermectin group, the patient consumed the tablet while being closely watched. Patients in the permethrin group used the cream on their own, which could have resulted in inappropriate application. Another possibility is that growing resistance to permethrin has become more common than it was a few years ago[18].

In 1995, Meinking et al[13] did an open label study. The study, like our study, had two follow-up visits. 45% success was observed with ivermectin at week 2, whereas at week 4, a 100% cure rate was reported with a single dose of ivermectin orally at a dose of 200µg/kg. Like in our study, no laboratory investigations were done after a single dose of ivermectin[14,19,20].

The primary limitation of our study was the exclusion of ivermectin from treatment for children younger than 5 years old (or 15kg), lactating mothers, and pregnant women due to safety concerns in these conditions and the potential for increased drug penetration through the developing blood-brain barrier. To assess this medication's effectiveness and safety in kids, more research is needed.

CONCLUSION

There is no discernible difference in the effectiveness of topical permethrin and oral ivermectin when used to treat scabies.

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1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.

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