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Original Article

Comparative Trials of 5%Permethrin Lotions Vs 1% Gamma Benzene Hexachloride Lotions in Treatment of Scabies

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Abstract

Background

Scabies is a contagious pruritic skin condition caused by the mite Sarcoptesscabiei var. hominis, and it is one of the major public health problem in developing country like ours. To determine and compare the efficacy of topical permethrin and topical gamma benzene hexachloride in treatment of scabies in population of Nepal.

Methods

This was a prospective, randomized, comparative study conducted in 300 diagnosed cases of scabies treated with permethrin and gamma benzene hexachloride.

Results

At the end of 2nd week, treatment was effective in 91.2% cases in permethrin (group A) and 64.6% in gamma benzene hexachloride (group B). After switch over of the non-improved patients to the other group drug, 6.7% were treated successfully with gamma benzene hexachloride and 80.9% were treated successfully with permethrin at the end of 4th week. No major side effects were observed in both groups. Gamma benzene hexachloride was found to be cost effective than permethrin.

Conclusion

Permethrin was found to be more effective than gamma benzene hexachloride in treatment of scabies.

Keywords : *Gammabenzenehexachloride, Permethrin, Scabies*

Introduction

Scabies is a contagious disease caused by parasite Sarcoptesscabiei, varhominis [1]. It has been recognized at least 3000 years back and was reported in ancient India, China and the Middle East as a disease in humans and animals [1]. In developing country health burden of this disease is high, where it is endemic [2]. In Nepal it is endemic and is one of the common skin problem for which patients visit hospital.

An ideal scabicidal drug has to be safe, effective and of low cost as this disease is more common in poor people [3]. Drugs used in scabies have changed from sulphur compounds to gamma benzene hexachloride to permethrin to oral Ivermectin [2]. In Nepal there is three drugs commonly used for the treatment of this disease, Gamma benzene hexachloride (Lindane) 1 % Cream/lotion, Permethrin 5% cream/lotion or oral Ivermectin. Lots of studies are being carried out comparing the efficacy and safety of antiscabetic drugs [2].

In 1983, Hernandez-Perez first reported that some patients with scabies in El Salvador did not respond to 1% lindane

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even when used twice in 48 hours [4]. There are reports of several lindane resistant scabies worldwide in recent years and lindane resistance is rising [5]. Further, children and pregnant women are not advised to use lindane and there are several reports of central nervous system toxicity and convulsions with lindane [6]. Many studies has found permethrin to be safe and effective in scabies [2,7]. So, though little expensive, currently 5% topical Permethrin cream/lotion is considered by many as the drug of choice in the treatment of scabies [7].

As this disease in endemic in developing country like Nepal and there is always need of safe and effective treatment to decrease the burden of this disease in population, we carried out the study to compare efficacy and safety of lindane 5% lotion with Permethrin 1% lotion.

Materials and Methods

This prospective, comparative, randomized study was conducted on the patients, diagnosed as scabies, attending the Outpatient department of Dermatology, Nobel medical college and teaching hospital, Biratnagar, Nepal for a period of one year from Jan 2017 to Dec 2017. The diagnosis was made on the basis of clinical history and examination. Ethical clearance was obtained from Institutional ethics committee of Nobel Medical College and teaching hospital, Biratnagar, Nepal.

Case Selection

Inclusion Criteria

- Any newly diagnosed patient of scabies of any gender and above 5 years of age.

Exclusion Criteria

- Pregnant or lactating females
- History of diabetes, hypertension or any chronic disease, psychiatric illness or neurological disorder
- Any other associated skin disease which affect the study due to same presentations like atopic dermatitis, dyshidrotic eczema, insect bite reaction.
- Patients who had received any anti-scabietics or topical steroids during the past 4 weeks

A total of 351 patients of scabies attending the OPD of Dermatology were enrolled in our study after proper informed written consent. But, only 300 patients completed the treatment and were compliant with the follow up schedule. Informed written consent was obtained from all the patients who were enrolled in this study and their age, gender, socioeconomic status, occupation were recorded for demographic comparison. The selected patients were allocated to any one of the two treatment groups randomly on basis of a computer generated random table.

The diagnosis of scabies was done clinically by presence of the following criteria: demonstration of a burrow and/or typical scabietic lesions at the classical sites, nocturnal pruritus, and history of similar symptoms in their families and/or close contacts and demonstration of eggs, larvae, mites or fecal material under light microscopy when needed.

Interventions

The patients were randomly allocated on one of the following groups-

Group A: Single application 50ml of Permethrin lotion 5% was applied over whole body, below neck and scrub bath was taken after overnight application of 8 hours. This process was repeated after one week. The 50ml 5% Permethrin lotions was priced at NRs. 150.

Group B: Single application of 50 ml of gamma benzene hexachloride 1% lotion was applied over whole body, below neck and scrub bath was taken after overnight application. This process was repeated after one week. The 50 ml 1% Gamma benzene hexachloride was priced at NRs.

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68. Participants of Group A and B were educated about the nature of the disease including the possibility of continued itching even after successful treatment for up to 2 weeks, mode of application of drugs and were instructed to take warm water bath after application of medicine next morning. They were advised importance of treatment of family members and close contacts as well. They were also told about prevention of transmission by washing all clothes and bedding that came in contact. The patients were told not to use any antipruritic drug or any other topical medications.

Evaluation and Efficacy Assessment

Treatment was done with antiscabietic agents and then followed up at intervals of 2 and 4 weeks. They were examined clinically again and evaluated based on previously defined criteria. Treatment was thought to be effective if pruritus improved and no new lesions developed. And, treatment considered being failure if there was still marked itching or appearance of new lesions. In such case, the patient was crossed over to the other group and evaluation performed at the end of 4th week.

Cost Effectiveness Assessment

The cost effectiveness was calculated on basis of total expenditure in medicine in NRs at the end of two week and cure rate in percentage and the drug was assessed on the basis of amount needed to treat on case successfully.

Analysis

The results of the study were statistically analyzed using SPSS version 22, using chi-square test. A P-value of <0.05 was considered statistically significant.

Results

A total of 300 scabies patients were studied excluding those patients who were not able to return for follow up either after 2 weeks or after 4 weeks. Among 300 patients studied, 141 (47%) were males and 159 (53%) were females. The mean age of scabies patient was 19.12 ± 13.88 years with minimum of 4 years and maximum of 58 years. The highest number of disease was observed in the patients between 0 to 10 years (44.00%), followed by 10 to 20 years (21.67%) and least in age group 50 to 60 years (4.33%) as shown in Table 1.

Table 1: Age and sex distribution of scabies patients

Age group	Male	Female	Total
0-10 years	59 (19.67%)	73 (24.33%)	132 (44.00%)
10-20 years	32 (10.67%)	33 (11.00%)	65 (21.67%)
20-30 years	15 (5.00%)	20 (6.67%)	35 (11.67%)
30-40 years	23 (7.67%)	18 (6.00%)	41 (13.67%)
40-50 years	7 (2.33%)	7 (2.33%)	14 (4.67%)
50-60 years	5 (1.67%)	8 (2.67%)	13 (4.33%)
Total	141 (47.00%)	159 (53.00%)	300 (100%)

Of the scabies patients, majority were students 196 (65.3%), followed by farmer 35 (11.7%), housewife 26 (8.7%), labourer 28 (9.3%), drivers 13 (4.3%) and the remaining 2 (0.7%) were doing other professions. Out of 300 scabies patients, majority 127 (42.3%) patients presented on winter season followed by 86 (28.7%) patients in spring, 53 (17.7%) patients in summer and 34 (11.3%) patients in autumn. Of the total scabies patients, a majority 136 (45.3%) belongs to low class family, followed by 115(38.3%) to middle class family and 49 (16.3%) to high class family. The total of 195 (65%) scabies patients had positive contact history with family or friends whereby 105 (35%) have no contact history as shown in Table 2.

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Table 2: Distribution of scabies patient by various demographic features

	Category	Numbers	Percentage
Season	Winter	127	42.3%
	Spring	86	28.7%
	Summer	53	17.7%
	Autumn	34	11.3%
Occupation	Student	196	65.3%
	Housewife	26	8.7%
	Farmer	35	11.7%
	Labourer	28	9.3%
	Driver	13	4.3%
	Others	2	0.7%
Socioeconomic status	Low class	136	45.3%
	Middle class	115	38.3%
	High class	49	16.3%
Contact history	Present	195	65%
	Absent	105	35%

Out of 300 patients, 167 were treated with permethrin (Group A) and 133 were treated with lindane (Group B). The demography of two groups does not show any statistically significant difference as shown in Table 3.

Table 3: Comparison of group A and group B at 2nd weeks and 4th weeks of treatment

		Group A n=167	Group B n=133	P value
Sex	Male	78 (46.7%)	63 (47.4%)	0.501
	Female	89 (53.3%)	70 (52.6%)	
Age (years)		27.11 ± 10.08	27.68 ± 10.95	0.636
Effectively treated at 2 weeks		152 (91.02%)	86 (64.66%)	<0.001*
Effectively treated at 4 weeks after cross over		1 (6.7%)	38 (80.9%)	<0.001*

*Statistically significant at p<0.05

On evaluation after 2 weeks on first follow up, treatment was effective in 152 (91.02%) patients in the permethrin group (Group A) and 86 patients (64.66%) in the lindane group (Group B) which when analyzed using chi- square test shows statistically significance difference (p<0.001) as shown in table 3. Total of 62 patients (15 in permethrin group and 47 in lindane group) who had not improved were crossed over to the other group. Among the patients who were not improved 32 were males and 30 were females and their mean age was 23.06 ± 14.17 years.

On the next follow-up, at 4-week post-treatment, out of 15 patients who showed no improvement in the permethrin group at the first follow-up and was subsequently treated with lindane, only one patient showed improvement and rest 14 patients still had scabies. However, of all the 47 patients not responding to lindane who were then treated with permethrin at first follow-up, 38 showed improvement and only 9 still had severe itching as shown in Table 3.

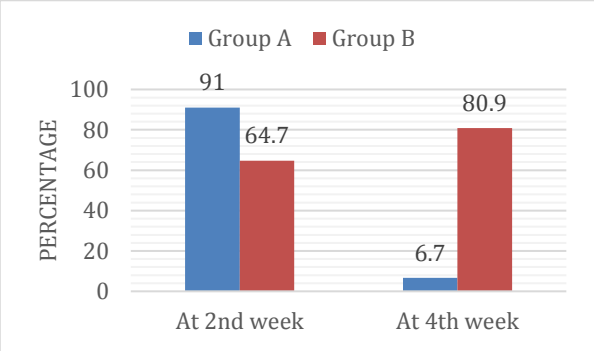

Figure 1: Response of Group A and Group B at 2nd weeks and after cross over of drug at 4th week

The patients who were still having the symptoms after 4 week follow up were treated with oral ivermectin. Regarding side effect of the drug 4 patients treated with gamma benzene hexachloridecomplains of irritation and only 1 patient treated with permethrin complains of mild burning sensation. Major side effect was not observed with both the drugs. On comparing cost effectiveness, gamma benzene hexachloride (NRs 105.16) was found to be cost effective than permethrin (NRs164.80) as shown in Table 4.

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Table 4: Cost- effectiveness analysis of each drug at end of 2 weeks

Group Drug	Cost in NRS for 100 participants	Cure rate (%)	Cost effectiveness	Cost (NRS) to treat one case
Permethrin	150 ×100 × 2 = 30000	91.02 %	NRS 30000 for 91.02 participants	329.45
Gamma benzene hexachloride	68× 100 × 2 = 13600	64.66 %	NRS 13600for 64.66 participants	210.33

Discussion

Scabies is a common public health problem in Nepal. Topical 1% gamma benzene hexachloride and topical 5%permethrin is commonly used drug to treat this disease. So, our study was done to compare these two drugs.

We found that scabies was more common in school going children of low socioeconomic class family in winter season. This may be due to lack of hygiene in children and overcrowding in winter and population of low socioeconomic class. Our result showed that permethrin 5% lotion is superior to gamma benzene hexachloride 1 % lotion in treatment of scabies.

Zargari O et al. like ours, also found that permethrin is better than gamma benzene hexachloride for the treatment of scabies. They found an improvement rate of 84.6% after two weeks in permethrin group, whereas lindane was effective only in 48.9% of patients [7].

Schultz et al. reported thatimprovement was seen in 91% patients treated with permethrin and 86% given lindane. They concluded that because of a lower potential for neurologic toxicity, permethrin might be preferable to lindane for the treatment of scabies, particularly in children [8].

We did not compare topical drug with oral ivermectin. Dulcie Celia A et al. and Maurya M et al. found that even though, both ivermectin and permethrin were equally efficacious and safe but ivermectin is the cost effective one. Therefore, ivermectin may be the preferred drug in the treatment of scabies with better compliance [2,9].

Gamma benzene hexachloride, an organochlorine, is a neurotoxin that interacts with the GABA-A receptor chloride channel complex at the picrotoxin binding site and disrupts GABA neurotransmission. This results in death of mite.Since it acts only on GABA-A receptors, so its ovicidal effect cannot be established. Thus a second course of treatment must be given after one week to destroy any newly hatched larvae. Its selective action on single receptor may explain its low efficacy in comparison to permethrin [2].

Permethrin, a synthetic pyrethroid, is a neurotoxin and it disrupts the function of voltagegated sodium channels of arthropods, causing prolonged depolarization of nerve cell membranes and disrupting neurotransmission. It blocks the movement of sodium ions from outside to inside of the nerve cells. This causes delayed repolarisation and paralysis and death. Permethrin acts on ubiquitous sodium channels so it acts at all stages of the life cycle of the mite. Gamma benzene hexachloride dose not has this effect [10]. Human skin is 20 fold more permeable to lindane than to permethrin. Hence, the risk for systemic toxicity due to systemic absorption during overuse is projected to be 40 to 400 times lower for 5% permethrin lotion than for 1% lindane lotion [11].

Regarding side effect, no major side effect was observed except for irritation in 3 % of cases treated with gamma benzene hexachloride and less than 1 % cases with

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permethrin. Zargari O et al and Maurya M et al. also did reported any side effect in their patients [7,9].

Gamma benzene hexachloride was found to be cost effective with net price of NRs 210.33 compare to 329.45 for Permethrin.

In country like Nepal where the prevalence of scabies is very high, our study might help the clinicians to choose the better treatment option.

Conclusion

Permethrin is better drug than gamma benzene hexachloride regarding its efficacy and side effect in treatment of scabies though it is little bit expensive when effectiveness cost is taken into consideration. We recommend that permethrin is better drug with fewer side effects for treatment of scabies.

Limitation of Study

The study could have been better if oral ivermectin was compared with both the topical drugs.

Ackonwledgement

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Conflict of Interest

None

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