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Original Research Article

Scabies in children and its outcome with topical permethrin and oral ivermectin: a single center prospective study

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ABSTRACT

Background: Scabies is highly prevalent in children less than 6 years and more so in less than 2 years of age. Treating scabies in infants and children is challenging. The objective was to study the characteristics and distribution of lesions and outcome with topical Permethrin and Oral Ivermectin in scabies in children.
Methods: 264 cases of scabies from the skin and pediatric outpatient of a tertiary care center were enrolled.
Results: It is common in children below 5 years of age. The effectiveness of local Permethrin and oral Ivermectin was not significantly different in the form of complete cure.
Conclusions: Children tend to scratch the rash repeatedly, the scratch marks and crusting of the rash sometimes make this infection hard to identify, hence high index of suspicion is required to diagnose. Complicated lesions in scabies require more duration than uncomplicated lesions. Permethrin and Ivermectin are equally effective in scabies. Ivermectin being orally administered is a drug of choice in epidemics.

Keywords: Children, Ivermectin, Permethrin, Scabies

INTRODUCTION

Scabies is a parasitosis caused by the mite *Sarcoptes scabiei.* Hallmarks of infestation include intense itching, papular rash. Scabies is essentially a disease of children, highest in the age group below 5 years. There is a decreasing prevalence with increasing age.[1]

In infants and young children, 75% of the mites can be found on the hands and feet, making this the best site to examine.[2] Common scabies in adults causes sometimes intense pruritus and skin lesions with a characteristic aspect and distribution. The lesions are often more extensive in children. The objective of the present study was to examine and investigate the extent and distribution of lesions and outcome with Permethrin cream and Oral Ivermectin in the treatment of scabies in pediatric patients.

Diagnosis of scabies: It's one of the most difficult or one of the easiest diseases to diagnose (Stokes 1936). An inability to diagnose is mainly because of inadequate experience and inadequate instruction. Children tend to scratch the rash repeatedly, the scratch marks and crusting of the rash sometimes make this infection hard to identify, hence high index of suspicion is required to diagnose.

- Characteristics distribution of lesions: the eruption commonly involves: The sides and webs of the fingers, the flexor aspects of the wrists, the extensor aspects of the elbows, the anterior and posterior axillary folds, the periumbilical areas, waist, penis (shaft and glans), the extensor surfaces of the knees, the lower half of the buttocks, and the lateral aspects of the feet. The back is relatively free of involvement; the head is spared except in very young children. Nodular lesions, often bronzed or coppery are occasionally encountered, particularly in the groin, axillae and male genitalia. Lesions of this type tend to persist for weeks after treatment. Constant scratching and the application of irritating proprietary medications may result in extensive eczematization.[3] In fact; non-specific secondary lesions are the most common, including excoriation, eczematous eruptions, and impetigo with the risk of subsequent nephritis. When a pruritic eruption also exists in family members or contacts, scabies is a likely diagnosis. Good hygiene limits the number of lesions but extensive excoriated scabies lesions are not necessarily in homeless people. Crusted scabies may be localized and very misleading. Some patients have involvement of only the scalp, face, finger, and toenail. Scabies occurs in at least 2-4% of patients with HIV infection.[4]
- History of similar illness in the family: Scabies is spread by close personal contact and frequently seen within the context of families, sexual partners, amongst school-age children, and institutional people.[5]
- Intense pruritis, which tends to get worse at night Generalized itching is usually due to sensitization while localized is usually due to burrowing of mite. In infants or small children, pruritus is particularly intense during the night and at naptime. Pruritus may be so severe that the child is persistently irritable and even refuses to eat. The nocturnal pruritus is usually intense and characteristic.[6] Patients scratch so vigorously that they often draw blood. Blooded sheets, pajamas, or underwear are signs that should suggest scabies. The reason for the nocturnal pruritus is not known, although increased mite activity with warmer skin temperatures may be an explanation.[5]
- Documentation of the presence of burrows is hardly required for the diagnosis.

Main agents proposed as topical scabicides Benzyl benzoate 10% and 25% lotions, Pyrethrins: permethrin 5% cream, Lindane :1% lotion or cream Malathion: 0-5% lotions, Sulfiram :25% solution, Sulphur: 2-10%.[4] Permethrin 5% cream is safe and effective even in infants less than 1 month of age and appears to be the treatment of choice.[7] Large scale management: Ivermectin is used as drug of choice in epidemics.[2]

The Canadian Paediatric Society and the Centers for Disease Control and Prevention recommend permethrin cream (5%) as first-line therapy for patients older than 2 months of age. Sulfur (7%) is a safe alternative for young infants. Lindane cream or lotion should be used with caution in children younger than 2 years of age. Topical Permethrin appears to be the most effective treatment of scabies.[8]

There are hardly any differences in efficacy between the available treatments for scabies. Single administrations of permethrin 5% and systemic Ivermectin are comparably effective. There are differences in the frequency and ease of application as well as when eradicating scabies in populations with a high prevalence.[9]

Reasons for failure of treatment of scabies

Inadequate application of the chosen medicament, medicament too dilute for effectiveness, re-infestation from untreated household contacts from another unsuspected source.[10]

METHODS

The study was conducted under Department of Pediatrics, Seth GS Medical College, Mumbai. Pediatric patients visiting Skin and Pediatric Outpatients were enrolled. The duration was 8 months (August 2004 to March 2005). Sample size was 264 cases of scabies. It is a prospective single center study.

Inclusion criteria

Patients <12 years of age including newborns, Symptomatology- history of contact with scabies, history of itch and rash, Lesions on skin confirmed with dermatologists and resistant cases already diagnosed.

Exclusion criteria

Age above 12 years, Lesions which are not of scabies confirmed with skin physician, Patient's already got cured with adequate treatment and patients' unable / do not come during follow up. Patients for each drug was selected as randomly of similar age and sex; pattern or rash, complicated lesions.

All of the patient's parents were explained about the methodology for drug application, possible adverse response. All patients were called for follow up after 7, 15 and 30 days. During follow up, response to treatment in form of absence of new lesions; a decrease of itching and /or absence of itching were noted. Any adverse effect during treatment, if present noted. Patients who were not followed up during the period were not mentioned in final data.

Instruction for treatment

Parents were explained that scabies is easily curable if instructions are carefully followed: Start with a warm bath. Approximately 30 gm (one ounce) of a topical

preparation is required to cover the trunk and extremities of an average adult; proportionately less is required for children and infants. Treat the entire trunk and extremities (not just obvious lesions). The ointment should be thoroughly rubbed into (painted over) all the skin of your body and limbs.

Permethrin should be applied to the entire body (including the head in infants). Treatment is best done at night before going to bed. Wear your usual night-clothes and repeat next night. The under- clothing and sheets / blankets should be changed on the next day. Do not have another bath until 24 hours after the last treatment. You may itch for a few days. Everyone in your house should be treated as above at the same time.

- Concomitant topical preparations not to use topical preparations other than those prescribed for scabies.
- Treat the household: all members of the personal household and sexual contacts should be treated at the same time.
- Treatment of fomites: intimate articles of clothing (underwear, pajamas, sheets, and pillowcases) should be washed by machine or automatically dried (hot cycle in each) and ironed.
- Supportive measures: oral anti-pruritic agents, antihistamines were used. Systemic antibiotics were used for complicated scabies.[11] Ivermectin was used in the dose of 200 micrograms per kilogram per dose. A second application of treatment after 7 days is recommended for all anti-scabies agents (Roberts 1998).

Data collection

Socio-demographic and clinical details were collected by using a pre-tested and validated questionnaire. Collected data was arranged in tabulated form using Microsoft excel.

Statistical Analysis

A computer based statistical analysis (SPSS) was done and chi-square test, whenever indicated, was used. Four cardinal features (as follows) in clinical diagnosis of scabies were considered. Other differential diagnoses like atopic dermatitis, contact dermatitis, lichen planus, dermatitis herpetiformis, bullous pemphigoid, neurodermatitis, prurigo nodularis may mimic the lesions of nodular scabies, were excluded by relevant clinical examination and history.[12] In this study, topical Permethrin and Oral Ivermectin were used for treatment and compared for effectiveness.

RESULTS

The socio-demographic characteristics of the patients were as shown in Table 1. Common age group was 6 to 12 years of age. Male: Female ratio was 1.3:1. It was more common in joint families with overcrowding, commonest with 5 family members followed by 4 family members. Eighty seven percent families were having single room, highlighting its association with over-crowding.

Table 1: Distribution of the cases by various sociodemographic variables.

(n=264)	No. (%)
Age in years	
< 2	60 (22.7)
2 to 5	87 (33.0)
6 to 12	117 (44.3)
Gender	
Female	114 (43.2)
Male	150 (56.8)
Literacy level of parents	
Primary	1 (0.4)
Up to 10 std	87 (33.0)
>10 Std	176 (66.7)
Economic status (Rupees) Per capita Income of parent per month	
<600	164 (62.1)
600 to 1200	92 (34.8)
>1200	8 (3.0)
Total no. of family members	
3	7 (2.7)
4	67 (25.4)
5	109 (41.3)
6	54 (20.5)
7	20 (7.6)
8	3 (1.1)
9	1 (0.4)
10	3 (1.1)
No. of rooms	
1	231 (87.5)
2	33 (12.5)
Over Crowding	
Absent	26 (9.8)
Present	238 (90.2)

Commonest duration of symptoms while presentation was less than 1 month in 231 (87.5%) and only 33 (12.5%) have more than 1 month. Itching was noted in 202 (76.5%) and absent in 62 (23.5%).

Type of Rash – Vesicular, Papular, excoriation and Secondary infected found to in cases 262 (99.2%), 65 (24.6 %), 166 (62.9%) and 41 (15.15%) respectively. Burrows noted in 5 (1.9%) (Table 2). Common pattern of distribution noted as inter-digital space; Upper Limb, Lower Limb; in descending order: followed by palms–soles; Face–Scalp; Genitals. The association of age in years and distribution of rash (P <0.0001) and age in years with type of rash (P <0.0001) was significant (Table 2) and (Table 3).

Table 2: Age and type of rash.

Type of rash	Age (years) n (%)			Total
	<2 (n=60)	2 to 5 (n=87)	6 to 12 (n=117)	
Vesicular	60 (100.0)	85 (97.7)	117 (100.0)	262 (99.2)
Excoriation	32 (53.3)	67 (77.0)	67 (57.3)	166 (62.9)
Papular	31 (51.7)	29 (33.3)	5 (4.3)	65 (24.6)
Scalling	2 (3.3)	6 (6.9)	5 (4.3)	13 (4.9)
Nodular	1 (1.7)	2 (2.3)	5 (4.3)	8 (3.0)
Burrow	1 (1.7)	1 (1.1)	3 (2.6)	5 (1.9)
Secondary Infection	10 (16.7)	17 (19.5)	14 (12.0)	41 (15.5)

Table 3: Age and distribution of rash.

Distribution of rash	Age (years) n = 264			Total
	<2 (n=60)	2 to 5 (n=87)	6 to 12 (n=117)	
Upper Limb	8 (13.3)	50 (57.5)	97 (82.9)	155 (58.7)
Lower Limb	10 (16.7)	41 (47.1)	88 (75.2)	139 (52.7)
Generalized	47 (78.3)	35 (40.2)	12 (10.3)	94 (35.6)
Trunk	7 (11.7)	27 (31.0)	15 (12.8)	49 (18.6)
Palms/Soles	31 (51.7)	5 (5.7)	2 (1.7)	38 (14.4)
Face/Scalps	29 (48.3)	5 (5.7)	1 (0.9)	35 (13.3)
Genitals	1 (1.7)	4 (4.6)	11 (9.4)	16 (6.1)
Interdigital Spaces	12 (20.0)	56 (64.4)	110 (94.4)	178 (67.4)

Duration for response to treatment required <7 day, 8-15 day, 15-30 days and >30 days in 35 (13.25%), 159 (60.23%), 54 (20.45%) and 16 (6.06%) respectively.

The average duration of response in non-complicated lesions was less than 15 day whereas in complicated lesions the duration was more than 15 days. (i.e. 30 % in less than 15 days; 15-30 days in 52.5% and more than 30 days in and 17.5%).

The duration of response, in both the drugs, Ivermectin and Permethrin was 8-15 days and the difference was statistically not significant (p=0.368).

DISCUSSION

Scabies is commonest in very young children and young adolescent, and its incidence declines with age. In this study, the commonest age group was 6 to 12 years. It was common in parents where literacy level was better i. e. >10th standard (Table 1).

Sites of involvement

Sites in series of Taplin et al Webs and Hands-86%, Upper Limb-70%, lower Limb-43%, Trunk-79%, Groin and Genitals-67%, Face and Scalp-18%.[13]

The present study has also found that there was significant involvement of palms, soles, face, and scalp in children less than 2 years of age which are quite unusual sites in older children and adults.

Lesions/Type of rash

In this Study vesicles 262 (99.2%); excoriated lesions 166 (62.91%); papules. 65(24.6%) were the most common lesions of scabies. Burrows were seen in only 1.9% cases, while Wakhlu I has mentioned that papules were commonest 89.9% and Vesiclo-papular lesions were common than other lesions.[14] He found excoriation in 77.8% study group, burrows in 6.3%. Taplin et al mentioned in his study that burrows were noted only in 0.35% of study groups. The difference is because scabies in warm humid climates is characterized by a paucity of barrows and more generalized distribution, and is frequently associated with complication of bacterial infection.[13] In the majority of cases lesions occur in a combination of various types of rash. Secondary infections: Pustules were present in 77.35% patients of all complication. Whereas pustules were found in 42.9% of study group by I. Wakhlu whereas Taplin et al noted pustules in 59.8% of the study group.[13,14] We also found that two patients (0.8%) had Norwegian scabies and both patients were immunocompromised (HIV Positive) (Table 4). In our study, we have included patients as blind trial groups and included from different age and sex as a random selection. Both drugs (Topical Permethrin and Oral Ivermectin) were tried in different types of rash. The difference of response may be due to the difference in a number of patients selected. We have large study population and included the duration of complicated lesions in both drug groups. But this difference was not statistically significant. As mentioned in by Gopalkrishnan UV permethrin is superior in response.[15]

There was no significant difference in response for the duration, in comparative groups. It means Ivermectin is a better alternative for permethrin for easy oral administration, efficacy, adverse effects and cost. Other studies by Drs Fred Baker et al, Gopalkrishnan UV, mentioned similar benefits of Ivermectin.[15] Ivermectin also has additional benefits that it can be used in epidemics.[2]

Table 4: Mean duration of response.

Modality of Treatment	Oral Ivermectin		Topical Permethrin	
Duration of response in days	**In present series**	**Gopalkrishnan UV et al**	**In present series**	**Gopalkrishnan UV et al**
15 days	81.70%	70%	70%	97%
30 days	96.70%	95%	92.6%	99%

Complications

In the present study, scabies with complications was seen in 53 (21.18%) patients. Common complications were secondary infection (impetigo / pustules) 77.35% of all complications. Others studies noted it was to be in 42.9% by Wakhlu I et al 59.8 (<5 years) Taplin et al.[13,14] Other complications which are rarely noted as - Norwegian scabies-(0.8%); lymphadenopathy (0.8%). Complicated lesions require more duration of treatment for resolution of lesions. In the present study, the complicated lesions-30% patients were cured in 15 days; 52.5% patients were cured in 15-30 days and for 17.5%. Patients have cured in more than 30 days. It is definitely significant as compared to non-complicated lesions i.e. 73.49% of patients responded among duration less than 15 days in non complicated lesions. We also found that in complicated lesions Ivermectin was found to be more effective. It also has additional cost benefit factor. It is a better alternative to locally applicable permethrin in complicated scabies.[16]

CONCLUSION

Scabies was commonly seen in children below 6 years of age, predisposing factors are overcrowding and poor hygiene. It was common in poor economic groups than average and good economic group. The itching was found to be a main presenting complaint (76.5%) and predominantly nocturnal in nature. The effectiveness of permethrin and oral Ivermectin was not significantly different in form of complete cure. Ivermectin has additional benefits of use as easy to administer orally and low cost as compared to Permethrin.

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