A Comparative Study between 10 Per Cent Sulfur Ointment and 0.3 Per Cent Gamma Benzene Hexachloride Gel in the Treatment of Scabies in Children

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Abstract

Background : Scabies is a common contagious skin disease in children. Treatment of scabies in infants and children is the subject of worldwide concern because of risk and benefit of the variety of scabicides.

Objective : To compare the efficacy of 10 per cent sulfur ointment and 0.3 per cent gamma benzene hexachloride gel for the treatment of scabies in children.

Method : A randomized investigator blind study was conducted to compare the efficacy of 10 per cent sulfur ointment and 0.3 per cent gamma benzene hexachloride (GBH) for the treatment of scabies in children at Queen Sirikit National Institute of Child Health from December 1999 to May 2000. Diagnosis was made by the clinical signs of excoriated papules in the classic distribution with nocturnal pruritus and family history of similar symptoms. Diagnosis for all patients was confirmed by positive skin scrapings for eggs, larva, mites or fecal pellets by light microscopy. Patients were followed-up at intervals of 2 and 4 weeks.

Results : One hundred children with an age range from 6 months to 13 years were randomized into 2 groups, 10 per cent sulfur group (50 cases) and 0.3 per cent GBH (50 cases). Age, sex, history of contact cases and clinical manifestations were not statistically different between the two groups. After 4 weeks of treatment, there were no statistical differences between the two groups in patients assessed cured (92% *vs* 94%), clinical cure (92% *vs* 91%) and parasitic cure (83% *vs* 84%). The adverse effect of foul odor in the sulfur group was more common than in the GBH group ($p < 0.05$).

Conclusion : 10 per cent sulfur ointment is as safe and efficacious as 0.3 per cent GBH for the treatment of scabies in children.

Key word : Sulfur Ointment, Gamma Benzene Hexachloride, Scabies in Children

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Scabies is a common contagious skin disease. It is still a major problem in developing countries including Thailand[1]. Scabies is caused by the mite Sarcoptes scabiei. The transmission is by direct skin to skin contact from an infected individual and occurs most commonly in household contacts. Scabies in infants and young children manifest with generalized pruritic papulovesicular lesions on the face, scalp, trunk, palms and soles. The diagnosis of scabies is made by history, clinical manifestations and confirmed by positive skin scraping for mites or fecal pellets by light microcopy.

Treatment of scabies in infants and children is the subject of worldwide concern because of the risk and benefit of scabicides. The choice of scabicides must be based on effectiveness, patient's age and potential toxicity[2-4]. Various topical scabicides used in children include benzyl benzoate, crotamiton, gamma benzene hexachloride, sulfur in pretolatum, permethrin and ivermectin[5-7].

There have been a few controlled studies documenting which drugs are better than others[8-14]. Sulfur in petrolatum is recommended as safe and inexpensive but few studies have demonstrate its efficacy[15,16]. The aim of this study was to compare the efficacy of 10 per cent sulfur ointment and 0.3 per cent gamma benzene hexachloride gel for the treatment of scabies in Thai children.

MATERIAL AND METHOD

Patients with scabies, older than 6 months of age who attended the Dermatology Unit, Queen Sirikit National Institute of Child Health from December 1999 to May 2000 were included. Patients who lived in orphanages, patients with serious central nervous system illness, malnutrition or immunodeficiency were excluded from the present study. Diagnosis of scabies was made by the clinical presentation of excoriated papules in the classic distribution with nocturnal pruritus and a family history of similar symptoms. Diagnosis was confirmed in all patients by positive skin scrapings for eggs, larva, mites or fecal pellets by light microscopy[17].

The patients were allocated into 2 groups by using a random table. One group was given topical 10 per cent sulfur ointment made by pharmacists of Queen Sirikit National Institute of Child Health. The drugs were applied to the entire body from neck to toe by the parents for 7 consecutive nights. The second group was given 0.3 per cent gamma benzene hexachloride (GBH) gel as a single overnight application from neck to toe by the parents and repeated again a week later.

All contact cases were treated at the same time with 25 per cent benzyl benzoate in adults or 10 per cent sulfur in children. Patients in both groups were given oral antihistamines and oral antibiotics if there was superimposed secondary bacterial infection. General measures about washing all clothes with soap and water and sun drying were instructed by the investigator.

The patients were followed-up at regular intervals of 2 and 4 weeks and were thoroughly examined clinically and given skin scraping.

The patient was considered cured if there was a decrease or absence of itching symptoms. Clinical cure was defined as no new lesions and healing of all the old lesions. Parasitic cure was defined by absence of the parasites by skin scraping.

The statistical analysis was performed by Chi's square test and Fishers'exact test.

RESULTS

A total of 100 patients were studied, of which 50 were in the sulfur group and 50 were in the GBH group. There were no statistically significant difference between both groups in age, sex, duration of rash, severity of itching, family history of contact scabies and the number of lesions (Table 1 and 2).

The results of skin scrapings were not stastistically different in both groups ($p > 0.05$). It was found that eggs, eggshells and feces gave the most common positve scrapings (Table 3).

Table 4 shows the results of therapy 2 and 4 weeks after treatment. By 2 weeks, 89 per cent (33/37) in the sulfur group and 92 per cent (35/38) in the GBH group there was improvement of symptoms by the patients' assessment. By 4 weeks, 92 per cent (33/36) of the sulfur group and 94 per cent (30/32) of the GBH group respectively were cured by patient assessment.

At 2 weeks, the sulfur group had a clinical cure rate of 81 per cent (30/37) and the GBH group 79 per cent (30/38). At 4 weeks, clinical cure rate had increased to 92 per cent (33/36) and 91 per cent (29/32) in the sulfur group and GBH group respectively.

At 2 weeks the sulfur group had a parasitic cure of 73 per cent (27/37) and GBH group 79 per cent

Table 1. Baseline characteristics of the patients.

Clinical parameters	Sulfur group (n = 50)	GBH group (n = 50)	P-value
Mean age (years)	3.4 ± 3.3	3.0 ± 3.1	0.64
Sex (male : female)	32 : 18	28 : 22	0.41
Duration (weeks)	5.19 ± 4.36	4.75 ± 2.65	0.53
Nocturnal pruritus (%)	38	50	1.46
Family history of scabies (%)	64	74	0.28

Table 2. Clinical manifestation of scabies.

Number of active lesions	Sulfur group (n = 50)	GBH group (n = 50)	Total patients
Mild < 50	11	9	20
Moderate 50-100	21	20	41
Severe > 100	18	21	39
Total	50	50	100

p = 0.79

Table 3. Results of skin scraping of scabies.

	Sulfur group (n = 50)	GBH group (n = 50)	Total patients
Adult	10	10	20
Larva	9	8	17
Eggs and eggshell	31	32	63
Feces	40	34	74

p = 0.94

(30/38). At 4 weeks, the parasitic cure had increased in the sulfur group to 83 per cent (30/36) and GBH group to 84 per cent (27/32).

Four weeks after treatment was considered to be the definite point for evaluating the efficacy of treatment. The authors found that there was no statistical difference between the two groups by patient assessed cure (92% *vs* 94%), clinical cure (92% *vs* 91%) and parasitic cure (83% *vs* 84%).

There were no serious side effects in both groups. The authors found that foul odor was more common in the sulfur group than in the GBH group (p = 0.03). The other side effects were erythema and burning which were not statistically different in both groups (Table 5).

DISCUSSION

Scabies is particularly common in low socioeconomic situations, overcrowding and where personal hygiene is poor. Factors to be considered in choosing the drug for treatment are efficacy, cosmetic elegance, safety and cost of drugs[2-6].

Topical scabicides in children are gamma benzene hexachloride (GBH), crotamiton, sulfur, benzyl benzoate, permethrin and ivermectin. One per cent gamma benzene hexachloride or Lorexene® emerged as the standard therapy in 1950 because of its efficacy and cosmetic acceptability. An exposure of at least 6 hours is necessary to achieve a cure rate of 96 per cent[8,18] However, there were many reports of GBH toxicity in children especially central nervous

Table 4. Patients assessed cure, clinical cure and parasitic cure in patients treated with 10 per cent sulfur and 0.3 per cent GBH.

Treatment	No cured/no patients				P-value
	Sulfur group	%	GBH group	%	
Patient cure 2 wk	33/37	89	35/38	92	0.6
Patient cure 4 wk	33/36	92	30/32	94	1.0
Clinical cure 2 wk	30/37	81	30/38	79	0.2
Clinical cure 4 wk	33/36	92	29/32	91	1.0
Parasitic cure 2 wk	27/37	73	30/38	79	0.5
Parasitic cure 4 wk	30/36	83	27/32	84	0.9

Table 5. Side effects of scabicides.

Type of side effect	Sulfur group (n = 50)	GBH group (n = 50)	P-value
Foul odor	10	3	0.03*
Burning	2	6	0.2
Erythema	2	5	0.28

* = statistical significance

system toxicity, convulsion and death[19]. Because of GBH toxicity, Braun in 1950 treated scabies successfully with 0.3 per cent GBH[20]. Nowadays, 1 per cent GBH has been withdrawn from Thailand, only 0.3 per cent GBH is available and the efficacy is the same as 1 per cent GBH.

Crotamiton is an antipruritic agent as well as a scabicide, and has been widely used as a safe alternative scabicide for small children and infants [3,5,12]. The efficacy has a 60 per cent success rate after a single 8 to 12 hour application, is slightly less effective than 1 per cent GBH and not as effective as permethrin. The side effects are contact dermatitis and irritation to denuded skin[14]

Benzyl benzoate (10-20%) is effective, safe and inexpensive. It is recommended by the World Health Organization (WHO) for use as a scabicide and pediculocide in underdeveloped countries. The most common side effects are irritation and strong odor. A comparison study of 20 per cent benzyl benzoate and permethrin showed an efficacy of 20 per cent benzyl benzoate to be as good as permethrin but there were more side effects than permethrin[3,11].

Permethrin is a synthetic pyrethin derived from chrysanthenum plants. The mechanism of the drug is to produce rapid paralysis of the insect's nervous system. It is an effective and safe drug for the treatment of scabies in children and neonates. The advantages are, it is cosmetically elegant and easy to use[3,5,7,9,11-14]. The efficacy of the drug was compared with lindane and permethrin in children aged 2 months to 5 years, after a single dose, permethrin achieved a 90 per cent cure rate in comparison to 60 per cent with crotamiton cream. The toxicity of pyrethrin generally is quite low[14].

Ivermectin is the only oral drug used in the treatment of scabies. The mechanism of action of the drug is that it interrupts gamma amino butyric acid (GABA) induced neurotransmission of many parasites. Ivermectin single dose 100-200 μg/kg body weight was as effective as benzyl benzoate but the drug should not be used in children[13,21]. However, topical ivermectin provides high efficacy, is easy to use and has no side effects[22,23].

Sulfur has been used as a scabicide for centuries, although its use was considered outmoded following the introduction of GBH and crotamiton. Sulfur has been used as a scabicide for infants and children because of its safety and low cost. The adverse effects of sulfur are foul odor, staining and it must be applied nightly at least 3 days[15,16,24].

Treatment failure can be attributed to misdiagnosis, poor application of topical therapy or inadequate treatment of household and sexual contacts who may be acting as a reservoir of infection. It is important

to stress that all household contacts must be treated whether or not they have symptoms(3,6).

In Thailand, available scabicides for use in children are gamma benzene hexachloride (GBH), crotamiton, sulfur and benzyl benzoate. In the present study, a 7-day application of 10 per cent sulfur ointment was as effective as 0.3 per cent GBH gel for patient cure, clinical cure and parasitic cure. Although foul odor was more common following sulfur treatment than GBH, the advantage of sulfur is its cheaper cost compared to GBH treatment so sulfur is considered the drug of choice for Thailand.

In conclusion, 10 per cent sulfur ointment is as safe and efficacious as 0.3 per cent GBH for the treatment of scabies in children.

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REFERENCES

1. Green MS. Epidemiology of scabies. Epidemiol Rev 1989; 11: 126-50.
2. Elgart ML. A risk-benefit assessment of agents used in treatment of scabies. Drug Safety 1996; 14: 386-93.
3. Walker GJA, Johnstone PW. Intervention for treating scabies (Cochrane review) In: The Cochrane Library. Oxford: Update Software 2002: 1-11.
4. Chosidow O. Scabies and pediculosis. Lancet 2000; 355: 819-26.
5. Meinkin TL, Elegart GW. Scabies therapy for the millenium. Pediatr Dermatol 2000; 17: 154-6.
6. Morgan-Glenn PD. Scabies. Pediatr Rev 2001; 22: 322-3.
7. Taplin D, Meinking TL, Porcelain SL, Castillero PM, Chen JA. Permethrin 5 per cent dermal cream : A new treatment for scabies. J Am Acad Dermatol 1986; 15: 995-1001.
8. Taplin D, Rivera A, Walker JG, et al. A comparative trial of three treatment schedules for the eradication of scabies. J Am Acad Dermatol 1983; 9: 550-4.
9. Schultz. MW, Gomez M, Hansen RC, et al. Comparative study of 5 per cent permethrin cream and 1 per cent lindane lotion for the treatment of scabies. Arch Dermatol 1990; 126: 167-70.
10. Amer M, El Bayoumi ME, Rizk MK. Treatment of scabies preliminary report. Int J Dermatol 1981; 20: 289-90.
11. Haustein UF, Hlawa B. Treatment of scabies with permethrin *vs* lindane and benzyl benzoate. Acta DermVenereol 1989; 69: 348-51.
12. Taplin D, Meinking TL, Chen JA, Sanchez R. Comparison of crotamiton 10 per cent cream (Eurax) and permethrin 5 per cent cream (Elimite) for the treatment of scabies in children. Pediatr Dermatol 1990; 7: 67-73.
13. Usha V, Nair TV. A comparative study of oral ivermectin and topical permethrin cream in the treatment of scabies. J Am Acad Dermatol 2000; 42: 236-40.
14. Amer M, EL-Gharib I. Permethrin *vs* crotamiton and lindane in the treatment of scabies. Int J Dermatol 1992; 31: 357-8.
15. Maibach HI, Surber C, Orkin M. Sulfur revisited. J Am Acad Dermatol 1990; 23: 154-5.
16. Lin AN, Rumer RJ, Carter DM. Sulfur revisited. J Am Acad Dermatol 1988; 18: 553-8.
17. Muller G, Jacobs P, Moore N. Scraping for human scabies. Arch Dermatol 1973; 107: 70.
18. Shacter B. Treatment of scabies and pediculosis with lindane preparations: An evaluation. J Am Acad Dermatol 1981; 5: 517-27.
19. Nodgt SP, Chew G. Acute lindane poisoning in three children. J Emerg Med 2000; 18: 51-53.
20. Braun W. Gamma hexachlorocyclohexan als antiscabiosum. Dermatol Wochenschr 1950; 121: 200-6
21. MeinkingTL, Taplin D, Hermida J, Pardo R, Kerdel F. The treatment of scabies with ivermectin. N Engl J Med 1995; 333: 26-30.
22. Victoria J, Trujillo R. Topical ivermectin: A new successful treatment for scabies. Pediatr Dermatol 2001; 18: 63-5.
23. Youssef MY, Sadaka HA, Eissa MM, El-Ariny AF. Topical application of ivermectin for human ectoparasites. AmJ Trop Med Hyg 1995; 53: 652-3.
24. Prukdachatkunakorn C, Damrongsak M, Sinthupuan S. Sulfur for scabies outbreak in orphanages. Pediatr Dermatol 2002; 19: 448-53.

การเปรียบเทียบการใช้ยา 10% ขี้ผึ้งกำมะถันกับ 0.3% แกมมาเบนซีนเฮกซาคลอไรด์ในการรักษาโรคหิดในเด็ก

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ความเป็นมา : หิดเป็นโรคติดต่อทางผิวหนังที่พบบ่อยในเด็ก ยาที่ใช้รักษาโรคหิดในเด็กมีหลายชนิด แต่ละชนิดมีข้อดีและข้อเสียต่างกัน

วัตถุประสงค์ : เพื่อเปรียบเทียบประสิทธิภาพการใช้ยา 10% ขี้ผึ้งกำมะถันกับ 0.3% แกมมาเบนซีนเฮกซาคลอไรด์ในการรักษาโรคหิดในเด็ก

วิธีการศึกษา : ศึกษาผู้ป่วยเด็กจำนวน 100 คน ที่มารับการวินิจฉัยว่าเป็นโรคหิด ณ สถาบันสุขภาพเด็กแห่งชาติมหาราชินี ตั้งแต่เดือนธันวาคม พ.ศ. 2542 – พฤษภาคม พ.ศ. 2543 การวินิจฉัยอาศัยประวัติ การตรวจร่างกายและยืนยันการวินิจฉัยโดยการขูดเชื้อทางผิวหนัง พบตัวอ่อน ไข่ หรืออุจจาระของตัวหิด แบ่งผู้ป่วยเป็น 2 กลุ่ม กลุ่มละ 50 คน โดยผู้วิจัยสุ่มตัวอย่าง กลุ่มที่ 1 ได้รับ10% ยาขี้ผึ้งกำมะถัน ทาตั้งแต่คอถึงเท้า นาน 7 วัน กลุ่มที่ 2 ได้รับยา 0.3% แกมมาเบนซีนเฮกซาคลอไรด์ ทาอาทิตย์เว้นอาทิตย์ รวม 2 ครั้ง ติดตามอาการและขูดเชื้อทุก 2 และ 4 สัปดาห์

ผลการศึกษา : อายุ เพศ ประวัติการสัมผัสหิดในครอบครัวและอาการแสดงทางคลินิกในทั้งสองกลุ่มไม่แตกต่างกัน ผลการรักษา 4 สัปดาห์ พบว่าไม่มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติระหว่างกลุ่มที่ 1 และกลุ่มที่ 2 ในอาการคัน (92% กับ 94%), ผื่นผิวหนัง (92% กับ 91%)และ การขูดเชื้อ (83% กับ 84%) เมื่อเปรียบเทียบผลข้างเคียงการใช้ยาของทั้งสองกลุ่มพบว่า ขี้ผึ้งกำมะถันมีกลิ่นเหม็นมากกว่ายา 0.3% แกมมาเบนซีนเฮกซาคลอไรด์อย่างมีนัยสำคัญทางสถิติ ($p < 0.05$)

สรุป : 10% ขี้ผึ้งกำมะถัน เป็นยาที่ปลอดภัยและมีประสิทธิภาพไม่แตกต่างจาก 0.3% แกมมาเบนซีนเฮซาคลอไรด์ในการรักษาโรคหิดในเด็ก

คำสำคัญ : ขี้ผึ้งกำมะถัน, แกมมาเบนซีนเฮกซาคลอไรด์, การรักษาโรคหิดในเด็ก

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