

10% Potassium hydroxide solution vs. cryotherapy in the treatment of molluscum contagiosum: A case-control study

Farhana Muzaffar, Goona Niaz Ali

Department of Pediatric Dermatology, The Institute of Child Health/The Children's Hospital, Lahore

Abstract *Background* Molluscum contagiosum (MC) is a common viral infection affecting children. A number of chemical and physical modalities are available for its treatment.

Objective To evaluate the efficacy and safety of cryotherapy versus 10% potassium hydroxide (KOH) solution in treating MC.

Patients and methods 40 children with MC were divided into two groups. Cryotherapy (one freeze-thaw cycle) was done in group A (n=20) or 10% potassium hydroxide solution (KOH) was applied (group B, n=20) by the patient or a parent twice daily until 12 weeks. Patients were followed up at baseline, week 2, week 4, week 8, and week 12 for efficacy (defined as clearance of lesions) or side effects.

Results By the end of study, 14 patients in group A (cryotherapy) and 17 patients in group B (KOH) were evaluable. All 14 (100%) patients in cryotherapy group and 16/17 (94.1%) in KOH group showed complete clearance of lesions. 100% patients in group A (cryotherapy) and 88.2% in group B (KOH) developed local side effects. However, these were mild and did not warrant discontinuation of treatment.

Conclusion 10% KOH solution is as effective as cryotherapy for the treatment of MC in children. However, KOH is relatively safe and more patient friendly therapy.

Key words

Molluscum contagiosum, cryotherapy, potassium hydroxide

Introduction

Molluscum contagiosum (MC) is a common viral infection which predominantly affects the juvenile age group. It is caused by *Molluscipox virus*, a DNA virus. Clinically, it is characterized by shiny, pearly papules with central umbilication. They can range from a few to hundreds in number. Spontaneous remission is

said to occur but it takes 6 to 18 months. Although the lesions are asymptomatic in the majority, these may cause cosmetic disfigurement and embarrassment as well as may be a potential source for autoinoculation or transfer to other children. Hence, parents are concerned about the treatment of disease.

Therapeutically, no specific anti-*Molluscipox virus* drug has been developed so far and a number of treatment modalities have been used. These include destruction or topical modalities. Destructive treatment options are curettage, cryotherapy, expression or pricking with a sterile

Address for correspondence

Dr. Farhana Muzaffar,
Associate Professor
Department of Pediatric Dermatology,
ICH/Children's Hospital, Lahore
E-mail: dr_farhana62@hotmail.com

needle, electrodesiccation, photodynamic therapy, and laser ablation. However, these are not well-tolerated by children because of pain. Topical medical therapy includes salicylic acid, glycolic acid, tretinoin, tazarotene, 5% sodium nitrite co-applied daily with 5% salicylic acid topical preparations, podofilox, liquefied phenol, tretinoin and cantharidin. All these therapies have their own side effects profile.

Potassium hydroxide (KOH) is a strong alkali which has keratolytic properties because of which it is commonly used to prepare smears for the diagnosis of superficial fungal infections and bacterial vaginosis (Whiff test).⁴ It is also used in many personal care products, cuticle solvent and wart remedy. It has also been used successfully in a concentration of 5-10% for the treatment of MC.^{5,6,7} However, scanty local data are available on the subject. KOH is easily available in every dermatology department and relatively much cheap treatment option. The present case-control study was undertaken to compare the efficacy and safety of 10% KOH solution with cryotherapy.

Patients and methods

This case-control study was conducted in the Pediatric Dermatology Department, The Institute of Child Health/The Children's Hospital, Lahore from August 2009 to November, 2009. Forty children aged 4-16 years, diagnosed as molluscum contagiosum on clinical grounds were enrolled in the study. Written informed consent was obtained from the parents of all children. Inclusion criteria used were: number of lesions 5-100, no treatment during last four weeks and willingness to participate in the study. Patients with known immunodeficiency, facial lesions only and cold hypersensitivity were excluded. The following information was recorded: age, sex, site of lesions, previous

treatments. Patients were randomized into 2 groups, each of 20 patients. Group A was treated with cryotherapy and group B was treated with 10% potassium hydroxide (KOH) solution.

In group A, lesions were treated with a single 15-second freeze-thaw cycle of liquid nitrogen. For patients in group B, the parents were advised to apply the 10% KOH solution to each lesion twice daily with a cotton-tipped applicator until the lesions showed signs of inflammation. Treatment in either group was to be discontinued if inflammation occurred. The same observer carried out the assessment of therapeutic response at baseline and then at week 2, 4, 8 and 12. The end point of the study was complete clearance of lesions. Patients were also inquired and examined for any local side effect e.g. erythema, itching, burning, pain, erosion, crusting, scarring etc.

The children who achieved complete clinical clearance before the end of the study were re-evaluated 1 month after clearance, and those who developed postinflammatory pigmentary change were followed up for an additional 3 months. At the end of study, patients or their parents were also requested to comment about preferred treatment option amongst cryotherapy or KOH.

Results

Out of 20 patients in group A (treated with cryotherapy), 14 completed the study whereas in group B (treated with 10% KOH), 17 completed the study. The rest were lost to follow up due to non-treatment reasons. The age of the patients ranged from 4 to 16 years; however, the majority was under 12 years. The relevant demographic and clinical data are shown in **Table 1**. Duration of disease varied from 3 weeks to 6 months (26 weeks). 83% of patients had MC since less than

Table 1 Demographic and clinical data in two treatment groups.

	Group A (Cryotherapy) N=14	Group B (10% KOH) N=17
Age (years)		
Range	4-16	4-14
Mean	6±3.4	6±4.1
Male:female	8:6	9:8
Duration of lesions (weeks)	3-26	3-24
Sites of involvement		
Face	6	5
Trunk	10	13
Upper limbs, hands	8	12
Lower limbs, feet	4	6
No. of lesions		
Range	6-70	6-70
Mean	22.3±12.4	25±10.5
Family history of MC	5	3
History of atopy	2	2

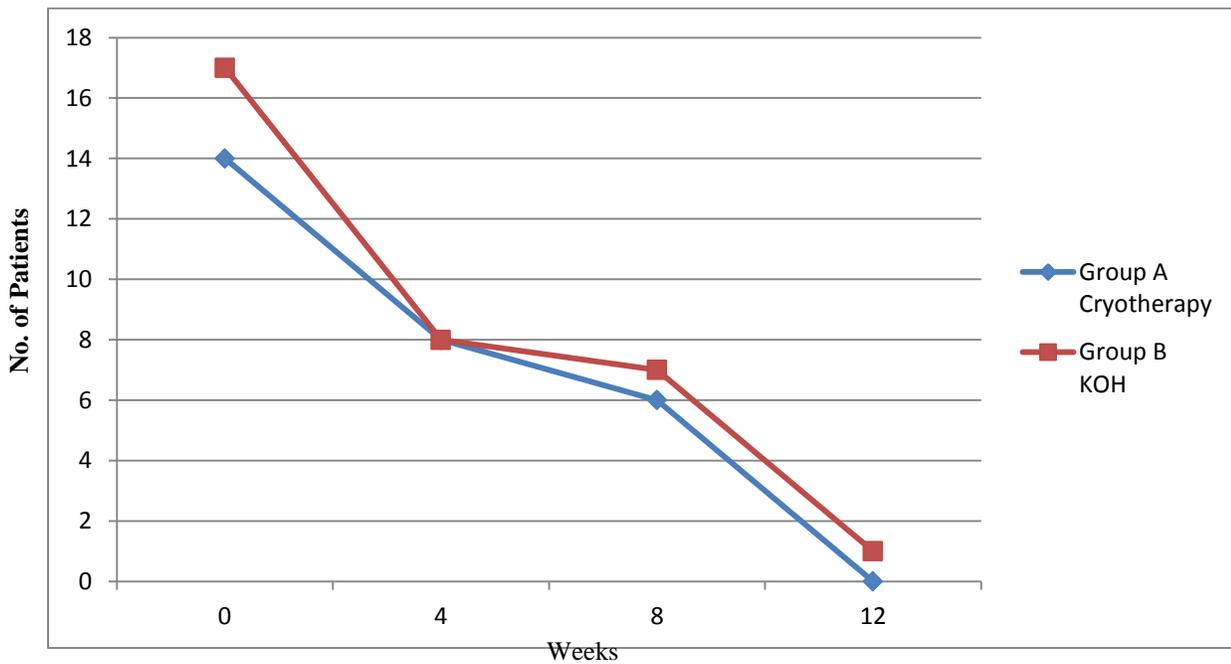


Figure 1 Treatment response in two treatment groups.

4 months. Other disease characteristics like family history of MC, history of atopy, number of lesions and their distribution are shown in **Table 1**. History of similar complaints in the family was noted in 8 cases. Four cases had history of atopy. The number of lesions varied from 6 to 96. Out of total 31 patients, 11 (35.1%) had lesions on the face (but not treated),

23 (74.2%) on trunk, 20 (64.5%) on upper limbs and 10 (32.3%) patients on lower limbs.

The time taken for complete clearance of the lesions is shown in **Figure 1**. In group A, complete clearance of lesions was noticed in all 14 (100%) patients with cryotherapy, of which 8 patients were cleared of lesions by 4 weeks of treatment; and the other 6 by 8 weeks of

treatment. In group B, complete clearance of lesions was observed in 16 (94.1%) of 17 patients with 10% KOH. Amongst these, 8 patients were cleared of lesions by 4 weeks of treatment, 7 by 8 weeks of treatment and 1 by 12 week. Response to treatment was seen irrespective of duration of disease and site of involvement ($p>0.05$).

All patients (100%) in group A complained of pain. 12 (85.7%) also developed blisters. Transient postinflammatory hypopigmentation was seen in 3 (21.5 %) patients which resolved by the end of study i.e. 12 weeks. Fifteen out of 17 (88.2%) patients on KOH (group B), complained of stinging sensation immediately after application of the KOH solution, however, this irritation gradually reduced after repeated application. No significant difference in side effects was seen in individuals with atopy ($p>0.05$). No patient discontinued treatment because of side effects.

Almost all patients opined to choose KOH treatment rather cryotherapy, if given a choice.

Discussion

The majority of patients seek treatment for MC because of its negative impact on quality of life. An ideal treatment for MC should be effective, safe, easy to comply, easily available and cheap especially in resource-poor communities like ours. All the treatment modalities based on physical destruction e.g. cryotherapy, electrodesiccation, curettage and laser are painful and difficult to comply with especially for children. Similarly, other topical treatments also cause cutaneous irritation, postinflammatory pigmentation etc. So the quest for a better treatment continues.

KOH is a strong alkali with keratolytic activity and it is routinely used in dermatological practice for diagnostic purposes. It can also cause an irritant reaction in the skin, varying with the concentration, body region to which it is applied, and individual susceptibility. It is cheap and easily available in all dermatology units. Many preliminary studies show promising results with KOH in the treatment of MC in children.^{5,6,7}

Our results also endorse the previous data. In our study, all 14 (100%) children showed complete clearance with cryotherapy whereas 16 of 17 (94.1%) children were completely cleared with KOH treatment ($p>0.05$). Although there was no statistically significant difference between two groups in terms of efficacy, KOH therapy was more safe and patient friendly as compared to cryotherapy. All patients complained of pain during and after the procedure. 85.7% developed blisters and 21.5% hypopigmentation albeit transient. 10% KOH caused stinging sensation in 88.2% of patients which gradually disappeared. Hence, cryotherapy had more side effects rendering it less tolerable. All parents reported that KOH solution was easy to use and they preferred to treat their children at home instead of subjecting their child to a more aggressive physical modality of treatment in the hospital setting.

Romiti *et al.*⁵ suggested 10% KOH solution as a safe, effective and inexpensive, noninvasive treatment of MC. The only limitation of KOH treatment was local side effects which included a stinging sensation around the site of application, and hyper- or hypopigmentation. For this reason they tried 5% KOH solution and consequently had less irritation.

The exact mechanism of action of KOH is not known but the speculated one is as follows.

Histopathological features of MC show lobulated, endophytic hyperplasia of keratinocytes which contain a very large intracytoplasmic inclusion, and there is usually scanty dermal infiltrate. Certain viruses e.g. rubeola and HIV, have an ability to evade or suppress the host's immune response which facilitates their spread in body or a persistent infection.^{5,6} It has been suggested that, molluscipox virus may have a similar ability to suppress the host's immune response, especially T cells, which play a central role in antiviral defense; so that there is usually no dermal infiltrate around intact MC lesions. Topical application of KOH, digests keratin and like other physical or chemical therapies, induces inflammation; this in turn stimulates innate and cell-mediated immune response that inhibits MC-induced immunosuppression and eliminates the infection of MC.

There are some limitations to this study. First, our study design did not take spontaneous clearing of MC lesions into consideration. Secondly, the number of clinical cases was relatively small. Considering its irritant potential, it will be worthwhile to compare 5% KOH vs. 10% KOH to find an optimum concentration of KOH which would be more tolerable without jeopardizing its efficacy. Histopathological studies can be combined to establish the mechanism of cure with KOH.

In conclusion, 10% KOH solution is as effective as cryotherapy for the treatment of MC. However, it is relatively less traumatic, less painful, easier to use at home and cost-effective, which make it a better option in the treatment of MC.

Acknowledgement

The author owes special thanks to Ms. Mehreen for her assistance in the statistical analysis of the study.

References

1. Dohil MA, Lin P, Lee J *et al.* The epidemiology of molluscum contagiosum in children. *J Am Acad Dermatol* 2006; **54**: 47-54.
2. Scheinfeld NS. Molluscum contagiosum. *Skinmed* 2008; **7**: 89-92.
3. Lee R, Schwartz RA. Pediatric molluscum contagiosum: reflections on the last challenging poxvirus infection, Part 2. *Cutis* 2010; **86**: 287-92.
4. What is Potassium Hydroxide used for. Available from: http://wiki.answers.com/Q/What_is_Potassium_Hydroxide_used_for Accessed on 15.02.2011.
5. Romiti R, Ribeiro AP, Grinblat BM *et al.* Treatment of molluscum contagiosum with potassium hydroxide: a clinical approach in 35 children. *Pediatr Dermatol* 1999; **16**: 228-31.
6. Romiti R, Ribeiro AP, Romiti N. Evaluation of the effectiveness of 5% potassium hydroxide for the treatment of molluscum contagiosum. *Pediatr Dermatol* 2000; **17**: 495.
7. Metkar A, Pande S, Khopkar U. An open, nonrandomized, comparative study of imiquimod 5% cream versus 10% potassium hydroxide solution in the treatment of molluscum contagiosum. *Indian J Dermatol Venereol Leprol* 2008; **74**: 614-8.