

Treatment of Molluscum Contagiosum with 10% Potassium Hydroxide Solution

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Abstract

Background: To determine the efficacy and safety of topical 10% potassium hydroxide solution in the treatment of molluscum contagiosum (MC).

Methods: An open, prospective, non-randomized study of one year duration was conducted using 10% KOH solution to treat MC. Twenty eight patients completed the study. A total of seven appointments were planned; one baseline and six follow-up visits. 10% KOH was applied to molluscum lesions daily till the lesions resolved or till 3 months had elapsed.

Results: Twenty eight patients, among which 22 were children, completed the study. The mean age of patients was 10.6 years. The total lesion count in the patients varied from 5 - 94, with the mean lesion count of 22.14 SD \pm 18.32. There was complete resolution of lesions in 20 (71.4%) of patients, 4 (14.3) had a near complete, 2 (7.1%) had partial and 2 (7.1%) patients had no improvement. 82% patients tolerated the treatment well with no side effects.

Conclusion: 10% KOH solution is an effective and well tolerated treatment for MC. It is less painful and cost-effective as compared to many well-established therapeutic modalities. It has the advantage of ease of application at home making it an acceptable and feasible option for the treatment of MC.

Key Words: Molluscum contagiosum, Potassium hydroxide, Efficacy.

Introduction

Molluscum Contagiosum (MC) is among the most common viral skin infections. Common treatment options include destructive therapy, topical therapy and immunotherapy. Destructive therapy is poorly tolerated because of pain on application. In addition, these therapies are expensive and have inconvenience of application in hospital setting. MC is among the most common viral skin infections, occurring in approx 2-8% of children.^{1,2} It is caused by a member

of the Poxvirus family, the genus Molluscipox virus. The virus is transmitted by close physical contact, autoinoculation, and fomites. MC presents as asymptomatic, discrete, smooth, flesh-coloured, dome-shaped papules with central umbilication.¹ The lesions can be numerous and recurrent. The infection usually resolves within months in people without immune deficiency, but treatment may be preferred for social and cosmetic reasons or to avoid spreading the infection.³ Treatment options include destructive therapy, topical therapy, immunotherapy and oral therapy.¹ Destructive treatment modalities include curettage, cryotherapy, expression or pricking with a sterile needle, electrodesiccation, photodynamic therapy, and laser ablation.^{4,5} Among topical therapies different chemical agents, like cantharidin,⁶ povidone-iodine,⁷ potassium hydroxide,⁸ tretinoin,⁹ and imiquimod¹⁰ have been used with variable success. Immune modulating agents include interferon alpha, imiquimod and cimetidine.¹ Destructive therapy is poorly tolerated in children because of pain on application. In addition, these therapies are expensive and have inconvenience of application in hospital setting.

Patients and Methods

An open, prospective, non-randomized study of one year duration was conducted at Dermatology Department of Combined Military Hospital, Lahore using 10% KOH solution to treat MC. Sample size of 28 cases was estimated using 95% confidence interval and 14% deviation acceptance with a percentage of complete response in 85% in the previous studies. A total of seven appointments were planned; one baseline and six follow-up visits. During the baseline visit thorough history and dermatological examination was carried out. Cases were studied for number of lesions, their site, any eczematous change, presence of pain or pruritus. First application of 10% KOH solution was performed with the patient or parent closely observing the procedure and was advised to apply the drug in a similar way at home

twice daily. Six follow-up visits were planned at the end of week 1, 2, 4, 6, 8 and 12. The medication was to be applied till the lesions resolved or till 3 months had elapsed. KOH applied on the skin initiates an inflammatory response leading to lesion clearance. The number of lesions, their site, crusting, erythema, erosions, pain, pruritus, improvement of lesion were documented. The clinical response to treatment was assessed using the methods devised by Marsalet al and Capriotti et al.^{11,12} The patients were divided into 4 groups on the basis of improvement of MC lesions. Group 4= complete cure; Group 3= near complete response (with less than 5 MC lesions all over the body); Group 2= partial response (less than 60% of the lesions since the baseline visit and more/equal than 5 lesions); Group 1= poor response (>60% of the lesions since baseline visit). Patients whose lesions cleared up before 3 months were documented and were discharged from the study having attained "complete cure". At the end of 3 months final assessment was made.

Results

Twenty eight patients, 22 children and 6 adults completed the study. Age of patients ranged from 2 years to 36 years and the mean age was 10.6 years ± 8.96. Eleven (39.3%) patients were female and 17 (60.7%) were male. The duration of MC lesions varied from 2 - 39 weeks, with a mean duration of 8.6 weeks (Table 1). Twelve (42.9%) of the patients gave positive family history in a first degree relative. The total lesion count in the patients varied from 5 - 94, with the mean lesion count of 22.14 SD +_ 18.32. 32.2% patients had been treated previously with other therapeutic modality (17.9% with cryotherapy and 14.3% with phenolization) but had unsatisfactory response. Successful 10% KOH solution application to MC initiates an inflammatory response consisting of erythema, crusting, erosion and usually associated with a mild stinging or pruritus (Figure 1). There was complete resolution of lesions in 20 (71.4%) of patients, 4 (14.3%) had a near complete, 2 (7.1%) had partial and 2 (7.1%) patients had no improvement (Table 2). Complete cure was seen in majority of patients in age group 2 to 20 years (Table 3; Figure 1-4). Duration of disease could prolong the response time for the patients as it has strong effect on treatment and improvement in patients with a significant value (Table 4). There was no significant effect noted for other demographical factors like age, gender and site of disease. An equal distribution was observed on evaluation on different sites, but most commonly the

lesions were present on multiple sites; 16(57%) of cases (

Table 1: Distribution of the characteristics in study population (n=28)

		Mean Percentages
Age		10.60±8.96
Gender	Male	11(39.3%)
	Female	17(60.7%)
Family history	Yes	12(42.9%)
	No	16(57.1%)
Duration of disease		8.57±9.36
Site of disease	Head & neck	5(17.9%)
	Trunk	3(10.7%)
	Upper limb	1(3.6%)
	Lower limb	2(7.1%)
	Genitalia	1(3.6%)
	Multiple sites	16(57.1%)

Table 2: Percentage improvement in the disease grades of the patients

Response	No	Percentage
1. Poor Response	2	7.1
2. Partial Response	2	7.1
3. Near Complete Response	4	14.4
4. Complete Cure	20	71.4

Table 3: Impact of demographical variables on the study outcome

		Improvement grades				Total	P-value
		Group 1: Poor Response	Group 2: Partial Response	Group 3: Near Complete Response	Group 4: Complete Cure		
Gender	Female	0	0	1	10	11	0.273
		.0%	.0%	25.0%	50.0%	39.3%	
Male	2	2	3	10	17	60.7%	
		100.0%	100.0%	75.0%	50.0%		60.7%
Age group	2-20 year	1	2	2	17	22	0.267
			50.0%	100.0%	50.0%	85.0%	
	>20 year	1	0	2	3	6	
			50.0%	.0%	50.0%	15.0%	

Table 5). Majority of the patients (82%) tolerated the treatment well with no side effects. 2 (7.1%) developed contact dermatitis after application of KOH; 3 (10.7%) patients developed secondary bacterial infection requiring oral antibiotic therapy. Four patients developed transient post-inflammatory hypopigmentation once the lesions cleared; this resolved within a month of stopping KOH application. The hypopigmentation settled after the completion of study duration with no further treatment.

Table 4: Stratification of the improvement with respect to family history and duration of disease

		Improvement Grades				Total	P-value
		Group 1: Poor Response	Group 2: Partial Response	Group 3: Near Complete Response	Group 4: Complete Cure		
Family History	Yes	1 50.0%	1 50.0%	1 25.0%	9 45.0%	12 42.9%	0.887
	No	1 50.0%	1 50.0%	3 55.0%	11 75.0%	16 57.1%	
Duration of disease	2-12 year	1 50.0%	0 .0%	3 75.0%	19 95.0%	23 82.1%	0.000
	13-23 year	0 .0%	2 100.0%	0 .0%	0 .0%	2 7.1%	
	>23 year	1 50.0%	0 .0%	1 25.0%	1 5.0%	3 10.7%	

Table 5: Improvement according to body site

Site of lesion	Improvement Grades				Total	p-value
	Group 1: Poor Response	Group 2: Partial Response	Group 3: Near Complete Response	Group 4: Complete Cure		
Head & Neck	0 .0%	0 .0%	0 .0%	5 25.0%	5 17.9%	0.667
	Trunk	0 .0%	0 .0%	0 .0%	3 15.0%	
Upper limb	0 .0%	0 .0%	0 .0%	1 5.0%	1 3.6%	
	Lower	0 .0%	1 50.0%	0 .0%	1 5.0%	
Genitalia	0 .0%	0 .0%	0 .0%	1 5.0%	1 3.6%	
	Multiple sites	2 100.0%	1 50.0%	4 100.0%	9 45.0%	



Fig 1: Signs of inflammation after application of 10% KOH solution



Fig 2: 6 year old boy, baseline



Fig 3 Same patient, after 2 weeks of treatment



Fig 4: Same patient, at 8 weeks of treatment, mostly resolved lesions, 2 healed crusted lesions at the base of the neck and post inflammatory hypopigmentation at few sites

Discussion

MC is a common viral infection that frequently affects children of school going age. It is thought that using community bathing facilities/swimming pools or siblings using the same washing sponges or towels spreads the infection.¹¹ In healthy patients, cutaneous MC is a self-limiting disease that often spontaneously resolves in 6 to 9 months, usually without scarring. Quality of life is a factor to consider when deciding whether or not to treat a paediatric patient as he or she may suffer chastisement from peers at school if the lesions are visible. Not treating paediatric infections also carries the risk of the disease spreading to others, and this consideration may favour the option of treatment over benign neglect.¹³ Conditions like atopic dermatitis may cause widespread development of MC, making it imperative to treat the lesions promptly. Destructive treatment options like curettage, expression or pricking with a sterile needle, electrodesiccation and laser ablation are not well-tolerated by children because of pain and are expensive.

Among drugs that are applied topically imiquimod has been found to be of limited efficacy. In a study spanned over more than 10 yrs in USA it was found that it has been prescribed in only 7% of the patients of MC.¹⁰ KOH has been used in varying strengths; 2.5%, 5%, 10% and 20%. The rationale for using the lower strengths is to minimize its side effects, especially reducing irritant effects on face. The exact mechanism by which KOH clears MC lesions is not clear. It appears that topical application of KOH digests keratin and induces inflammation; this in turn stimulates innate and cell-mediated immune response that inhibits MC-induced immunosuppression and eliminates the infection of MC. Considering the same mechanism of action KOH has been successfully used in warts.¹⁴⁻¹⁶

Short et al, conducted a double blind, randomized, placebo-controlled study comparing 10% KOH solution with a placebo.¹⁷ The end point of their study was the complete clearance of the lesions. They recruited 20 patients (10 in each group), age ranging from 2 - 12 years. They excluded patients with facial lesions. 2 (20%) of the patients complained of severe stinging sensation and developed severe inflammatory response and 2 (20%) reported transient post inflammatory hyperpigmentation. 70% of their patients' lesions were cleared with 10% KOH. Only 20% of the patients in the placebo group cleared the lesions at the end of the study. In our study the majority of the patients (82%) tolerated the drug well.

7% developed contact dermatitis at the site of application but it was easily managed by the use of low potency topical steroids.

In a similar study Handjani et al⁸ compared 10% KOH with cryotherapy, whose efficacy for treating MC is well established. The two groups had 15 patients each. Age varied from 1 – 24 years. 86.6% in the KOH group had complete clearance as compared to 93.3% in the cryotherapy group ($p>0.05$). Post inflammatory hyperpigmentation was noticed more commonly with cryotherapy.

A study on 2 different concentrations of KOH (2.5% and 5%) was conducted.¹⁸ out of the 29 patients recruited in the study 25 completed it; 13 in 2.5% group and 12 in 5% group. 11 (44%) of the patients had lesional clearance at the end of the study. 8 of these patients were in the 5% treatment group and 3 were in the 2.5% KOH group. This difference was statistically significant ($p < 0.047$). There were no statistical differences between the two groups with respect to side-effects ($p = 0.682$). We have used higher percentage 10% KOH solution and achieved better efficacy. We would suggest against using concentration of KOH lesser than 10%. Al Sudany et al¹⁹ have compared 10% KOH with 25% podophyllin solution. They found 64% of their patients were cleared of MC lesions at the end of the study. However, the study duration was 4 weeks. We present the case that had their patients continued the medication the percentage of patients cleared of MC could have increased.

In Pakistan, Qureshi et al have used 10% KOH to treat their MC patients.²⁰ They have compared its efficacy with cryotherapy. The mean age of their patients was 20.53 years. A later incidence peak in young adults is attributable to sexual transmission with lesions more common in genital area.²¹ 80% of their patients achieved clinical clearance of the lesions. They did not find statistically significant difference in the clearance of the lesions amongst the patients receiving two different treatment modalities, indicating 10% KOH has the same efficacy as cryotherapy. The patients in our study were predominantly children, unlike their study based mainly on adults. Therefore, our study sheds light on how 10% KOH solution treats children, the age group mainly affected by MC.

Side effects like severe stinging sensation and hypopigmentation has been reported with 10% KOH use.²² In our study 82% of the patients tolerated the topical medicament well. Only a few patients developed contact dermatitis, secondary infection and hypopigmentation at the site which resolved with the

passage of time. In contrast, destructive therapies like cryotherapy and electrodesiccation are associated with much higher chances of burning, pain and pigmentary changes which can last for a long time.²³⁻²⁵ In our setup where patients come from far flung areas, it is difficult for them to have regular follow up for hospital based treatment. A treatment modality which is economical, acceptable, efficacious and easily tolerated is the need of the hour.

Conclusion

1. 10% KOH solution is an effective treatment for MC.
2. It has the advantage of ease of application at home making it a good and feasible option in the treatment of MC.

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