

EFFICACY OF 5% POTASSIUM HYDROXIDE VERSUS 10% POTASSIUM HYDROXIDE SOLUTION FOR THE TREATMENT OF MOLLUSCUM CONTAGIOSUM AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To compare the efficacy of 5% potassium hydroxide (KOH) and 10% potassium hydroxide (KOH) solution for the treatment of molluscum contagiosum at a tertiary care Hospital.

Study Design: Quasi-experimental study.

Place and Duration of Study: Dermatology Department, Tertiary Care Hospital Karachi, from Oct 2020 to Apr 2021.

Methodology: Sixty patients with molluscum contagiosum who fulfilled the inclusion and exclusion criteria were enrolled in the outpatient department of tertiary care hospital in Karachi. Patients were divided into two groups, A (5% KOH) and B (10% KOH) of 30 patients each. Potassium Hydroxide (KOH) solution was applied at home using the cotton-tipped applicator twice daily. Follow-up of patients was done at 2-weekly intervals for 12 weeks. Efficacy was measured based on the resolution of lesions or improvement from baseline.

Results: Complete response occurred in 23 (76.7%) cases in 10% KOH Group while 6 (20%) in 5% KOH Group, Partial response occurred in 6 (20%) in 10% KOH group while 15 (50%) in 5% KOH group, No response occurred in 1 (3.33%) in 10% KOH group and 9 (30%) in 5% KOH group ($p < 0.001$).

Conclusion: 10% Potassium Hydroxide (KOH) is an efficient modality for the treatment of molluscum contagiosum compared to 5% Potassium Hydroxide (KOH).

Keywords: Efficacy, Molluscum contagiosum, Potassium hydroxide (KOH), Safety.

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INTRODUCTION

Molluscum contagiosum (MC) is a common viral infection caused by the molluscum contagiosum virus (MCV) which predominantly involves the skin and mucous membrane. MCV belongs to the Poxviridae family that is a double-stranded DNA virus.¹ It predominantly affects children, sexually active adults, and immunocompromised individuals. The worldwide incidence of MC infection is estimated to be between 2-8%. In Pakistan, MC constitutes 10.6% of all viral skin diseases.²

Typically, Molluscum contagiosum lesions are rounded, dome-shaped, and white to flesh-coloured, pearly papule. Transmission of MC is by direct contact with infected skin (contact can be sexual, non-sexual or autoinoculation) or by contaminated fomites like towels or sponges, etc.^{3,4} Presentation of the lesions of MC can be single, multiple, or clustered, with sometimes appearance of an erythematous halo.⁵

The diagnosis of Molluscum contagiosum is clinical, primarily based on the distinguishing traits of the

lesions.⁶ Histologic examination of a biopsied lesion can be used to confirm the diagnosis, which shows molluscum bodies (Henderson-Paterson bodies) in the keratinocyte cytoplasm. A clinical tool that can aid in diagnosis is dermoscopy which shows the central area of amorphous material (can be white to yellow), with peripherally arranged vessels (linear or branched). Although lesions of MC may resolve spontaneously after several months, they can be symptomatic and cause psychosocial distress. Therefore, patients may seek treatment for social/aesthetic reasons, and additionally due to worries of spreading disease to others. There are many treatments for MC, including physical elimination and systemic and topical interventions like curettage, cryotherapy, pricking with a sterile needle, photodynamic therapy, Salicylic Acid, Glycolic Acid, Tretinoin, Podophyllin, Antharidin, Trichloroacetic Acid, 5-Fluorouracil, Silver Nitrate, intralesional PPD and Potassium Hydroxide (KOH).⁷⁻¹⁰

Most treatments for Molluscum contagiosum are hospital-based and require multiple visits, having negative aesthetic, psychological and socioeconomic effects. KOH can be a favourable treatment of MC due to fewer hazards and the convenience of self-

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application. Currently, in Pakistan, lower concentrations of KOH are being used in many setups because of fear of burning at the site of application which leads to undertreatment and incomplete recovery. There is a paucity of data on this subject in our local population. Moreover, in Pakistan previous studies are either not comparative or are not blinded. Hence, we compared the response of Mollusca to 5% vs 10% of KOH. The results of this study will help to evaluate which concentration of KOH is more effective for the management of MC in our local population. The management option with better results may be used as the preferred treatment for MC.

METHODOLOGY

This quasi-experimental study was conducted at the department of Dermatology, Tertiary care Hospital, Karachi Pakistan, from October 2020 to April 2021. Approval was sought from the hospital research ethics committee (ERC/2020/Derma/00) before conducting the study. We calculated a sample size of 60 patients, using the World Health Organization sample size calculator with a level of significance: 5%, power of test: 95%, anticipated first population proportion: 0% 11 and anticipated second population proportion: 41.2%.¹¹

Sixty patients who fulfilled the inclusion/exclusion criteria were enrolled through non-probability consecutive sampling technique and randomized into two groups A and B of 30 patients each by lottery method. All patients in Group A were provided with 5% KOH solution and patients in group B, with 10% KOH solution.

Inclusion Criteria: Patients having 2-50 lesions for at least one month belonging to the age group 2-14 years were included.

Excluded Criteria: Patients who have taken any therapy for Molluscum contagiosum lesions in the past month, hypersensitivity to KOH and known immunosuppression were excluded.

Informed written consent was obtained from the parents of the children and demographic details were noted. Complete clinical history along with detailed physical examination was recorded, which included the diagnosis, site, size, and number of lesions. Patients were reviewed at 2 weekly intervals and efficacy was evaluated. Efficacy was categorized as complete response (complete resolution 100%), partial response (clearing of $\geq 50\%$ of the Molluscum contagiosum lesions), no response ($< 50\%$ clearance).

Bottles of 5% KOH and 10% KOH were indistinguishable, and each patient received a bottle (identical) of the solution assigned. The first application of either concentration of KOH solution was performed by the researcher herself using the cotton-tipped applicator and parents/patients were instructed to carefully observe the method and were advised to apply the solution similarly at home twice daily. Efficacy in two weekly follow-up visits was observed by the principal researcher for a total of 12 weeks. Neither the patients, their parents, nor the researcher knows about the patient's assigned group.

Data was entered and analyzed by using the statistical package for the Social Sciences version (SPSS) 24. The quantitative variables were presented as Mean \pm SD. The qualitative variables were presented as frequency and percentage. Chi-square test was applied to compare outcome (complete response, partial response, no response) between both the groups before and after stratification into male/female and duration of disease. The p -value ≤ 0.05 was considered significant.

RESULTS

In this study, 60 patients were included, which were divided into two groups of 30 patients each Group A (5% KOH) and group B (10% KOH) respectively. All 60 patients completed the study. Descriptive statistics of both groups were well-matched (Table-I).

Table-I: Descriptive statistics of both groups.

Variables	Group A (Mean \pm SD)	Group B (Mean \pm SD)
Age Group (Years)	8.77 \pm 2.52	7.47 \pm 3.02
Duration of Disease (months)	2.77 \pm 1.04	3.00 \pm 1.08
Height (cm)	135.10 \pm 10.73	128.20 \pm 9.41
Weight (kg)	26.70 \pm 4.10	28.20 \pm 8.98
BMI (Kg/m ²)	15.10 \pm 1.90	17.60 \pm 5.80
Number of Lesion	14.67 \pm 7.32	16.53 \pm 10.97

The frequency of duration of lesions in group A was, 18 (60%) and 12 (40%) for ≤ 2 months and > 2 months respectively, and in group B it was, 13 (43.3%) and 17 (56.7%) for ≤ 2 months and > 2 months respectively. Stratification concerning the duration of disease in ≤ 2 months and > 2 months showed significant findings with the p -value of < 0.001 and p -value 0.004 respectively (Table-II).

Frequency distribution of gender showed that out of 30 patients in group A, 16 (53.3%) and 14 (46.7%) were male and female respectively. Whereas out of 30 patients in group B, 19 (63.3%) and 11 (36.7%) were male and female respectively. Gender had no effects on

the success of treatment, but the number of lesions does have an impact on treatment outcome. Our study showed that treatment was efficacious in 5 (21.7%) and 13 (76.5%) patients, from groups A and B respectively, who had < 25 lesions. Efficacy is depicted in Table-III which shows that group B (10% KOH) has higher efficacy than group A (5% KOH) with a p -value <0.001 which is significant.

Table-II: Effects on the outcome by duration of disease.

Duration of Disease	Response			p -value
	Group	Complete	Partial	
≤2 month	A	-	9 (60)	<0.001
	B	7 (100)	6 (40)	
>2 monts	A	6 (27.3)	6 (100)	0.004
	B	16 (72.7)	-	

Table-III: Efficacy in the study groups.

Efficacy	5% KOH Group, n (%)	10% KOH Group, n (%)	p -value
	No	No	
Complete response	6 (20)	23 (76.7)	<0.001
Partial response	15 (50)	6 (20)	
No response	9 (30)	1 (3.3)	

In Group A 6 (20%) patients showed complete response out of the 30, with zero response of patients by 4 weeks, 2 patients showed complete response by 8 weeks and 4 by 12 weeks. In Group B complete response was seen in 23 (76.7%) out of a total of 30 patients, of which 17 patients showed complete response by 4 weeks, another 5 by the end of 8 weeks and 1 more by the end of 12 weeks. Figure (A & B) showed the response of 10% KOH after 8 weeks of treatment. There was no severe local or systemic adverse reaction reported in our study. The only finding was slight erythema and tingling sensation immediate post-application of 10% KOH sol while no erythema following application of 5% KOH sol was observed.



Figure: Response of 10% KOH (A) before treatment (B) after 8 weeks of treatment.

DISCUSSION

The requirement for active treatment for Molluscum contagiosum is controversial; however, there is a consensus that it need to be indicated in instances of

widespread disease, associated with complications or aesthetical complaints, parents also seek treatment for their children in worry of the unfolding of lesions to other youngsters. A variety of therapeutic options are available to treat MC but they are mostly hospital-based, induce pain and require repeated sittings based upon their response which leads to a decrease in patient compliance. Thus, leading to the quest to search for an alternative treatment modality that is easily usable at home and pain-free leading to a higher compliance rate.

We compared the efficacy of 5% KOH and 10% KOH solution in the treatment of MC in children and found excellent results of the 10% KOH group as compared to the 5% KOH group with average lesion clearance in 4 weeks. The results of our study are comparable with the study of Rahman *et al*,¹² who determined the efficacy of 10% KOH solution for treating MC. Complete, partial and no response occurred in 23 (76.7%), 6 (20%) and 1 (3.33%) cases in the 10% KOH group respectively in our study, while complete, partial and no response occurred in 20 (71.4%), 2 (7.1%) and 2 (7.1%) cases in their study respectively. They have evaluated the fourth category of near-complete response as well, which showed 4 (14.3%) improvement. The success rate of 10% KOH, reported by different studies ranges between 41.2-92.5%.¹³⁻¹⁶ KOH destroys keratinocytes leading to stimulation of innate and cell-mediated immune response that inhibits MC-induced immunosuppression and eliminates the infection of MC. This response seems to be dose-dependent with higher concentration causing speedy clearance. Faster onset of action subsequently leads to good compliance.

The age ranged from 2 years to 14 years in our study of which mean age was 8.77 (SD ± 2.52) years in 5% KOH group and 7.47 (SD ± 3.02) years in 10% KOH group which is comparable to the study of Farhana Muzaffar¹¹ where the mean age was 4.5 (SD ± 1.99) years in 5% KOH group while 5.3 (SD ± 2.05) years in 10% KOH group, respectively. However, in Qureshi *et al*, study the mean age of patients was 20.53 (SD ± 8.17) years.¹⁷

The mean number of lesions in our Group A and B was 14.67 (SD ± 7.32) and 16.53 (SD ± 10.97) respectively. Our study showed that treatment was efficacious in 05 (21.7%) and 13 (76.5%) patients, from groups A and B respectively, who had <25 lesions. Ucmak *et al*,¹⁸ studies evaluated the effectiveness and outcomes of everyday applications of Potassium Hydroxide (KOH) solution at 2.5% and 5% concentrations, two

times every day in 29 youngsters with Molluscum contagiosum. Patients with fewer lesions remitted better ($p < 0.05$).

In our study female was outnumbered by male with a male ratio female of 1.7:1, which is comparable with the study of Sudany *et al*,¹⁹ which reported a male ratio female of 1.6:1. The same study showed that the total number of lesions per patient was in the range of 1 to 75 with a mean \pm SD of 8.95 ± 9.32 lesions, at the end of the study 64% of patients of 10% KOH group showed complete clearance of lesion and total 181 (82.3%) lesions out of 220 showed complete clearance.

There was no severe local or systemic adverse reaction reported in our study. The only finding was slight erythema immediate post application which infers that 10% KOH is an efficacious and safe modality of treatment similar results can be seen in a study performed by Teixeira *et al*,²⁰ and Heo *et al*.²¹

LIMITATIONS OF THE STUDY

The limitation of our study was a single-centre study, a smaller sample size, and a study based on pediatric population only. Further studies with larger sample sizes are required with the involvement of the adult population so that the results can be generalized.

CONCLUSION

KOH 10% is an efficient modality for the treatment of molluscum contagiosum in the pediatric age group as compared to KOH 5%. It is safe, effective, and easily manageable at home and in a country, with meagre resources like ours it is cost-effective as well.

Conflict of Interest: None.

Authors' Contribution

HSB: Concept and design of the study, data analysis, NA: Drafting and study supervision, final approval of version, final approval of version, AUB: Data analysis, revisiting critically, OF: Data analysis, AWAQ: Data analysis.

REFERENCES

1. Leung AKC, Barankin B, Hon KLE. Molluscum contagiosum: an update. *Recent Pat Inflamm Allergy Drug Discov* 2017; 11(1): 22-31.
2. Fasih S, Arif AB, Younas S. Pattern of skin diseases in Abbas Institute of Medical Sciences, Muzaffarabad. *Pak J Physiol* 2017; 13(4): 26-29.
3. Müller CSL, Laue M, Kremer K, Becker S, Vogt T, Smola S. Molluscum-contagiosum-virus in einer epidermalzyste. *J Dtsch Dermatol Ges* 2018; 16(9): 1144-1146.
4. Arshad AR. Molluscum contagiosum. *J Pioneer Med Sci* 2015; 5(4): 124-128.
5. Olsen JR, Gallacher J, Piguet V, Francis NA. Epidemiology of molluscum contagiosum in children: a systematic review. *Fam Pract* 2014; 31(2): 130-136.

6. Meza-Romero R, Navarrete-Dechent C, Downey C. Molluscum contagiosum: an update and review of new perspectives in aetiology, diagnosis, and treatment. *Clin Cosmet Investig Dermatol* 2019; 12(2): 373-381.
7. Forbat E, Al-Niaimi F, Ali FR. Molluscum contagiosum: review and update on management. *Pediatr Dermatol* 2017; 34(5): 504-515.
8. van der Wouden JC, van der Sande R, Kruithof EJ, Sollie A, van Suijlekom-Smit LW, Koning S. Interventions for cutaneous molluscum contagiosum. *Cochrane Database Syst Rev* 2017; 5(5): CD004767.
9. Viswanath V, Shah RJ, Gada JL. Intralesional 5-fluorouracil: a novel therapy for extensive molluscum contagiosum in an immunocompetent adult. *Ind J Dermatol Venereol Leprol* 2017; 83(2): 265-266.
10. Fatima S, Ejaz A, Anwar A. Comparison of the efficacy of intralesional purified protein derivative (PPD) with cryotherapy in the treatment of cutaneous warts. *Pak Armed Forces Med J* 2019; 69(5): 965-970.
11. Muzaffar F, Faiz F. Comparison of 5% Potassium Hydroxide with 10% Potassium Hydroxide solution in the treatment of molluscum contagiosum: a comparative study. *J Pak Assoc Dermatol* 2014; 24(4): 337-341.
12. Rahman A, Akhtar A, Tabassum S, Ahmad RS. Treatment of molluscum contagiosum with 10% potassium hydroxide solution. *J Rawalpindi Med Coll* 2017; 21(3): 248-252.
13. Can B, Topaloglu F, Kavala M. Treatment of pediatric molluscum contagiosum with 10% Potassium Hydroxide solution. *J Dermatolog Treat* 2014; 25(3): 246-248.
14. Romiti R, Ribe iro AP, Grinblat BM. Treatment of molluscum contagiosum with potassium hydroxide: a clinical approach in 35 children. *Pediatr Dermatol* 1999; 16(3): 228-230.
15. Short KA, Fuller C, Higgins EM. Double-blind, randomized placebo-controlled trial of the use of topical 10% Potassium Hydroxide solution in the treatment of molluscum contagiosum. *Pediatr Dermatol* 2006; 23(3): 279-281.
16. Giner-Soriano M, Teixidó C, Marsal J, Díez O, Pera H, Vlachó B, et al. Randomized placebo-controlled clinical trial on efficacy and safety of topical 10% Potassium Hydroxide for molluscum contagiosum treatment in children. *J Dermatolog Treat* 2019; 30(8): 750-756.
17. Qureshi A, Zeb M, Jalal-ud-din M, Sheikh ZI, Alam MA, Anwar SA. Comparison of the efficacy of 10% Potassium Hydroxide solution versus cryotherapy in the treatment of Molluscum contagiosum. *J Ayub Med Coll Abbottabad* 2016; 28(2): 382-385.
18. Uçmak D, Akkurt MZ, Kacar SD, Sula B, Arica M. Comparative study of 5% and 2.5% Potassium Hydroxide solution for molluscum contagiosum in children. *Cutan Ocul Toxicol* 2014; 33(1): 54-59.
19. Al-Sudany NK, Abdulkareem DR. A comparative study of topical 10% KOH solution and topical 25% podophyllin solution as home-based treatments of molluscum contagiosum. *J Dermatol Dermatol Surg* 2016; 20(2): 107-114.
20. Teixidó C, Díez O, Marsal J, Giner-Soriano M, Pera H, Martínez M, et al. Efficacy and safety of topical application of 15% and 10% Potassium Hydroxide for the treatment of Molluscum contagiosum. *Pediatr Dermatol* 2018; 35(3): 336-342.
21. Heo J, Park T, Kim W. The efficacy and safety of topical 10% Potassium Hydroxide for molluscum contagiosum: a systematic review and meta-analysis. *J Dermatolog Treat* 2021; 2(1): 1-9.