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Original Article

Comparative study of efficacy and side effects of 10% and 20% koh aqueous solution for treatment of molluscum contagiosum in children

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ABSTRACT

Molluscum Contagiosum (MC) caused by Molluscum Contagiosum Virus (MCV) , is a common cutaneous viral infection in childhood age group as it can be acquired with contact in school , swimming pools, contact sports & day care centres. Previous studies suggests that in case of childhood, therapeutic approaches should be patient friendly and can be provided with parents at home with no or little discomfort. Previous studies of potassium hydroxide (KOH) aqueous solution support its use in children. Aims: the present study compares efficacy, duration of treatment & side effects between 10% & 20% KOH aqueous solution in children having molluscum contagiosum. Methods: the present comparative study consists of two groups of 40 patients each, treated with 10% & 20% KOH respectively after written consent from the parents of the patients. Out of 80 patients which were divided into two groups (A and B) 40 each. 10 patients from group A & 17 patients from group B didn't follow the advised protocol so they were not include in the analysis. 53 patients in total & 30 in group A & 23 in group B were available for analysis. Parents were instructed to apply given strength of KOH once a day at bedtime on the lesion only. Diagnosis of the lesions was done by clinical findings. Study period consists of 12 weeks (June, 2011 to August, 2011). Results: Out of 53 patients 34 were male & 19 were female with male female ratio of 1.78:1. Age distribution ranges from 1-14 yrs with mean age of 6.5 years. Among 53 patients only 1 patient have single lesion remaining 52 patients had multiple lesion with mean lesion count 17.88. In group A mean lesion count was 17.4 and in group B 18.37. 53 patients completed the trial with complete clearance in 19 patients (63.33%) within 8 weeks in group A and all the patients from group B recovered from the MC within 4 weeks. Total 39(73.58%) patients suffer from one or more of the side effects among these 19 patients (63.33%) were from group A & 20(86.95%) from group B. Conclusion: Molluscum contagiosum is more common in males in the age group of 5-10 yrs. 10% KOH is relatively less effective but having less side effects & was more acceptable by patients and their parents as compared to 20% KOH. So this study recommends use of 10% koh which is much safer , can be easily applied by parents at their home instead of 20% koh which is having more in numbers & intensity of side effects. But due to small size of study sample we recommend further study with larger sample size to establish or deny the findings.

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1. Introduction

Molluscum contagiosum (MC) is a viral infection of the skin or occasionally of the mucous membrane. It is caused by a DNA poxvirus called the molluscum contagiosum virus (MCV) which is the only member of the genus molluscipox (1). MCV has no animal

reservoir, infecting only humans. There are four types of MCV, MCV-1 to -4;(2) MCV-1 is the most prevalent type (75%-90%) than other types, except in immunocompromised individuals.(3,4) but lesional morphology & anatomical distribution has no relation with the type.(5) This infection is among the most common viral skin infections in children. This common viral disease has a higher incidence in children, sexually active adults, and in immunodeficient hosts(6). MC is most common in children aged one to ten years old. MC can affect any area of the skin but it

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commonly involve head & neck, trunk, arms, legs and genitals. The virus commonly spreads through skin-to-skin contact which includes sexual contact or touching or scratching the lesions. Handling infected objects can also result in infection. The virus can spread from one part of the body to another or to other people. The virus can be spread among children at day care or at school. The time from infection to the appearance of lesions can range up to 6 months, with an average incubation period between 2 and 7 weeks.

In 1817, Bateman described the lesions characteristic for this infection and assigned its name.(7) In 1841, Henderson and Paterson described the intra-cytoplasmic inclusion bodies now known by their names or by "molluscum bodies" (8). Molluscum contagiosum lesions are shiny pearly white, hemispherical, dome-shaped, umbilicated papule which usually shows a central pore.(9) They are often 1–5 millimeters in diameter. They are generally not painful, but they may itch or become irritated. Picking or scratching the lesions may lead to further infection or scarring. In about 10% of the cases, eczema develops around the lesions.(10) They may occasionally be complicated by secondary bacterial infections & become painful.

The viral infection is limited to a localized area on the topmost layer of the epidermis (11). Once the virus containing head of the lesion has been destroyed, the infection is gone. The central part of the lesion is often packed with new virions that sheds from the lesion surface into the environment and may spread the infection. The virus may spread to neighbouring skin areas by autoinoculation. Children are particularly susceptible to autoinoculation, and may have widespread clusters of lesions. To avoid spread of infection, patient should be advised to avoid swimming pools, communal baths, contact sports, shared towels etc. Spontaneous resolution of lesions occur in good percentage of cases which may go away on their own and are reported as lasting generally from 6 to 8 weeks, to about 18 months. Treatment for molluscum contagiosum is not always mandatory as the lesions may disappear by themselves and heal without scarring unless infected by bacteria. Removal of lesions reduces the rate of spread to other people as well as from one part of the body to another, which happens by touching and scratching the lesions (autoinoculation). Treatments causing the skin on or near the lesions to rupture may spread the infection further, much the same as scratching does. But still treatment is needed according to the increasing number of lesions, total number of lesions, size, duration, persistence & location of lesions. Genital lesions in adults should be treated in order to prevent spread through sexual contact. Treatment may be required depending on medical reasons like bleeding, secondary infection, itching, potential scarring and psychosocial reasons like disfigurement, embezzlement, fear of transmission etc. Although in healthy patients treatment is not required but it may help to reduce autoinoculation or transmission to close contacts and improve clinical appearance. Treatment options include curettage, cryotherapy, expression or pricking with a sterile needle,

electrodessication, photodynamic therapy, laser ablation podophyllin, tretinoin, cantharidin, trichloroacetic acid, silver nitrate, salicylic acid, tincture iodine, glycolic acid, tazarotene, adapalene, liquefied phenol, cidofovir and potassium hydroxide. Oral treatment of molluscum contagiosum includes cimetidine, giseofulvin & cidofovir.

Treatment options can be divided into destruction therapy, topical therapy and oral therapy. Destruction & topical therapy may result in scarring or post-inflammatory pigmentary changes. Destructive treatment modalities including curettage, cryotherapy, expression or pricking with a sterile needle, electrodesiccation, photodynamic therapy, and laser ablation which are poorly tolerated in children, required a trained person to perform it and are more costlier. Topical medical therapy includes podophyllin, tretinoin, cantharidin, trichloroacetic acid, silver nitrate, phenol, salicylic acid, tincture iodine, glycolic acid, tazarotene, liquefied phenol, cantharidin, cidofovir and potassium hydroxide. 5% imiquimod cream and 10% KOH solution are equally effective in molluscum contagiosum though KOH has a faster onset of action and much cheaper than imiquimod(12). A 25% suspension in a tincture of benzoin or alcohol may be applied once a week. It may be associated with side effects include severe erosive damage in adjacent normal skin that may cause scarring and systemic effects such as peripheral neuropathy, renal damage, adynamic ileus, leucopenia, and thrombocytopenia. Podofilox is a safer alternative to podophyllin and may be used by the patient at home(13,14). Mixture of salicylic acid and glycolic acid is more irritating. Potassium hydroxide (KOH) is an incredibly strong metallic base. In medical practice, it is used in the diagnosis of fungal infection, whiff test for diagnosis of bacterial vaginosis, treatment of male genital wart, and treatment of molluscum contagiosum in children. Previous studies support favourable results with 10% & 20% koh aqueous solution for treating molluscum contagiosum in children. Topical 10% koh results in favourable outcome ranges from 44% to 92.5% (12,15) and in case of 20% koh the result was almost 90% patients benefitted. These results encouraged us to conduct comparative study between these two concentrations for effective therapeutic option which can be conducted at home in a familiar place for children by parents also. The most appropriate therapeutic approach largely depends on the clinical situation. In healthy children, a major goal is to limit discomfort, and benign neglect or minor direct lesional trauma is appropriate.

In search of patient friendly treatment options in children various trials of potassium hydroxide were done with favourable results and it can be conducted at home by patient's parents. In adults who are more motivated to have their lesions treated, cryotherapy or curettage of individual lesions is effective and well tolerated. In immunocompromised individuals, molluscum contagiosum may be very extensive and difficult to treat. The goal may be to treat the most troublesome lesions only. In severe cases, these patients may warrant more aggressive therapy with lasers, imiquimod, antiviral therapy, or a combination of these. Of course, effective antiretroviral therapy in patients with AIDS makes therapy of molluscum contagiosum much more effective.

This study was conducted in south-east part of Rajasthan at SRG hospital & Medical College, Jhalawar to compare the efficacy, duration of treatment & side effects of topical 10% & 20% KOH aqueous solution in children having molluscum contagiosum .

2. Material and Methods

This study was conducted to compare the efficacy & side effects various of 10% & 20% concentrations of KOH aqueous solution in children with MC in the department of Skin, STD & Leprosy of Jhalawar Medical College & attached SRG Hospital which is a tertiary referral centre for skin diseases situated at the south-east region of Rajasthan. The study group consists of 80 children with molluscum contagiosum divided in two groups (A & B) of 40 children (age 1-14 yrs) each. Out of 80 patients which were divided into two groups 40 each 10 patients from group A & 17 patients from group B didn't follow the advised protocol so they were not include in the analysis. 53 patients in total & 30 in group A & 23 in group B were available for analysis. Diagnosis was done by clinical appearance of the lesions. Biopsy was not done. History of similar lesions in other family members was taken. All the patients were investigated for HIV infection after prior consent of the parents but none of the patient was found to be reactive for HIV infection. Age, sex, numbers, distribution, & duration of the lesions, presence of atopy in patient or in the family members were noted in a predesigned performa.

Children from group A were treated with 10% KOH & group B were treated with 20% KOH aqueous solution. Exclusion criteria were age less than 1 year, patients received other therapeutic measures for MC in previous month & presence of systemic disease involving heart, liver & kidney. After fully understanding of the actual therapeutic process written consent from patient's parents was taken. Patients whose parents can't understand the process or not ready to follow the instructions were not included in the study. Other therapeutic approaches with systemic or topical agents for MC were not allowed during the study period. Parents or guardians were advised to apply petroleum jelly around the lesion at beginning and then with cotton swab apply 10% or 20% KOH solution at centre of the lesion according to assigned groups at bed time only. They were advised to apply as minimum amount of solution as possible so only the lesion become wet without spillage beyond the lesion. In case of accidental spillage, immediate wash with cold water was advised. This treatment was continued till the lesions showed signs of inflammation or superficial ulceration. Parents were asked to report local (erythema, itching, burning, pain, erosion, crusting) and systemic (fever, flu like illness, diarrhoea, myalgia) side effects. The assessment of therapeutic response and side effects was clinically seen at the end of week 1, 2, 4, 8 & 12.

3. Results and Discussion

In this trial, children from group A were treated with topical 10% KOH aqueous solution & group B with 20% once daily at bed time. 10 patients from group A & 17 patients from group B withdraw from the study due to moderate to severe burning sensation and are not ready to follow the protocol of the study further, so 30 from group A & 23 from group B were available for analysis during the study.

The age of children varied from 1-14 yrs with mean age 6.5 yrs, in group A (mean age – 6.6 years) while in group B (mean age – 6.4 years) which is unanimously supported by other studies also.(16) 1

Chandrashekar Laxmisha et al reported that most commonly affected age group among children is 5-10 yrs of age, present study also shows the same pattern of age distribution in children with molluscum contagiosum.(17)

Out of 53 children 34(64.15%) were male & 19(35.84%) were females with male female ratio of 1.78:1, in group A 19 (63.33%) were males and 11 (36.66%) were females, in case of group B 15 (65.21%) were males and 8 (34.78%) were females. Although the sample size is small but still data are comparative with previous studies.(17,18) usually males outnumbered females but in children MF ratio is lesser as compared to adult age group. (17,18)

Family history of atopy was present in 9 children (16.98%) in total, while in group A it was 5(16.66%) & 4(17.39%) in group B. History of atopic dermatitis was present in 6 (11.32%) of cases, 2 children (6.66%) in group A & 4 children (17.39%) in group B. Osio A et al from Paris also reported higher percentage of association between atopic dermatitis and molluscum contagiosum(16). Seiz MB et al reported in their study the association between atopic dermatitis & molluscum contagiosum was 13.6%.(19,20)

All the children had lesions more than one except one from group B who had single lesion over forehead. Number of lesions varied from 1-30 with mean lesion count (average number of molluscum contagiosum) was 17.82, in case of group A number of lesions varied from 8-30 with mean lesion count was 17.4 and in case of group B lesions varied from 1-28 with mean lesion count 18.37. 35 children had involvement of one site & rest of the 18 have involvement of more than one site, among groups 21 children (70%) from group A & 14 children (60.86%) from group B were having lesions on single site of the body, whereas in 9 children (30%) from group A & 9 children (39.13%) from group B multiple sites were involved. As far as sites were concerned head & neck site was most commonly affected 34(64.15%) in total (in group A 19(63.33%) & in group B 15(65.21%) followed by trunk 20(37.73) in total (in group A 12(40%) & in group B 8(34.78%) & then upper limbs in total 13 (24.52%) (in group A 7(23.33%) & in group B 6(26.08%), lower limbs in total 2(3.77%) both in group B(8.69%).

Maximum numbers of patients were having molluscum contagiosum since less than three months. The minimum duration of infection was 15 days and maximum duration was six months. History of similar complaints in the family was noted in 13 patients.

Number of lesions varied from 1-30 in total number of patients while in divided groups 8 to 30 in group A (mean lesion count 17.4) & 1 to 28 in group B (mean lesion count 18.37).

The mean lesion count decreased from 17.4 to 11.6 at end of week 1, to 7.22 at week 2, to 3.87 at week 4, to 2.97 at week 8 & to 1.94 at week 12 in patients treated with 10% KOH .

The mean lesion count decreased from 18.37 to 6.6 at end of week 1, to 1.76 at week 2 & all the lesions were cleared at week 4 with 20% KOH.

We found complete clearance of lesions in 19 (63.33%) out of 30 patients in group A out of which 5 patients cleared all the lesions at end of first week, 8 cleared at end of 2nd week, 4 at the end of 4th week, and 2 at the end of 8th week but none of the remaining patients cleared all the lesions at the end of 12th week.

We observe complete clearance of lesions in all the patients in group B out of which 10 patients got complete clearance at first week, next 10 patients at 2nd week and remaining 3 patients at 4th week.

Time required for clearance of almost all the lesions is about 4 weeks which is also present in our study (21). In this study time required for clearance of lesions in group A varied from 1-week to 8 weeks. Mahajan et al found in their study of 17 days for lesions to resolve with 20% KOH while in present study resolution time in group B was varied from 1-4 weeks it is due to patients were reviewed at week 1, 2, 4, 8 & 12. While 20 cases (86.95%) were cleared of all the lesions within 2 weeks (22). The development of inflammation and ulceration time varies 5-20 days (mean 12.42 days) in group A & 4-15 days (mean 8.04 days) in group B. The development of inflammation and ulceration also varies with the size & duration of the lesion but not with the site of the lesion in our study. We observe that smaller & newer lesions required much less time as compared to bigger & older ones. Almost all the children reported a mild stinging sensation lasting for 1 to 2 minutes after application. Out of 53 patients 39 (73.58%) developed one or more of the side effects. As far as groups were concerned all patients except three developed side effects in 20% KOH group (86.95%) while in 10% KOH group 19 patients (63.33%) developed side effects. Among the side effects erythema, burning sensation, itching & crusting were commoner side effects. These were managed by emollients, antihistaminics and analgesics as and when required. Secondary infection was managed by oral antibiotics after gram's stain. 3 patients from group B developed hypopigmentation & 2 developed hyperpigmentation while in case of group A this figure was 1 & 0. These pigmentary changes gradually improved with mild topical steroid in all the patients except one with hyperpigmentation in group B which persists after 12 weeks. We didn't observe hypertrophic or atrophic scarring and neither systemic side effects in both the groups. Patients from group A took relatively more period than group B for resolution of lesions which is comparable with other studies, it may be due to increased strength of the KOH in group B. As far as side effects are concerned patients from group B developed more side effects. Parents of patients from group A found 10% KOH aqueous solution more acceptable than other therapies, but from group B due to more side effects they are more concerned about long term side effect, burning sensation and in spite of good outcome not ready to use it next time. Nevertheless topical KOH solution proved to be an effective, safe, inexpensive and non-invasive

alternative therapeutic modality in children. Though 20% KOH solution results in more rapid resolution of lesions but it is associated with more & intense side effects, we recommend 10% KOH in children instead of 20% KOH, which can be used by patient's parents at their home. Though this study supports use of 10% KOH in children but due to the small sample size more studies with larger sample size are required to support or deny the conclusion.

SUMMARY AND CONCLUSION

Efficacy & side effects of 10% & 20% KOH aqueous solution were studied in children age group 1-14 yrs with maximum number of cases in age group 5-10 yrs & male female ratio was 1.78 : 1.

30 patients from group A were treated with 10% KOH & 23 patients from group B with 20% KOH. There was significant difference in clearance time between two groups. There was significant difference in cured patients between two groups.

There was significant difference in side effects between two groups with more in numbers & intensity in group B (group A 63.33% & group B 86.95%) 10% KOH aqueous solution was found to be effective, safe, non-invasive & patient friendly therapeutic approach to treat molluscum contagiosum in children.

TABLE 1- Showing the characteristics of patients at start of study

	Group A	Group B	Total
Mean age	6.6	6.4	6.5
Male	19(63.33%)	15(65.21%)	34(64.15%)
Female	11(36.66%)	8(34.78%)	19(35.84%)
Mean lesion count	17.4	18.37	17.82
Single site involvement	21(70%)	14(60.86%)	35(66.03%)
Multiple site involvement	9(30%)	9(39.13%)	18(33.96%)
Head & neck	19(63.33%)	15(65.21%)	34(64.15%)
Trunk	12(40%)	8(34.78%)	20(37.73%)
Upper limb	7(23.33%)	6(26.08%)	13(24.52%)
Lower limb	0	2(8.69%)	2(3.77%)

TABLE 2- Showing the side effects in both groups

	Group A	Group B
Total	19 (63.33%)	20 (86.95%)
Burning	6 (20%)	12 (52.17%)
Erosion	3 (10%)	8 (34.78%)
Ulceration	0	3 (13.04%)
Hypopigmentation	1 (3.33%)	3 (13.04%)
Hyperpigmentation	0	2 (8.69%)
Sec. Infection	1 (3.33%)	3 (13.04%)
Crusting	5 (16.6%)	11 (47.82%)
Hypertrophic scarring	0	0
Erythema	12 (40%)	21 (91.30%)
Itching	6 (20%)	8 (34.78%)
Systemic side effects	0	0

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