
Indian Journal of
Dermatology

THERAPEUTIC ROUND
Year : 2012 | **Volume** : 57 | **Issue** : 1 | **Page** : 38--41

Evaluation of topical potassium hydroxide solution for treatment of plane warts

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Abstract

Background: Plane wart is a common dermatological disease that is caused by human papilloma virus; although the rate of spontaneous recovery is high, it usually takes a long time to occur. Many modalities of treatments have been used but none of them proved to be uniformly effective. Potassium hydroxide (KOH) solution is a well-known keratolytic agent with many dermatological uses. **Objective:** To evaluate the efficacy and tolerability of topical KOH solution in the treatment of plane warts. **Materials and Methods:** A total of 250 patients with plane warts, consulting the department of Dermatology and Venereology of Basra Teaching Hospital between March 2008 and October 2009, were enrolled in this opened therapeutic trial study. Patients were divided into two age and sex cross-matched equal groups; patients in group (A) were treated with topical 5% KOH solution once at night, while patients in group (B) were treated with topical 10% KOH solution once nightly. Only 107 patients from group (A) and 95 patients from group (B) completed the study, while the remainders were defaulted for unknown reasons. The patients were evaluated at second and fourth week to assess the cure rates and side effects, those patients who showed complete cure were followed up for 3 months to detect any recurrence. **Results:** At the end of second week, 9.3% of group (A) patients showed complete disappearance of their warts, *vs* 66.3% of group (B) patients. At the end of fourth week, 80.3% of group (A) patients showed complete response in comparison with 82.1% of group (B) patients. The side effects for the treating solution in both concentrations include itching, burning sensation, erythema, and temporary dyspigmentations, that were reported in 77.6% of group (A) patients in comparison with 90.5% of group (B) patients. Recurrence rate was reported in 5.8% of group (A) patients *vs* 5.1% of group (B) patients during the three months period of follow-up. **Conclusions:** Topical KOH solution is proved to be an effective and safe treatment of plane warts in both concentrations (5% and 10%) with no important side effects.

How to cite this article:
Al-Hamdi KI, AL-Rahmani MA. Evaluation of topical potassium hydroxide solution for treatment of plane warts.Indian J Dermatol 2012;57:38-41

How to cite this URL:
Al-Hamdi KI, AL-Rahmani MA. Evaluation of topical potassium hydroxide solution for treatment of plane warts. Indian J Dermatol [serial online] 2012 [cited 2019 Sep 19];57:38-41
Available from: http://www.e-ijd.org/text.asp?2012/57/1/38/92675

Full Text

Introduction

Warts are benign proliferation of skin and mucosa that result from infection with human papilloma virus (HPV) which are double-stranded deoxyribonucleic acid (DNA) viruses that replicate inside the

nucleus. Wart occurs at any age but it is unusual in infancy and early childhood. [1] The incidence increases in the school years to reach a peak between the age 12 and 16 years, then declines sharply to the age of 20 years, and more gradually thereafter. [1] Infection with HPV may be clinical, subclinical, or latent. [2]

Plane warts are caused by HPV type 3 and 10, occur mostly in children and young adults. [3] The face, back of the hands, and the shins are the site of predilection [4] lesion usually presented as 2 to 4 mm flat topped papules that are slightly erythematous or brown on pale skin and hypopigmented on darker skin. [5] Useful finding is the tendency of plane warts to koebnerize forming linear, slightly raised papular lesions. [5] Lesion may resolve spontaneously within one month, particularly when inflamed or it may stay for long time to resolve. [6]

Many modalities of treatment were used to treat plane warts, but none is uniformly effective, these includes topical Salicylic acid, Imiquimod, 5-Flourouracil, isotretinoin gel 0.05%, [7] topical zinc sulfate solution, [8] oral zinc sulfate, [9] cimetidine, [1] Bacillus Calmette-Guérin (BCG) vaccination, [10] curettage/electrodessication and cryotherapy. [1]

Potassium hydroxide (KOH) is an incredibly strong metallic base. In medical practice, it is used in the diagnosis of fungal infection, [11] whiff test for diagnosis of bacterial vaginosis, [11] treatment of male genital wart, [12] and treatment of molluscum contagiosum in children. [13],[14]

Materials and Methods

An opened therapeutic study where a total number of 250 patients with plane warts were enrolled in this study.

Physical examination was done for each patient to assess the number, location of the lesions, and presence of other types of warts. Any patients who are receiving steroid or other immune suppressant drugs, those with history of chronic illnesses or immune suppressed conditions, pregnant and nursing woman, those who receive any modality of treatment for their warts at least for the previous two months, and patients refusing this therapeutic trial were excluded from this study. The nature of the disease, course, prognosis, and full information related to the therapy including the possible side effects, action, and way of application were explained to the patients. Formal consent was taken from each patient prior to their inclusion in this study; in addition, the approval of the ethical Committee of Scientific Council of Dermatology and Venereology of Iraqi Board for Medical Specializations was also obtained.

A solution of 5% w/v KOH was prepared by dissolving 50 g of KOH in one litre distilled water, while 10% w/v KOH was prepared by dissolving 100 g of KOH in one litre of distilled water. The patients were divided into two equal age and sex cross-matched groups; for the first group, the patients were instructed to use 5% KOH solution topically once daily at night using a wooden probe sunken in the solution and making only one touch to the wart. In the second group, the patients were instructed to use 10% KOH solution topically once daily at night using the same method mentioned above.

All patients in the two groups were reexamined at the end of second week and fourth week to evaluate the response to treatment depending on clinical and photographic assessment and to record any possible side effects.

The patients were considered as responder when there was complete disappearance of warts; however, if there was no change, the patients were considered as nonresponder; if there is a decrease in the number of warts, the patients were considered as partial responder.

If complete response occurred at the end of second week, patients were followed up monthly for 3 months to detect any recurrence or persistent side effects, the follow-up is performed by monthly visit or by phone calling the patients.

If at the end of second week, no or partial response occurred, the patients were instructed to continue using the same concentration of KOH solution once nightly and then they were reevaluated at the end of fourth week; if complete response occurred, the patients were followed up for 3 months as mentioned above, if no response occurred, they were considered as treatment failure.

Statistical analysis

A descriptive statistics like mean and SD (standard deviation) together with analytic statistics like Chi-squared test, t-test, or Z-test test have been done when appropriate.

Results

A total of 250 patients were included in this study, they were divided into two equal age and sex cross-matched equal groups; each group included 125 patients.

Group A

Of 125 patients, only 107 patients completed this study; the remainders were regarded as defaulters.

This group comprised of 46 (42.9%) males and 61 (57.1%) females with a male to female ratio of 1 : 1.3. Their ages ranged from 3 to 45 years (mean±SD = 13.07±8.3). The number of warts in each patient ranged from 1 to 30 (mean±SD = 7.009±4.49). All of these warts were located on the face. The duration of the lesions ranged from 1 to 24 months with a mean duration of 4.76±3.89.

Group B

Of 125 patients, only 95 patients completed this study; the remainders were defaulted for unknown reasons.

This group comprised of 48 (50.5%) males and 47 (49.4%) females with a male to female ratio of 1.01 : 1. Their ages range from 4 to 43 years (mean±SD = 13.69±8.29). The number of warts in each patient ranged from 2 to 22 with a mean of 6.75±3.64; all of these warts were located also on the face. The duration of the lesions ranged from 1 to 36 months with a mean duration of 5±4.3.

As it is mentioned above, both groups were comparable with respect to different independent variables including age, sex, number and duration of lesions, where all P values between the two groups were statistically insignificant (P>0.05).

Cure rates at the end of second week of treatment

Ten patients (9.34%) of group A (those using 5% KOH) showed complete response, while 77 patients (71.9%) showed partial response; the remaining 20 patients (18.69%) showed no response.

On the other hand, 63 patients (66.3%) of group B (those using 10% KOH) showed complete response, while 26 patients (27.3%) showed partial response and the remaining six patients (6.3%) showed no response [Table 1]. The difference in the cure rate of those patients showing complete response is highly significant between the two groups (P=0.0001).{Table 1}

Cure rates at the end of fourth week of treatment

Eighty-six patients (80.3%) of group (A) showed complete response, while nine patients (8.4%) showed partial response and the remaining 12 patients (11.2%) showed no response [Table 2].{Table 2}

Regarding group (B), 78 patients (82.1%) showed complete response, while 14 patients (14.7%)

showed partial response and the remaining three patients (3.15%) showed no response [Table 3]. The difference in the cure rate for patients showing complete disappearance of their warts was not statistically significant between the two groups at the end of therapy (P=0.439).{Table 3}

This study showed that there is insignificant association between the duration of warts and the cure rate, i.e., lesions with long duration were responding to treatment similar to newer ones. In addition, patients with smaller number of warts showed a better response to treatment in comparison with patients with larger number.

Regarding side effects, 83 patients (77.6%) from group (A) and 86 patients (90.5%) from group (B) showed local side effects to the treating substance. These side effects include itching, burning sensation, erythema, and dyspigmentation (hypo- or hyperpigmentation). In group (A) patients, itching (42 patients, 39.3%) and burning sensation (29 patients, 27.15%) were the commonest side effects recorded, in contrast to patients in group (B), where burning sensation (37 patients, 38.9%) and dyspigmentation (27 patients, 28.4%) were the most common local reactions reported [Table 3]. The side effects that were caused by 10% KOH solution were more common than that reported among patients using 5% KOH with a statistically significant difference (P=0.0001).

During 3 months period of follow-up, the warts in five patients of 86 patients in group (A) who showed complete response recurred, in comparison with four patients of 78 patients in group (B).

Accordingly, the relapse rate in the group (A) was 5.8% vs 5.1% in group (B), statistically the difference was not significant (P=0.519) [Figure 1].{Figure 1}

Discussion

The course of human papilloma virus infection varies considerably, some lesions grow rapidly, some persist without any change, some regress spontaneously over several weeks, while others regress over long period of time. There are many modalities of therapy, reflecting that none is uniformly effective or directly antiviral. [1] Whatever method is used in the treatment of warts, there will be failures and recurrences. [1]

The present study aims to determine the efficacy and tolerability of topical KOH solution for treatment of plane warts. To the best of our knowledge, this is the first study in the world that has dealt with such therapy for plane warts. The study showed that topical KOH solution in 5% and 10% concentrations is an effective treatment of plane warts as it induced cure rate of 80.3% and 82.1% respectively. The mechanism by which KOH solution is supposed to act is mostly related to its keratolytic effect that leads to destruction of virus-infected cells and also probably attributed to its irritating effect that induce inflammatory response and inflammatory reactions, so causing resolution of warts. In this study, it has been also shown that topical 5% KOH solution showed a slower action in comparison with 10% KOH solution, which was clearly noted from the high significant difference in the rate of complete response at the end of second week of treatment, but large number of patients (77 patients (71.9%)) who used 5% KOH showed partial response, which means that they needed additional time to show complete disappearance of the treated warts which was actually achieved at the end of fourth week with a cure rate (80.3%) that is slightly lower than that induced by using 10% concentration (cure rate = 82.1%), but statistically, the difference between both groups is insignificant. In addition, it has been shown that patients with smaller number of warts responded better to KOH solution than patients with larger number, which may be attributed to the relatively better immunity in this group in comparison with those with larger number of warts where the immunity is supposed to be suppressed or could be due to better patient's compliance when the number of warts is small.

Many side effects were reported among patients using topical KOH solution in this study, but they were significantly lower among patients using 5% KOH solution in comparison with those using 10% KOH, which can be attributed to variation in the activity that is weaker with lower concentration. Meanwhile, side effects can be reported even with spontaneous resolution.

Furthermore, the recurrence rates of warts among patients showing complete response were 5.8% in group (A) vs 5.1% in group (B). This recurrence rate is lower than that reported when 5% KOH solution was used for the treatment of genital wart where the warts were recurred in 9.3%. [12] The relatively high recurrence rate among treated genital warts is probably attributed to the fact that up to 70% of genital warts are subclinical or latent infection; so, it can be clinically apparent at any time rather than due to true recurrence of the treated wart itself. [1]

Conclusion

Topical KOH solution was found as an effective and safe treatment of plane warts, beside that, 5% KOH solution is as effective as 10% KOH solution with fewer side effects, but it required longer period of treatment in comparison with 10% KOH solution.

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