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ORIGINAL ARTICLE

EVALUATION OF TOPICAL 10% POTASSIUM HYDROXIDE SOLUTION VERSUS 80% TRICHLOROACETIC ACID IN THE TREATMENT OF GENITAL WART

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ABSTRACT

Introduction: *Genital wart is one of the most common sexually transmitted diseases caused by Human Papilloma Virus. Many modalities of treatment are available with variable success rate, cost and side effect profiles, but none of them are uniformly effective.*

Method: *A prospective open -label non-randomized comparative study done in patients with anogenital wart to compare the efficacy and side effect profile of 10% potassium hydroxide solution and 80% TCA in the treatment of genital warts. Over 15 months period patients with anogenital wart were assigned to either 10% KOH or 80% trichloroacetic acid alternately, and the outcome was assessed.*

Result: *Eighty- two participants completed the study. The mean duration of healing in weeks for the KOH group was 4.1weeks (SD=2.7), while that for the TCA group, it was 7.4weeks (SD=3.3). After adjusting for lesion size, lesion number and HIV status, it was found that adjusted hazard ratio AHR for KOH was 1.98 (95% CI 1.16-3.38) which was significant with p value of 0.012. Though not statistically significant(p value = 0.68), 7.5 % in the KOH group and 14.3 % in the TCA group had recurrences.*

Conclusion : *A ten % potassium hydroxide solution was effective in the treatment of genital warts with shorter healing time compared to 80% TCA. Thus, it can be used as one of a treatment modality in the treatment of genital warts*

Key words: *genital wart, trichloroacetic acid, human papilloma virus , potassium hydroxide solution.*

INTRODUCTION

Genital wart is the most common sexually transmitted infection caused by Human Papilloma virus. More than 100 types of double-stranded HPV papovaviruses have been isolated thus far, and of these, about 35 types have affinity for genital sites. Anogenital warts are an epidermal manifestation attributed to the epidermotropic human papillomavirus (HPV). (1,2,5). Ninety percent of anogenital warts are caused by HPV 6 or 11 and are commonly found before, or at the time of, detection of genital warts and typically found on external genitalia (3,4). Genital warts are commonly transmitted by sexual contact and are usually asymptomatic (6).The oncogenic HPV 16 and 18, which are responsible for cervical cancer, can be a rare cause of external genital wart (7,8). HIV infection, genital ulceration, smoking and younger age groups are some of the risk factors for the development of anogenital warts(9,10,11).

Currently, the main management of genital warts is destruction of the wart caused by the virus, since elimination of the virus is difficult to achieve (12-15). There are many modalities of therapy, and none is uniformly effective or directly antiviral therapy (13). The main limitation of current therapies is the high recurrence rate after initial remission (9). The choice of therapy is based on the number, size, site, and morphology of lesions as well as patient preferences, cost, convenience, adverse effects, and clinician experience. Patient-applied therapy such as imiquimod cream or podofilox is increasingly recommended than physician-applied therapy like TCA and cryotherapy (13,14).

KOH solution has advantages over cryotherapy being less traumatic, less painful and suited for self-administration(13). These characteristics make KOH particularly helpful in the treatment of children with genital warts. As it does not need storing facilities, it can be used even in resource-poor settings (16). Trichloroacetic (70 - 90%) acid is one of the treatment option for genital wart which is recommended as a provider applied treatment option for genital wart(3,17). A study done in Brazil demonstrated that KOH is an effective, safe and low-cost treatment modality for genital warts in male patients (18).

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This comparative study assessed the efficacy and safety profile of 10% potassium hydroxide solution versus 80% trichloroacetic acid in patients with anogenital warts.

METHODS AND MATERIALS

This prospective open label comparative study was approved by institutional review board of Addis Ababa university, college of health science and ALERT hospital. Patients with anogenital wart who presented to dermatology outpatient department at ALERT hospital between March 2017 to May 2018 were included in the study. Age less than 3 years, pregnant women and patients with giant genital wart were excluded from the study. All patients and their guardian read and signed informed consent and assent form. The study participants were assigned either to 10% potassium hydroxide or 80% trichloroacetic acid treatment alternately. Those who cannot apply KOH by themselves or by family members due to its location eg. Perianal area, were assigned to TCA group.

The TCA was applied by a health care provider weekly. KOH was applied daily by the patients after it was demonstrated by the healthcare providers with a cotton tip applicator. Each patient was given 5ml flask containing 10%KOH and all patents were evaluated weekly.

The participants were followed until complete healing of lesion occurred or maximum for 12 weeks after which percent healed was assessed. Each participant was assessed for two months for recurrence after they completed their treatment. Pain was assessed by asking the patients to grade from 0 to 5 based on the severity. Data analysis was performed using SPSS version 25. Mean and Standard deviation for quantitative variables and absolute & relative frequencies for qualitative variables were performed. The results were included in tables and graphs and analyzed by simple descriptive analysis , chi square test and Cox proportional Hazards regression analysis. In the results evaluation 95% confidence interval was considered statistically significant.

RESULTS

A total of 90 patients with anogenital wart aged 4 to 52 were included in the study out of these 82 participants completed the study. Forty seven (57.3%) were females and the mean age was 28.4 (SD =7.9). The average duration of the lesion in months was 10.4 (SD=14.8). The lesion was symptomatic in most of the participants (58.5%), the most common symptom being itching (Table 1). Sixteen patients (19.5%) were HIV positives and only 4(4.9%) patients had other known chronic medical illness .The average lesion numbers and lesion size were 10 (SD =7.1) and 2.6cm² (SD= 1.2), respectively.

Table 1: Baseline characteristics of the 82 study participants

Characteristics		Value
Sex (F, %)	Male	35 (42.7%)
	Female	47 (57.3%)
Age (mean, 1SD)		28.4 ± 7.9
Lesion duration in months (mean, SD)		10.4 ± 14.8
Symptoms	Yes	48 (58.5%)
	No	34 (41.5%)
Types of symptoms (F, %)	Itching	39 (81.2%)
	Pain	9 (18.8%)
HIV status (F, %)	Positive	16 (19.5%)
	Negative	66 (80.5%)
Other medical illness (F, %)	Yes	78 (95.1%)
	No	4 (4.9%)
Lesion number(mean, SD)		10.1 ± 7.1
Lesion size(mean, SD)		2.6 ± 1.2

Forty participants were in the 10% KOH solution-group, and 42 were in the 80% TCA solution group. The mean age for 10%KOH group was 28.9 years and for TCA group it was 27.8years. In the KOH group, there were more males (60%) compared to the TCA group which consisted of only 26.2 % , this was due to easier self-application of treatment over male genitalia than female's.

The mean duration of the lesion was 13 months (SD =16.6) and 7.9month (SD = 12.4) for KOH group and TCA group respectively. The average lesion number in 10% KOH group was 9.4± 5.9, while in TCA group it was higher 10.7 ± 8. Five (12.5%) of participants in KOH group were HIV positives, while 11(26%) of participants inTCA group were HIV positives.

Table 2: Baseline characteristics and treatment outcome by treatment group

Characteristics	10%KOH (n=40)	80% TCA (n=42)	P value
Age (mean, SD)	28.9± 8.8	27.8 ± 7.1	0.54
Sex (F, %)			
Male	24 (60%)	11(26.2%)	0.002
Female	16 (40%)	31(73.8%)	
Lesion number (mean, SD)	9.4± 5.9	10.7 ± 8	0.39
Lesion duration(mean, SD)	13 ± 16.6	7.9 ± 12.4	0.12
HIV status (F, %)			
Positive	5(12.5%)	11 (26%)	0.118
Negative	35 (87.5%	29 (72.5)	
Pain grade (mean, SD)	2.5 ± 0.84	3.7 ± 0.82	0.001
Complete response (F,%)	35(87.5%)	33(78.6%)	0.28
Healing time(mean, SD)	4.2 ± 2.7	7.4 ± 3.3	<0.001
Recurrence (F, %)	3(7.5%)	6(14.3%)	0.62
Ulceration	5(12.5%)	4(9.5%)	0.6

At the end of 12 weeks of treatment, 87.5% of patients with KOH, and 78.6%of patients with TCA had complete response which is not statistically significant(p value 0.28). The mean healing time for KOH was 4.2 ± 2.7weeks (95%CI 3.33-5.15), while for TCA it was 7.43 ± 3.3 weeks (95%CI 6.66 -8.73) with p-value <0.0001. After adjusting for lesion size, lesion number and HIV status, the adjusted hazard ratio (AHR) for KOH was 1.98 (95% CI 1.16-3.38) with p value of 0.012. (Fig.1)

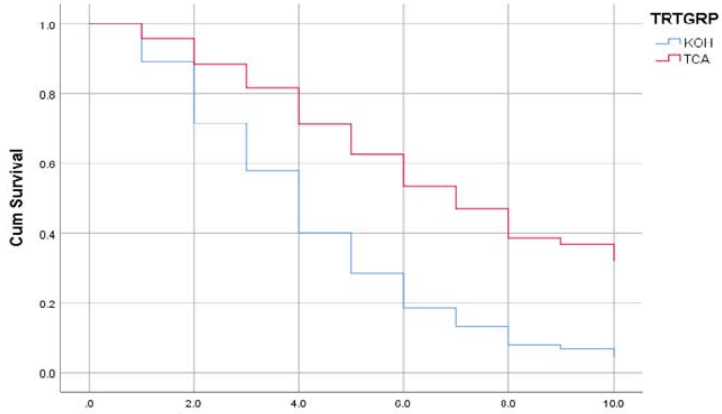

Figure 1: The mean healing time for 10% potassium hydroxide and 80% Trichloroacetic acid solutions in genital wart treatment.

Pain was less severe in patients with KOH group with the mean for pain grading was 2.57 and 3.67 for KOH and TCA groups, respectively which was statistically significant with p value less than 0.05). Three (7.5%) of patients from KOH group and 14.3% of patients from TCA group had recurrence within 2 months after completing treatment with p value of 0.62 which was not statistically significant. Ulceration was more common in KOH group 12.5% than TCA group 9.5 % with p value of 0.6. We also found that the healing time for patients with HIV was longer than HIV uninfected individuals. Fig.2 , Fig 3 and Fig. 4 shows treatment outcome before and after application of KOH solution in patients with genital wart.

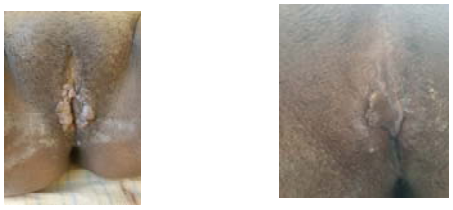

Figure 2: Before and after treatment in 27 years old female 2weeks after application of 10% KOH solution


Figure 3 : A 24 year old male with urethral wart 2 weeks after application of 10% KOH.


Figure 4 : A 4 year old girl after applying 10% KOH for three weeks

DISCUSSION

To our knowledge, this is the first treatment comparison study done to compare the efficacy of topical 10% KOH vs topical 80% TCA in the treatment of genital wart. We found that 10% KOH was effective in the management of genital wart with shorter duration of healing and less pain compared to 80% TCA mean duration of healing of 4.12 weeks and 7.43 weeks for KOH and 80% TCA, respectively. This study finding is similar with that of a study done in Brazil where the mean duration of healing was 3.3weeks for KOH (18). Another study found that the mean healing time for genital wart using 5% KOH to be 6.9 weeks which was a bit longer than our study but it may be due to low concentration of potassium hydroxide solution used in this study which was 5% compared to our study which is 10% (2).

Another study showed that 10% KOH was found to be equally effective in the treatment of plane warts compared to TCA with the advantage of faster onset of action and tendency of completely clearing warts with fewer side effects. The pain and the ulceration was less compared to 80% TCA. In a study done in Iran, 88.9% of patients with genital wart who were treated with potassium hydroxide solution got complete clearance of the lesion which was similar with our study in which 87.5% of patients in KOH group had complete lesion clearance (19). in our study, 7.5% patients in KOH group had recurrences after 2 months of treatment completion while 11.1 % had recurrence in another study .

The use of 10 % KOH as treatment of genital wart was not included in the CDC sexually transmitted guideline both 2010 and 2015 versions. Therefore, this result would be an input to include the use of 10% KOH in the treatment of genital wart as it has lower price, lower side effect as well as it can be applied by the patient himself/herself.

One of the limitations of this study was lack of randomization for some patients could not apply the KOH by themselves. The other limitation was that most patients with HIV infection were put on TCA treatment that may have introduced bias though we found that after adjusting for lesion size and HIV status KOH had lesser healing time than TCA. Well controlled randomized clinical trials recommended to support this finding.

Conclusion

Potassium hydroxide solution(10%) is a well tolerated medication for genital wart with low cost and faster healing time, patient applied treatment compared to 80% trichloroacetic acid in the treatment of genital wart. Thus it can be used as a treatment option in genital wart especially in areas with limited resources.

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Conflict of Interest
There is no conflict of interest.

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