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Topical potassium hydroxide 40% versus trichloroacetic acid 40% in the treatment of plantar warts: a randomized controlled trial

Hidróxido de potássio tópico 40% versus ácido tricloroacético 40% no tratamento de verrugas plantares: ensaio clínico randomizado

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ABSTRACT

Introduction: Warts are a viral skin condition caused by the human papillomavirus (HPV), which can lead to disfigurement, embarrassment, and frustration. No single treatment has been shown to guarantee complete eradication.

Objective: To evaluate and compare the effectiveness of topical potassium hydroxide (KOH) 40% and trichloroacetic acid (TCA) 40% in the treatment of plantar warts, based on clinical and dermoscopic outcomes, as well as to assess side effects and patient satisfaction.

Methods: An interventional comparative study was conducted involving 33 patients with plantar warts. Lesions were divided into two groups: Group A received topical TCA 40%, and Group B received topical KOH 40%. All patients were evaluated both clinically and through dermoscopy.

Results: Both treatment groups showed statistically significant clinical and dermoscopic improvement ($p < 0.001$ for both). Complete dermoscopic clearance without recurrence over a 2-month follow-up period was more frequent in the KOH group (88.6%).

Conclusion: Topical TCA and KOH were similarly effective. KOH, in particular, proved to be both effective and safe, making it a promising adjunct treatment for plantar warts alongside destructive and immunotherapeutic methods.

Keywords: Papillomaviridae. Warts. Controlled Clinical Trial

RESUMO

Background: *As verrugas são uma doença viral da pele causada pelo vírus do papiloma humano (HPV) que pode ser desfigurante, causando constrangimento e frustração aos pacientes. Nenhum tratamento pode garantir a erradicação total.*

Objetivo: *Avaliar e comparar a eficácia do hidróxido de potássio (KOH) tópico 40% versus ácido tricloroacético (TCA) tópico 40% no tratamento clínico e dermatoscópico de verrugas plantares, bem como relatar os efeitos colaterais e a satisfação do paciente.*

Métodos: *Este estudo intervencionista comparativo incluiu 33 pacientes com verrugas plantares. As lesões foram divididas em dois grupos: o Grupo A recebeu TCA tópico 40%, o grupo B recebeu KOH tópico 40%. Todos os pacientes foram submetidos a avaliação clínica e dermatoscópica.*

Resultados: *Ambos os grupos de tratamento apresentaram melhora significativa avaliada tanto clínica quanto dermatoscopicamente ($p < 0,001$ para ambos). A resolução dermatoscópica completa das verrugas sem recorrência durante um período de acompanhamento de 2 meses foi mais frequente no grupo KOH (88,6%).*

Conclusão: *TCA e KOH tópicos apresentaram eficácia semelhante. O KOH, em particular, demonstrou ser eficaz e seguro, tornando-se um tratamento complementar promissor para verrugas plantares, juntamente com métodos destrutivos e imunoterapêuticos.*

Palavras-chave: *Verrugas. Condiloma Acuminado. Ensaio Clínico*

Original Article

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INTRODUCTION

Plantar warts are benign skin manifestations caused by human papillomavirus (HPV) infection, most commonly types 1, 4, 57, 60, 63, 65, and 66. The myrmecia-type wart appears as a smooth-surfaced, deep, often inflamed, and tender papule or plaque. These lesions typically develop on the palms or soles, but can also occur near or under the nails, and less frequently on the fingertips. They are characteristically dome-shaped and extend deeper beneath the surface than they appear clinically. Warts are transmitted either through direct person-to-person contact or indirectly via contaminated surfaces. Verruca vulgaris accounts for approximately 70% of all cutaneous warts and occurs primarily in children.[1] Skin warts are estimated to affect up to 10% of children and young adults, with the highest incidence between 12 and 16 years of age. This prevalence increases by 50 to 100 times in immunocompromised individuals.[2]

Spontaneous clearance rates of warts are generally low and require extended periods of time, with reported rates of 23% at 2 months, 30% at 3 months, and 65%-78% after 2 years.[3] Cutaneous warts are estimated to affect up to 10% of children and young adults, with the highest incidence between 12 and 16 years of age. This prevalence increases by 50 to 100 times in immunocompromised individuals.[2]

The primary goals of treatment are to remove the wart without scarring, prevent recurrence — particularly at the same site — and, if possible, induce long-term immunity. Because of the variability of treatment outcomes, multiple therapeutic options, including combination therapies, may be considered. Treatment selection should be based on the size, location, and morphological type of the wart.[4] Destructive treatments, including chemical and surgical methods, function by damaging the epithelium and inducing infected cell death, which leads to antigen exposure and presentation,[2] thereby potentially triggering an immune response.

Superficial viral destruction can be induced by a variety of agents; however, such treatments may not reach virus-infected cells in the deeper layers of the epidermis. Direct stimulation of the immune system at the site of the wart may enhance the likelihood of an effective immunological response against infected keratinocytes.[5] Destructive procedures can be inconvenient, especially for large or multiple warts, as they may leave extensive areas of raw skin that require prolonged healing and carry an increased risk of secondary infection. Consequently, immunotherapy has emerged as a more favorable treatment option for resistant warts. Various agents have been utilized in immunotherapy, including systemic treatments such as H_2 receptor blockers, zinc, and interferons. Intralesional injections of the MMR (measles, mumps, rubella) vaccine, Candida antigen, purified protein derivative (PPD), and Trichophyton skin antigen have also been employed. Additional modalities include auto-implantation and the topical application of imiquimod.

Potassium hydroxide (KOH) solution is a promising treatment for cutaneous warts due to its keratolytic effect and ability to deeply penetrate the skin, resulting in the destruction of virus-infected cells. Its irritant properties may also stimulate an inflammatory response, contributing to wart resolution. KOH is associated with minimal side effects and is inexpensive.[6]

Trichloroacetic acid (TCA) is a topical destructive agent that induces hydrolysis of cellular proteins, leading to cell death. When applied to the skin, it causes coagulative necrosis of epidermal cells, precipitates proteins, and leads to necrosis of collagen from the papillary to upper reticular dermis. Within a few days, unaffected adnexal structures regenerate the skin, and the necrotic tissue peels away. TCA produces results similar to those of cryotherapy and is effective in treating anal, genital, cervical, and common warts when used at concentrations of 70-80%.[3] For common warts, lower concentrations (10-30%) are typically used. TCA offers the advantage of having no systemic toxicity, though local side effects such as burning, discomfort, hyperpigmentation, and, less commonly, scarring may occur.[7]

The aim of this study was to evaluate and compare the effectiveness of topical TCA 40% versus topical KOH 40% in the treatment of plantar warts, both clinically and dermoscopically, and to report on associated side effects and patient satisfaction.

MATERIALS AND METHODS

This interventional comparative study included 33 patients aged over 10 years. Each patient had two plantar warts: one lesion was treated with KOH and the other with TCA. Patients were excluded if they had autoimmune diseases, symptoms suggestive of inflammation or infection, were receiving immunosuppressive therapy, were pregnant or lactating, or had received wart treatment in the preceding months.

Following approval by the Research Ethics Committee of the Central Directorate for Research and Health Development, Egyptian Ministry of Health (IORG0005704/IRB0000687; Com. No./Dec. No: 7-2023/31), the study was conducted in the outpatient procedures department of the Cairo Hospital of Dermatology and Venereology, from December 2022 to July 2023. Written informed consent was obtained from each participant or from a parent/guardian in cases involving minors under 18 years of age.

Patients underwent a complete medical history to document name, age, sex, address, contact information, duration of the warts, and any previous therapeutic attempts and their outcomes. This was followed by a thorough clinical examination of the warts[4] to record their size, location, and surface characteristics. Each patient had two plantar warts: one lesion was treated with KOH and the other with TCA. The lesions were randomly assigned into two groups: Group A (33 lesions) received topical TCA 40%, and Group B (33 lesions) received topical KOH 40%. A piece of cotton soaked with the respective solution was gently applied to each wart and left in place for 1-2 hours. Both treatments were administered on the same day.

Treatment sessions were performed weekly until complete improvement or for a maximum of six sessions. All patients were evaluated through both clinical and dermoscopic assessments. Treatment efficacy was evaluated based on the following criteria:

Clinical photography

Photographs were taken at baseline, after every two treat¬ment sessions, and two months following the final treatment session. All images were evaluated by two dermatology consul¬tants who were blinded to patient identity and treatment details. The improvement of plantar warts was assessed using a three-point scale: i) non-responder (0): <25% improvement; ii) mild improvement (1): 25-75% improvement; and iii) complete im¬provement (2): >75% improvement. Images were captured using a smartphone camera (Samsung A7), featuring a 24-megapix¬el primary sensor, an 8-megapixel wide-angle sensor, and a 5-megapixel depth sensor.

Dermoscopic evaluation

Dermoscopic findings included thrombosed blood ves¬sels interrupting the cutaneous dermatoglyphics. A handheld dermoscope (DermLite DL4, 3Gen, USA) was used for exam¬ination. Evaluations were performed at baseline, after every two treatment sessions, and 2 months after the final session. Two inde-pendent dermatologists, blinded to treatment details, assessed the images using the following three-point scale: i) non-responder (0); ii) mild improvement (1); and iii) complete improvement (2).

Patient satisfaction:

Patient satisfaction was evaluated after the final treatment session using a 6-point scale ranging from 0 (not satisfied) to 5 (very satisfied).

Adverse effects were monitored and included post-inflammatory hyperpigmentation, hypopigmentation, bullae, erythema, infection, and scarring. Patients who experienced adverse effects received detailed post-treatment wound care instructions and were prescribed a topical antiseptic solution and antibiotic cream as needed.

Statistical analysis:

Data were collected, edited, coded, and entered using IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, N.Y., USA). Quantitative data were presented as the mean, standard deviation (SD), and range for parametric variables, or as the median and interquartile range (IQR) for non-parametric variables. Categorical variables were expressed as frequencies and percentages.

The chi-square test was used to compare qualitative variables between groups. For quantitative data, the independent t-test was applied to compare two groups with parametric distribution, while the Mann-Whitney U test was used for non-parametric comparisons.

A margin of error of 5% was accepted, and 95% confidence interval. The following thresholds were used to interpret p-values:

Not significant: $p > 0.05$
Significant: $p < 0.05$
Highly significant: $p < 0.01$

RESULTS

The study included 33 individuals: 12 men (36.4%) and 21 women (63.6%), all with multiple plantar warts. Participants' ages ranged from 14 to 50 years, with a mean age of 32.42 ±

Table 1: Demographic and clinical characteristics of patients

		N = 33
Age (years)	Mean ± SD	32.42 ± 8.96
	Range	14-50
Sex	Females	21 (63.6%)
	Males	12 (36.4%)
Number of warts	Mean ± SD	2.48 ± 0.76
	Range	2-4
Duration of warts (months)	Median (IQR)	2 (1-4)
	Range	1-12
Occupation	Housewife	14 (42.4%)
	Worker	4 (12.1%)
	Student	3 (9.1%)
	Secretary	2 (6.1%)
	Accountant	2 (6.1%)
	Butcher	2 (6.1%)
	Cloth sewer	1 (3.0%)
	Musician	1 (3.0%)
	Mechanic	1 (3.0%)
	Engineer	1 (3.0%)
	Barber	1 (3.0%)
	Chef	1 (3.0%)

Table 2: Follow-up of clinical photography assessment at different time points in both groups

Clinical photography		After 2 weeks	After 4 weeks	After 6 weeks	2-month follow-up	Test value	p-value	Sig.
KOH group	Non-responder	17 (51.5%)	1 (3.0%)	0 (0.0%)	0 (0.0%)	74.148	<0.001	HS
	Mild improvement	16 (48.5%)	28 (84.8%)	21 (72.4%)	8 (34.8%)			
	Complete improvement	0 (0.0%)	4 (12.1%)	8 (27.6%)	15 (65.2%)			
TCA group	Non-responder	12 (36.4%)	0 (0.0%)	0 (0.0%)	1 (4.3%)	64.248	<0.001	HS
	Mild improvement	21 (63.6%)	30 (90.9%)	21 (72.4%)	1 (4.3%)			
	Complete improvement	0 (0.0%)	3 (9.1%)	8 (27.6%)	15 (65.2%)			

P > 0.05 = Not significant (NS); p < 0.05 = Significant (S); p < 0.01 = Highly significant (HS)
**Chi-square test*

Table 3: Follow up for dermoscopic photography assessment at different times of measurement in both groups

Dermoscopic photography		After 2 weeks	After 4 weeks	After 6 weeks	2-month follow-up	Test value	p-value	Sig.
KOH group	Non-responder	16 (48.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	85.228	<0.001	H S
	Mild improvement	17 (51.5%)	30 (90.9%)	22 (73.3%)	6 (27.3%)			
	Complete improvement	0 (0.0%)	3 (9.1%)	8 (26.7%)	16 (72.7%)			
TCA group	Non-responder	10 (30.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	60.857	<0.001	H S
	Mild improvement	23 (69.7%)	30 (90.9%)	19 (63.3%)	7 (33.3%)			
	Complete improvement	0 (0.0%)	3 (9.1%)	11 (36.7%)	14 (66.7%)			

P > 0.05 = Not significant (NS); p < 0.05 = Significant (S); p < 0.01 = Highly significant (HS)
**Chi-square test*

8.96 years. The duration of warts ranged from 2 to 4 months, with a mean of 2.48 ± 0.76 months (Table 1).

A statistically significant improvement in clinical photographic assessment was observed throughout the treatment sessions in both the KOH and TCA groups, with p-values < 0.001 and 0.001, respectively (Table 2).

Dermoscopic photographic assessment also revealed statistically significant improvement during treatment in both groups, with p-values < 0.001 for each (Table 3).

Complete dermoscopic clearance of warts without recurrence during the 2-month follow-up period was achieved in 88.6% of the KOH group, compared to 66.7% of the TCA group.

There was no statistically significant difference between the two groups in terms of the number of sessions required for improvement or patient satisfaction scores. Both groups had a median of 6 sessions (IQR 3-6) (Table 4).

TABLE 4: Comparison between KOH and TCA groups regarding number of improvement sessions and patient satisfaction score

		KOH group	TCA group	Test value	P-value	Sig.
		n = 33	n = 33			
Number of improvement sessions	Median (IQR)	6 (5-6)	6 (5-6)	0.481≠	0.631	NS
	Range	3-6	3-6			
Patient satisfaction score	Median (IQR)	4 (3-5)	4 (3-5)	0.931≠	0.352	NS
	Range	2-5	2-5			

P > 0.05 = Not significant (NS); p < 0.05 = Significant (S); p < 0.01 = Highly significant (HS)
≠ Mann-Whitney test

TABLE 5: Comparison between KOH and TCA groups regarding side effects

		KOH group	TCA group	Test value	P-value	Sig.
		n = 33	n = 33			
Presence of side effects	No	25 (75.8%)	30 (90.9%)	2.727★	0.099	NS
	Yes	8 (24.2%)	3 (9.1%)			
Type of side effects	Black eschar	4 (50.0%)	0 (0.0%)	8.479★	0.132	NS
	Burning sensation	2 (25.0%)	0 (0.0%)			
	Ulcer	1 (12.5%)	0 (0.0%)			
	Subcorneal hemorrhage	1 (12.5%)	1 (33.3%)			
	Peeling	0 (0.0%)	1 (33.3%)			
	Tingling sensation	0 (0.0%)	1 (33.3%)			

P > 0.05 = Not significant (NS); p < 0.05 = Significant (S); p < 0.01 = Highly significant (HS)
★Chi-square test

No statistically significant differences were found between the groups regarding the occurrence or types of side effects, with p-values of 0.099 and 0.132, respectively. Side effects were reported in 9.1% (3 patients) in each group. In the KOH group, the side effects included burning sensation (66.7%, 2 patients) and subcorneal hemorrhage (33.3%, 1 patient). In the TCA group, side effects included ulceration, subcorneal hemorrhage, and peeling—each reported in 33.3% of the affected patients (Table 5).

No statistically significant difference was found between the two groups regarding final dermoscopic and clinical responses. Both groups showed similar rates of mild clinical improvement: 24.2% in the KOH group and 21.2% in the TCA group. Regarding final dermoscopic response, complete improvement was observed in 81.8% of the KOH group and 78.8% of the TCA group (Table 6).

Table 6: Comparison between KOH and TCA groups regarding final dermoscopic and clinical response

		KOH group	TCA group	Test value	p-value	Sig.
		n = 33	n = 33			
Final dermoscopic response	Non-responder	0 (0.0%)	0 (0.0%)	0.096	0.757	NS
	Mild improvement	6 (18.2%)	7 (21.2%)			
	Complete improvement	27 (81.8%)	26 (78.8%)			
Final clinical response	Non-responder	0 (0.0%)	1 (3.0%)	1.067	0.587	NS
	Mild improvement	8 (24.2%)	7 (21.2%)			
	Complete improvement	25 (75.8%)	25 (75.8%)			

P > 0.05 = Not significant (NS); p < 0.05 = Significant (S); p < 0.01 = Highly significant (HS)
**Chi-square test*

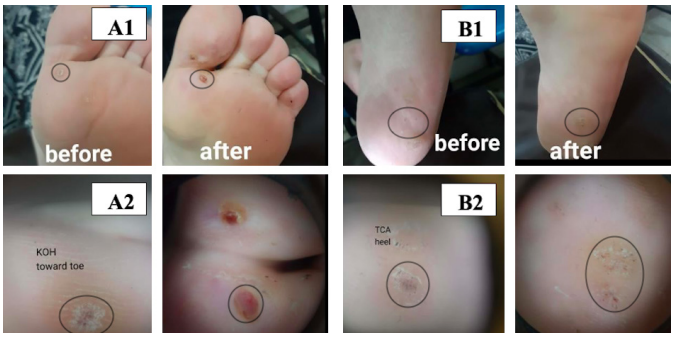

Figure 1: A - 26-year-old female patient with two plantar warts present for 3 months, each treated with KOH 40% and TCA 40% over six sessions. **A1 -** Wart near the big toe treated with KOH, showing complete clinical improvement (score 2). **A2 -** Dermoscopic image of the same wart, showing complete improvement (score 2). The patient reported a satisfaction score of 5 and minimal side effects. **B1 -** Wart on the heel treated with TCA, showing mild clinical improvement (score 1). **B2 -** Dermoscopic image of the same wart, showing mild improvement (score 1). The patient reported a satisfaction score of 4 and no side effects.

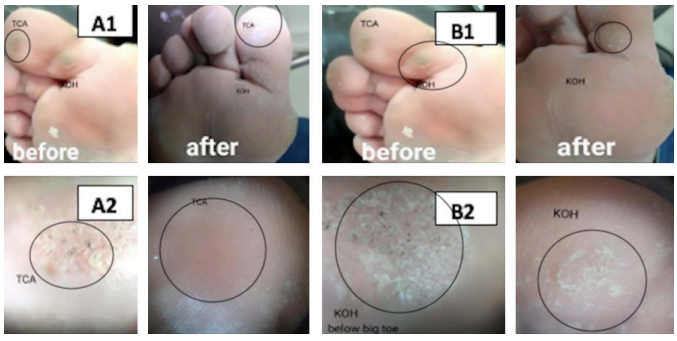

Figure 2: A - 22-year-old female patient with two plantar warts present for 1 month, treated with KOH 40% and TCA 40% over five sessions. **A1 -** Wart on the tip of the big toe treated with TCA, showing mild clinical improvement (score 1). **A2 -** Dermoscopic image of the same wart, showing complete improvement (score 2). The patient reported a satisfaction score of 3 and no side effects. **B1 -** Wart at the base of the big toe treated with KOH, showing complete clinical improvement (score 2). **B2 -** Dermoscopic image of the same wart, showing complete improvement (score 2). The patient reported a satisfaction score of 5 and no side effects.

A highly statistically significant correlation was found between dermoscopic and clinical assessments in the KOH group (p = 0.007). A statistically significant correlation was also observed in the TCA group (p = 0.022).

Final dermoscopic and clinical outcomes are illustrated in figure 1 and figure 2.

DISCUSSION

HPV is the primary cause of common warts, which often affect children and immunocompromised individuals. Warts can be disfiguring, leading to embarrassment and frustration, which motivates most patients to seek treatment.[8]

Although various treatment options are available — including topical medications, cryotherapy, laser therapy, photodynamic

therapy, surgical excision, and immunotherapy — no single method guarantees complete eradication or prevention of recurrence.[9]

Due to their destructive nature, many of these treatments can leave scars. Less invasive approaches, while minimizing scarring, may produce suboptimal responses or increase the likelihood of recurrence, particularly in patients with large or multiple lesions. For these reasons, immunotherapy has gained increasing attention and popularity.[10]

KOH has been investigated for its efficacy and tolerability in wart treatment. It has been shown to be a safe and effective option for treating plane warts. Its keratolytic properties promote the destruction of virus-infected cells, facilitating wart resolution.[11]

TCA is a topical destructive agent that induces cell death through the hydrolysis of cellular proteins. When applied to the skin, TCA causes protein precipitation, coagulative necrosis of epidermal cells, and collagen necrosis extending from the papillary to the upper reticular dermis. Within a few days, the epidermis regenerates from adnexal structures that were unaffected by the chemical injury, and the necrotic layers peel off. At various concentrations, TCA has been shown to be effective in treating anal, genital, cervical, and common warts, with response rates comparable to those achieved with cryotherapy.[11]

The aim of this study was to evaluate and compare the effectiveness of topical TCA 40% and KOH 40% in the treatment of plantar warts, using both clinical and dermoscopic assessments, while also documenting any side effects and levels of patient satisfaction.

This interventional comparative study included 33 patients over the age of 10 with multiple plantar warts. Exclusion criteria included autoimmune disease, signs of active inflammation or infection, use of immunosuppressive therapy, pregnancy or lactation, and receipt of wart treatment in the preceding months.

Patients underwent a complete medical history, including documentation of name, age, sex, address, contact information, duration of warts, and any previous therapeutic attempts and their outcomes. A thorough clinical examination of the warts was then performed to assess their size, location, surface characteristics, and number. Each patient's lesions were randomly divided into two groups: Group A received topical TCA 40%, and Group B received topical KOH 40%. The topical solutions were applied using a cotton swab and left in place for 1-2 hours. Both treatments were administered on the same day.

Treatment sessions were conducted weekly until complete improvement or for a maximum of six sessions. All patients were evaluated through clinical and dermoscopic assessments. Dermoscopic findings included the presence of thrombosed blood vessels interrupting the cutaneous dermatoglyphics.

Assessments were performed at baseline, after every two sessions, and two months after the final treatment session, using a three-point scale: i) non-responder (0); ii) mild improvement (1); and iii) complete improvement (2).

Among the studied patients with plantar warts, 63.6% were female and 36.4% were male.

Similarly, gender distribution in a study conducted by Hanif et al. (2022) showed that 48.65% of participants were male and 51.35% were female, all presenting with plantar warts.[11] In our study, participant age ranged from 14 to 50 years, with a mean ± SD of 32.42 ± 8.96 years. This was comparable to the findings of Al Mokadem et al. (2022), who reported an age range of 18 to 50 years in their study.[12]

No statistically significant difference was observed between the two groups regarding final dermoscopic and clinical responses. Based on final dermoscopic evaluation, complete improvement was recorded in 81.8% of the KOH group and 78.8% of the TCA group.

Complete dermoscopic clearance of warts without recurrence during the 2-month follow-up period was achieved in 88.6% of patients in the KOH group, compared to 66.7% in the TCA group.

Both groups showed statistically significant improvement in clinical and dermoscopic assessments across successive treatment sessions, with p-values of <0.001 for the KOH group and 0.001 for the TCA group.

The time required for complete wart resolution ranged from 3 to 6 weeks. Patient satisfaction scores ranged from 2 to 5, with a median of 4 in both the KOH and TCA groups.

No statistically significant difference was observed between the KOH and TCA groups regarding the incidence and type of side effects, with p-values of 0.099 and 0.132, respectively.

Since there were no significant differences between the KOH- and TCA-treated groups in terms of treatment response, number of sessions required for clearance, or patient satisfaction, these findings suggest that KOH has a therapeutic effect comparable to that of TCA. Both agents appear capable of achieving similar clinical outcomes.

Similarly, Khan et al. (2017) enrolled 100 patients with palmoplantar warts and treated them with 10% topical KOH applied once daily at night. The efficacy was comparable for both palmar and plantar warts ($p = 0.85$). Notably, a significantly better outcome ($p = 0.04$) was observed in patients with a single lesion, with 90.91% (20 out of 22) showing complete clearance. The study concluded that 10% KOH is highly effective for the treatment of palmoplantar warts, especially in cases involving a single lesion.[13]

Likewise, Bodar et al. (2020) reported that TCA needling was an effective technique for treating palmoplantar warts in a study involving patients aged 4 to 50 years. After obtaining informed consent, participants received weekly applications of 100% TCA followed by needling using an insulin syringe. Total wart clearance was achieved within a minimum of three weeks and a maximum of eight weeks.[11,14]

In contrast, Hanif et al. (2022) compared 148 cases of palmoplantar warts in patients of both sexes, aged 3 to 12 years. The

participants were divided into two groups of 74 each: Group A received topical TCA 35%, and Group B received topical KOH 10%. Efficacy was observed in 28 cases (37.84%) in Group A and 57 cases (77.03%) in Group B. Group B demonstrated significantly superior results compared to Group A ($p = 0.0001$).[11] According to their findings, 10% KOH was substantially more effective than 35% TCA, even after accounting for confounding variables such as age, site, size, and duration of the warts. These results suggest that higher concentrations of TCA may be required to achieve clearance of plantar warts, whereas lower concentrations of KOH can be equally effective.

Similarly, Attia et al. (2020) reported that both KOH 30% and TCA 30% were equally effective in the treatment of plane warts, with no statistically significant differences between the groups at the end of the treatment period or during follow-up. The study included 60 patients with plane warts, divided into two groups: Group A (TCA) and Group B (KOH). Complete clearance was observed in seven patients (23.3%) in each group. After 12 weeks, partial improvement was achieved in 15 patients (50%) in Group A and 16 patients (53.3%) in Group B. Non-response was noted in eight patients (27.6%) in Group A and seven patients (23.3%) in Group B.[15]

In contrast, Al-Hamdi et al. (2012) reported that topical KOH at lower concentrations (5% and 10%) provided a safe, effective treatment for plane warts, with minimal adverse effects. The study involved 250 patients with plane warts, divided into two equal groups based on age and sex. Group A received topical KOH 5% once nightly, while Group B received KOH 10% once nightly. By the end of the second week, complete wart clearance was observed in 9.3% of patients in Group A and 66.3% in Group B. At the end of the fourth week, complete response was achieved in 82.1% of Group B and 80.3% of Group A. Reported side effects included itching, burning sensation, erythema, and transient dyspigmentation, affecting 77.6% of patients in Group A and 90.5% in Group B. During the 3-month follow-up, recurrence rates were low in both groups: 5.8% in Group A and 5.1% in Group B.[16]

Patient-related variables such as age, gender, occupation, and wart location did not significantly influence treatment response in any of the study groups. However, larger-scale studies are warranted to confirm these findings.

In our study, side effects were minimal. Burning sensation was the most frequently reported adverse effect in the KOH group, consistent with findings by Attia et al. (2020).[15]

Limitations

The limitations of this study include the small sample size, the lack of long-term post-treatment follow-up, and the absence of correlation between long-term response and treatment outcome.

CONCLUSION

Both TCA and KOH demonstrated comparable effectiveness in the treatment of plantar warts. Notably, patients with a wart duration of less than 6 months showed a better therapeutic response.[13] Burning sensation was more frequently reported in the KOH group, along with pain and black eschar formation. Overall, topical TCA 40% and KOH 40% are effective and moderately safe options for the treatment of plantar warts and may be considered viable therapeutic alternatives.

Recommendations

Further prospective studies with larger sample sizes are recommended to validate the findings.

Additional investigations using different concentrations of both TCA and KOH are needed to assess their impact on clinical response in patients with plantar warts.

Future studies should include detailed documentation of side effects after each individual treatment session. ●

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Approval of the final version of the manuscript, conception and design of the study, preparation and writing of the manuscript, effective participation in the conduct of the study, intellectual participation in the propaedeutic and/or therapeutic approach to the cases studied.

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