

Comparative Efficacy of 25% Trichloroacetic Acid Peel Versus 30% Salicylic Acid Peel in Mild to Moderate Acne Vulgaris

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ABSTRACT

Objective: To compare the efficacy of 25% trichloroacetic acid peel (TCA) versus 30% salicylic acid peel (SA) in mild to moderate acne vulgaris.

Study Design: Randomized Control Trial (ClinicalTrials.gov: NCT05712837).

Place and Duration of Study: Department of Dermatology, Combined Military Hospital, Abbottabad Pakistan, from Jun to Nov 2022.

Methodology: Sixty patients with mild and moderate facial acne vulgaris (i.e, comedones, papules and pustules) diagnosed by consultant dermatologist on clinical presentation were included in this study. After randomization, patients were divided into two groups. Group-A was managed with 25% Trichloroacetic Acid (TCA) peel, while Group-B was managed with 30% Salicylic acid (SA) peel. Clinical evaluation was done and recorded initially at the start of therapy and then at every fourth week for twelve weeks. Efficacy was compared in both groups at the end of twelve weeks.

Results: 30% SA peel was more efficacious in achieving good MAS count (64.57 ± 1.176) at the end of 12-weeks as compared to 25% TCA peel (54.30 ± 3.52) (p -value < 0.001).

Conclusion: This randomized controlled trial showed that 30% SA peel was more efficacious in treating mild-to-moderate acne vulgaris of the face compared to 25% TCA peel.

Keywords: Acne Vulgaris, Michaelson Acne Score, Salicylic Acid, Trichloroacetic Acid.

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INTRODUCTION

Acne vulgaris is an inflammatory disorder of the pilosebaceous unit characterized by comedones and inflammatory lesions such as papules, pustules, nodules, cysts, and abscesses.¹ A variety of therapeutic modalities are available, including systemic, topical, and physical therapies. Topical retinoids, benzoyl peroxide and antibiotics have been the cornerstone of topical treatment of acne.² Combination formulations of these topical agents are also commonly prescribed for acne. Recently, topical Dapsone, Azelaic acid 5%, topical Delta-Aminolevulinic acid and α -hydroxy acids have been used to treat acne vulgaris.^{3,4} Some other most frequently used peeling agents are Salicylic acid, Glycolic acid, Pyruvic acid, Lactic acid, Mandelic acid, Jessner solution, Trichloroacetic acid, and Phenol.⁵ It has been established that both Salicylic acid (SA) and Trichloroacetic acid (TCA) are effective and safe peeling agents for acne vulgaris⁶⁻⁸ but there is scarcity of local data to validate their therapeutic efficacy especially in our local population. Therefore, this

study aimed to evaluate the efficacy of two peeling agents (25% TCA peel and 30% SA peel) in treating mild to moderate acne vulgaris.

METHODOLOGY

This randomized controlled trial was conducted at the Department of Dermatology, CMH Abbottabad, from June 2022 to November 2022. Ethical approval (file no: CMHAtD-ETH-Derma-22) was sought from the Ethical Committee of the hospital.

The sample size was calculated by WHO Sample Size calculator with 86.50%⁹ decrease in mean MAS count with 30% SA as compared to 54.0% decrease in mean MAS with 25% TCA, 80% power of test and 5% significance level. Nonprobability consecutive sampling technique was used to gather the sample for this trial.

Inclusion Criteria: Patients of either gender, aged 13 to 22 years, with mild (Grade-I, comedones and occasional papules) and moderate (Grade-II, comedones, many papules and few pustules) acne vulgaris of the face diagnosed by consultant dermatologist on clinical presentation were included in the study.

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Exclusion Criteria: Women who were pregnant or nursing, patients with a history of photosensitivity, hypertrophic scars or a keloidal tendency, active or recurrent herpes simplex infection, taking acne medication or who have taken oral or topical medication within the past 4 weeks were excluded.

Written informed consent was taken from all the study participants after a complete description of the study protocol. Acne vulgaris of the face was diagnosed on clinical presentation by consultant dermatologist with minimum 5 years of experience. Grade-I (comedones and occasional papules) and Grade-II (comedones, many papules and few pustules) acne vulgaris were labelled as mild and moderate respectively.

To ensure randomization, the lottery method was used to allocate the patients to study groups. Group-A was managed with 25% TCA peel (every 4th week for a total of 12 weeks), while Group-B was managed with 30% SA peel (every 4th week for a total of 12 weeks) as shown in Figure. When performing the peel, standard procedures¹⁰ for chemical peels were adopted. Homogenous erythema, or a generalized redness with a faint white icing was the intended effect for the TCA peel group. The SA peel group aimed for rapid (pseudofrost) whitening in under a minute. After finishing the peel was rinsed under cold water and patted dry with gauze to remove it. Treatment response was recorded at the 4th, 8th and 12th week in terms of reduction in Mean Acne Score(MAS) between baseline and 12 weeks, and evaluated as good when greater than 50% reduction, fair when 21%-50% reduction, and poor when less than 20% reduction was achieved.¹¹ Patients who had reached the primary endpoint of the trial (i.e, achieved greater than 50% reduction in MAS count), were excluded from further analysis at each follow-up visit.

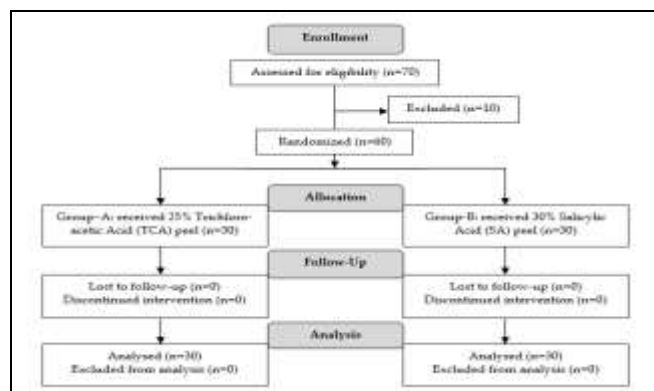


Figure: Patient flow diagram

All statistical analysis was performed using Statistical Package for the social sciences (SPSS) version 23.00. Demographic and clinical characteristics of patients in both groups were described by using descriptive statistics. The chi-square test and independent samples t-test was applied to look for the difference in categorical and quantitative variables in both groups respectively. Differences between both groups were considered significant if the *p*-values were less than or equal to 0.05.

RESULTS

A total of sixty patients were recruited for the study. Out of 60 patients with acne vulgaris of the face, 30 patients were managed by 25% TCA peel, while 30 patients were managed by 30% SA peel after the randomization. In Group-A, 15(50.0%) patients were males, while 15(50.0%) patients were females. In Group-B, 12(40.0%) patients were males, while 18(60.0%) patients were females (*p*-value 0.436) (Table-I).

Table-I: Demographic Characteristics of Study Participants with Acne Vulgaris (n=60)

Categorical Variables	Study Groups		p-value
	Group-A (n=30)	Group-B (n=30)	
Age Groups n(%)			
13-18 Years	16(53.3%)	23(76.7%)	0.058
19-22 Years	14(46.7%)	07(23.3%)	
Gender n(%)			
Male	15(50.0%)	12(40.0%)	0.436
Female	15(50.0%)	18(60.0%)	

At the baseline, in Group-A, mean baseline comedone count was 215.63±74.21 while in Group-B, mean baseline comedone count was 217.07±73.26 (*p*-value 0.940). In Group-A, mean baseline papule count was 78.83±6.35 while in Group-B, mean baseline papule count was 81.97±5.66 (*p*-value 0.048). In Group-A, mean baseline pustule count was 16.03±1.29, while in Group-B, mean baseline pustule count was 17.10±1.42 (*p*-value 0.004). In Group-A, mean baseline MAS count was 156.37±4.70, while in Group-B, mean baseline MAS count was 149.33±4.52 (*p*-value <0.001).

After 12 weeks of treatment, in Group-A, mean final comedone count was 85.10±5.47 while in Group-B, mean final comedone count was 68.47±11.51 (*p*-value <0.001). In Group-A, mean final papule count was 14.93±0.94 while in Group-B, mean final papule count was 12.47±1.27 (*p*-value <0.001). In Group-A, mean final pustule count was 5.87±1.30 while in Group-B, mean final pustule count was 4.10±0.80 (*p*-value <0.001). In Group-A, mean final MAS count was

64.57±1.17 while in Group-B, mean final MAS count was 54.30±3.52 (p -value <0.001) (Table-II).

Table-II: Baseline and Clinical Characteristics of Patients with Acne Vulgaris prior to Initiation of Treatment (n=60)

Outcome Variables	Study Groups (n=60)		p -value
	Group-A (n=30)	Group-B (n=30)	
	Mean±SD	Mean±SD	
Baseline Comedone Count	215.63±74.21	217.07±73.26	0.940
Baseline Papule Count	78.83±6.35	81.97±5.66	0.048
Baseline Pustule Count	16.03±1.299	17.10±1.423	0.004
Baseline Mean Acne Score	156.37±4.70	149.33±4.52	<0.001
After twelve weeks of treatment			
Final Comedone Count	85.10±5.47	68.47±11.51	<0.001
Final Papule Count	14.93±0.94	12.47±1.27	<0.001
Final Pustule Count	5.87±1.306	4.10±0.80	<0.001
Final MAS Count	64.57±1.176	54.30±3.52	<0.001

DISCUSSION

The results of our study suggest that 30% SA peel was more efficacious in treating mild-to-moderate acne vulgaris of the face compared to 25% TCA peel. The skin's texture and pigmentary anomalies can be improved with chemical peels, which are resurfacing procedures that use a chemical agent to exfoliate the skin in a controlled manner. Its rising popularity can be attributed to the fact that they are simple, cost-effective, and easy-to-implement methods.¹²⁻¹⁴ The three original and most reliable chemical peeling agents are Glycolic acid, Salicylic acid, and Trichloroacetic acid.¹⁵

TCA peels improve the skin's histological structure and clinical appearance, making them an effective treatment for a variety of dermatological conditions. It has been tried as a stand alone therapy and in combination with other drugs for acne. SA peel (20-30%) has been demonstrated to be beneficial in several studies as a superficial peeling agent for the treatment of acne vulgaris. SA is effective in the treatment of both acne and PIH, both of which are more common in people of darker skin tones. Its whitening effect is a major factor for Asian patients with acne vulgaris when deciding to use it as a superficial peeling agent.¹⁶

Only two studies^{9,10} have compared the efficacy of SA peels to that of TCA peels. In a recent study, Abdel Hay *et al.*,¹⁰ compared a 25% TCA peel to a mixed solution of 20% Azelaic acid and 20% SA on 34 people with mild to moderate acne vulgaris. After 8 weeks, there were notable improvements in both therapy groups. It was shown, however, that neither

of the treatments had any noticeable advantage over the other. In the early stages of the condition, or when patients have inflammatory lesions, the combination of Azelaic acid and SA is indicated, while TCA is preferred for those with non-inflammatory lesions, as stated by the authors. A split-face study by Abdel Meguid *et al.*,⁹ compared the efficacy of 25% TCA peels with 30% SA peels in the treatment of facial acne in twenty individuals with Fitzpatrick skin types III to V. In contrast, statistically significant differences were seen between the two groups, with SA peel showing greater efficacy against acne vulgaris since it considerably reduced individual lesion counts and produced good MAS in comparison to TCA peel.^{17,18}

The fact that both TCA and SA peels have a comedolytic effect may explain why these results are consistent with those of Abdel Meguid *et al.*¹⁰

Chemical peeling has been around for quite some time, and despite the proliferation of newer techniques for rejuvenating the skin, it still has the reputation of being a simple procedure that necessitates minimal equipment.¹⁹ Priming the patient is crucial for an effective peel with few complications.²⁰ Because of their similar effects on comedolysis, TCA and SA may perform similarly as peels.

Our study found that the average number of papules significantly decreased after 12 weeks of treatment. Group-B (SA) significantly reduced their mean papule count by a larger proportion than Group-A (TCA). The mean number of pustules decreased more in the SA group than in the TCA peel group after 12 weeks of therapy. A statistically significant difference was found in the mean number of pustules removed by both groups after 12 weeks of treatment.

It was discovered by Abdel Meguid *et al.*,⁹ that 30% SA peels are more effective than 25% TCA peels for treating inflammatory lesions on people with dark skin. Results from our study are supported by a decrease in inflammatory acne lesions. When comparing the SA peel to the TCA peel, the SA peel appears to be more effective at treating papules and pustules. This may be due to the SA peel's ability to inhibit the arachidonic acid cascade (inflammatory lesions).^{21,22}

There was statistically significant progress in both groups when comparing MAS levels before and after treatment was completed. Abdel Meguid *et al.*,⁹ compared the effectiveness of 30% SA peels to that of 25% TCA peels for the treatment of mild to moderate

acne vulgaris and found that both were effective. Our results are comparable with theirs.

A significant reduction in both individual lesion count and MAS counts throughout the course of medication represents an objective analysis of acne improvement, which highlights the benefits of our study.

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LIMITATION OF STUDY

This study had certain limitations as well. First, patients were not followed for recurrence, and notes were also not taken on the occurrence of specific complications or unintended side effects during the study period. Second, we did not measure patients' satisfaction with the treatments, instead relying solely on clinical parameters.

CONCLUSION

The results of our study suggest that 30% SA peel was more efficacious in treating mild-to-moderate acne vulgaris of the face compared to 25% TCA peel. However, large multicentered randomized controlled clinical trials are needed to strengthen the current understanding of the efficacy of chemical peels containing salicylic acid in our local population.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

KG & BM: Data acquisition, data analysis, critical review, approval of the final version to be published.

MAS & MH: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

SI & HF: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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