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Original Research Article

Comparative Efficacy and Safety of 70% Glycolic Acid and 30% Trichloroacetic Acid Peels in Facial Atrophic Acne Scars: A Randomised Open-Label Study

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Abstract

Background: Facial atrophic acne scars are common permanent sequelae of inflammatory acne and can produce considerable cosmetic and psychological distress. Chemical peeling is a relatively simple and cost-effective treatment for superficial and moderately deep scars. Glycolic acid and trichloroacetic acid are commonly used peeling agents, but comparative clinical data in darker skin types remain limited.

Materials and Methods: This randomised open-label comparative study included 20 adults with facial atrophic acne scars and Fitzpatrick skin types IV-VI. Ten patients received 70% glycolic acid peels and ten received 30% trichloroacetic acid peels. All patients were primed with 0.025% tretinoin cream at night and sunscreen with sun protection factor 30 during daytime for two weeks before treatment. Peeling was performed every four weeks for 16 weeks. Response was assessed using the Goodman and Baron quantitative global acne scarring grading system, physician visual analogue scale and patient visual analogue scale at baseline and at 4, 8, 12 and 16 weeks.

Results: The mean Goodman and Baron score decreased from 12.40 ± 3.12 at baseline to 8.65 ± 2.60 at the fourth follow-up in the glycolic acid group, corresponding to a 30.2% reduction. In the trichloroacetic acid group, the score decreased from 13.10 ± 3.45 to 6.50 ± 2.45, corresponding to a 50.4% reduction. The between-group difference at the final follow-up was not statistically significant (p=0.073). Trichloroacetic acid produced greater numerical improvement but was associated with more crusting, dryness, acne flare and post-inflammatory hyperpigmentation.

Conclusion: Both 70% glycolic acid and 30% trichloroacetic acid peels produced progressive improvement in facial atrophic acne scars. The 30% trichloroacetic acid peel showed greater reduction in scar scores but caused more adverse effects and downtime. The 70% glycolic acid peel is a useful alternative for patients who require better tolerability or lesser downtime.

Keywords: Acne scars; Chemical peel; Glycolic acid; Trichloroacetic acid; Goodman and Baron score.

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Introduction

Acne vulgaris is a common inflammatory disorder of the pilosebaceous unit. Inflammatory lesions may cause dermal collagen destruction and permanent facial scarring. [1] Acne scarring is a frequent sequela of acne and may persist long after active inflammatory lesions have resolved. [2] Facial acne scars can adversely affect appearance, self-confidence, interpersonal relationships and psychological well-being. [3]

Atrophic scars are the most frequent sequelae of acne and are commonly classified as ice-pick, rolling and boxcar scars. Available treatment options include chemical peeling, subcision, microneedling, punch techniques, dermabrasion, fillers, platelet-rich plasma and laser resurfacing. Treatment selection depends on scar morphology, depth, skin type, cost, patient expectations and acceptable downtime. [4] The Goodman and Baron quantitative global acne scarring grading system provides an objective numerical method for documenting the type and number of scars and for assessing response after treatment. [5]

Chemical peels produce controlled injury followed by epidermal regeneration and dermal remodelling. Glycolic acid is an alpha-hydroxy acid that promotes epidermal exfoliation, while trichloroacetic acid causes protein coagulation and a concentration-dependent controlled chemical

injury. Appropriate priming, photoprotection and post-procedure care are particularly important in darker skin because of the risk of post-inflammatory hyperpigmentation. [6]

The present study was undertaken to compare the efficacy and tolerability of 70% glycolic acid peel and 30% trichloroacetic acid peel in patients with facial atrophic acne scars.

Materials and Methods

This randomised open-label comparative interventional study was conducted in the Department of Dermatology, Venereology and Leprosy, Navodaya Medical College Hospital and Research Centre, Raichur. Twenty adults with facial atrophic acne scars and Fitzpatrick skin types IV-VI were recruited after written informed consent. The participants were randomised into two equal groups of ten each. Group A underwent 70% glycolic acid peeling and Group B underwent 30% trichloroacetic acid peeling.

Adults aged 18 years or older with facial atrophic acne scars were included. Patients with active acne, topical treatment for acne scars during the previous one month, oral treatment including isotretinoin during the previous three months, or an aesthetic procedure such as laser therapy, platelet-rich plasma or acne scar surgery during the previous three months were excluded. Other exclusions were active or recurrent herpes infection, a history of hypertrophic scarring or keloid, bleeding diathesis, human immunodeficiency virus or hepatitis B virus infection, pregnancy and lactation.

All patients underwent pre-peel priming with 0.025% tretinoin cream at night and sunscreen with a sun protection factor of 30 during daytime for two weeks before the first session. Peeling sessions were performed at four-week intervals over 16 weeks. Treatment response was evaluated at baseline and at 4, 8, 12 and 16 weeks using the Goodman and Baron quantitative global acne scarring grading system, physician visual analogue scale, patient visual analogue scale and standardised clinical photographs. Adverse effects, including post-inflammatory hyperpigmentation, acne flare, and dryness and crusting, were recorded.

Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequency and percentage. Between-group comparisons of mean Goodman and Baron scores at each assessment were performed using Welch's independent-samples t-test because only group-wise means, standard deviations and sample sizes were available. In the demographic table, continuous variables were compared using an independent-samples t-test and categorical variables using the chi-square test or Fisher's exact test, as appropriate. A p-value less than 0.05 was considered statistically significant

Results

A total of 20 adults with facial atrophic acne scars completed the study, with ten patients in each treatment group.

Baseline demographic and clinical characteristics: The mean age was 24.8 ± 4.1 years in the glycolic acid group and 25.6 ± 4.5 years in the TCA group (p=0.684). Males constituted 60.0% and 50.0% of the two groups, respectively (p=1.000). The mean duration of acne scars was 3.4 ± 1.6 years in the glycolic acid group and 3.8 ± 1.7 years in the TCA group (p=0.594). Fitzpatrick skin-type distribution (p=0.873), scar morphology (p=0.958) and baseline Goodman and Baron score (p=0.640) were comparable between the groups.

Table 1: Baseline demographic and clinical characteristics of the study groups

Variable	70% glycolic acid group (n=10)	30% TCA group (n=10)	p-value
Age, years, mean ± SD	24.8 ± 4.1	25.6 ± 4.5	0.684
Male, n (%)	6 (60.0%)	5 (50.0%)	-
Female, n (%)	4 (40.0%)	5 (50.0%)	
Duration of acne scars, years, mean ± SD	3.4 ± 1.6	3.8 ± 1.7	0.594
Fitzpatrick skin type IV, n (%)	6 (60.0%)	5 (50.0%)	0.873
Fitzpatrick skin type V, n (%)	3 (30.0%)	4 (40.0%)	
Fitzpatrick skin type VI, n (%)	1 (10.0%)	1 (10.0%)	
Predominantly ice-pick scars, n (%)	2 (20.0%)	2 (20.0%)	-
Predominantly boxcar scars, n (%)	3 (30.0%)	4 (40.0%)	-
Predominantly rolling scars, n (%)	2 (20.0%)	1 (10.0%)	-
Mixed scar morphology, n (%)	3 (30.0%)	3 (30.0%)	-
Baseline Goodman and Baron score, mean ± SD	12.40 ± 3.12	13.10 ± 3.45	0.640

Both treatment groups demonstrated a progressive reduction in mean Goodman and Baron quantitative acne scar scores over the four follow-up visits (Table 2). At baseline, the groups were comparable. Between-group differences remained non-significant at the first, second and third follow-ups.

At the fourth follow-up, the TCA group had a lower mean score than the glycolic acid group, but the difference did not reach statistical significance.

The glycolic acid group showed a mean reduction of 3.75 points (30.2%), whereas the TCA group showed a mean reduction of 6.60 points (50.4%).

Table 2: Mean Goodman and Baron quantitative acne scar scores at baseline and follow-up

Assessment	70% glycolic acid, mean ± SD (n=10)	30% trichloroacetic acid, mean ± SD (n=10)
Baseline	12.40 ± 3.12	13.10 ± 3.45
First follow-up	11.85 ± 3.20	11.20 ± 3.60
Second follow-up	10.75 ± 3.45	9.15 ± 2.80
Third follow-up	9.20 ± 3.10	7.25 ± 2.55
Fourth follow-up	8.65 ± 2.60	6.50 ± 2.45
p-value	0.01	0.01

Treatment-related adverse effects were more frequent in the 30% trichloroacetic acid group (Table 3).

Crusting was the commonest adverse effect and occurred in seven patients receiving trichloroacetic acid compared with one patient receiving glycolic acid.

Post-inflammatory hyperpigmentation occurred in one patient in the glycolic acid group and two patients in the trichloroacetic acid group.

Table 3: Adverse effects observed during treatment

Adverse effect	70% glycolic acid, n (%)	30% trichloroacetic acid, n (%)
Post-inflammatory hyperpigmentation	1 (10.0%)	2 (20.0%)
Acne flare	2 (20.0%)	3 (30.0%)
Dryness	2 (20.0%)	4 (40.0%)
Crusting	1 (10.0%)	7 (70.0%)

Clinical photographs demonstrated visible improvement after repeated peeling sessions in both treatment groups (Figures 1 and 2).

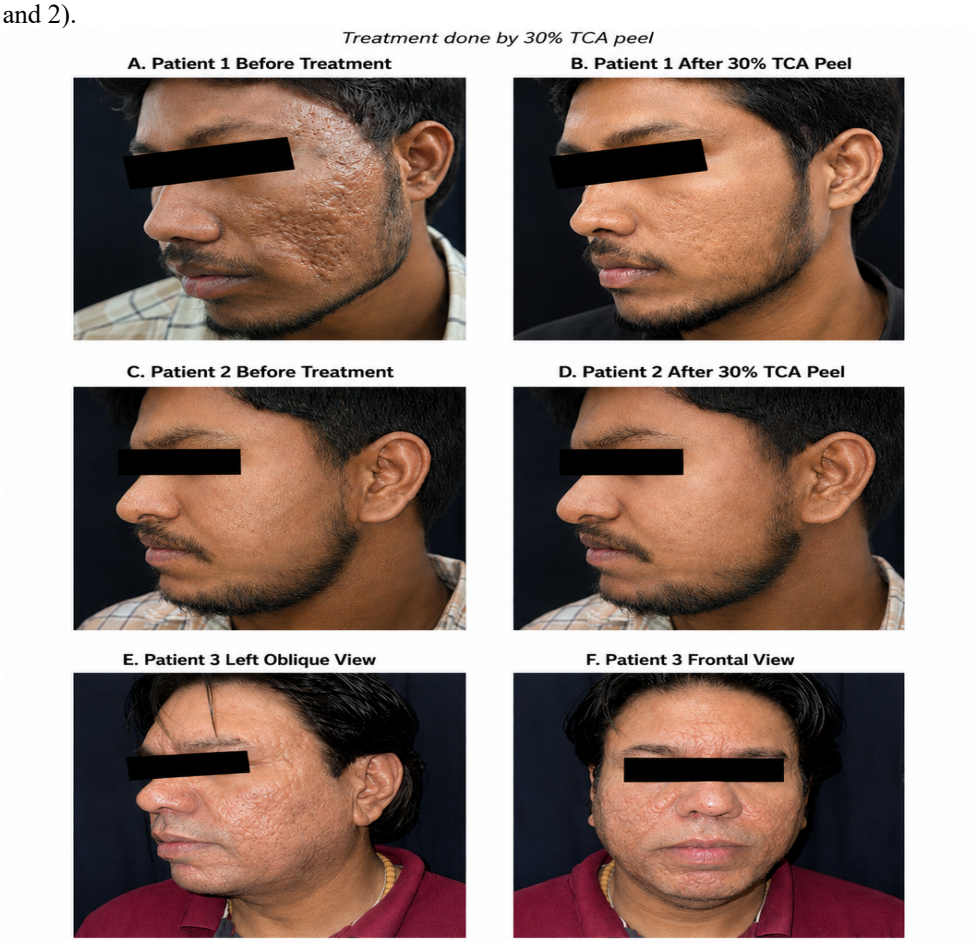

Figure 1: Representative clinical photographs of patients treated with 30% trichloroacetic acid peel.

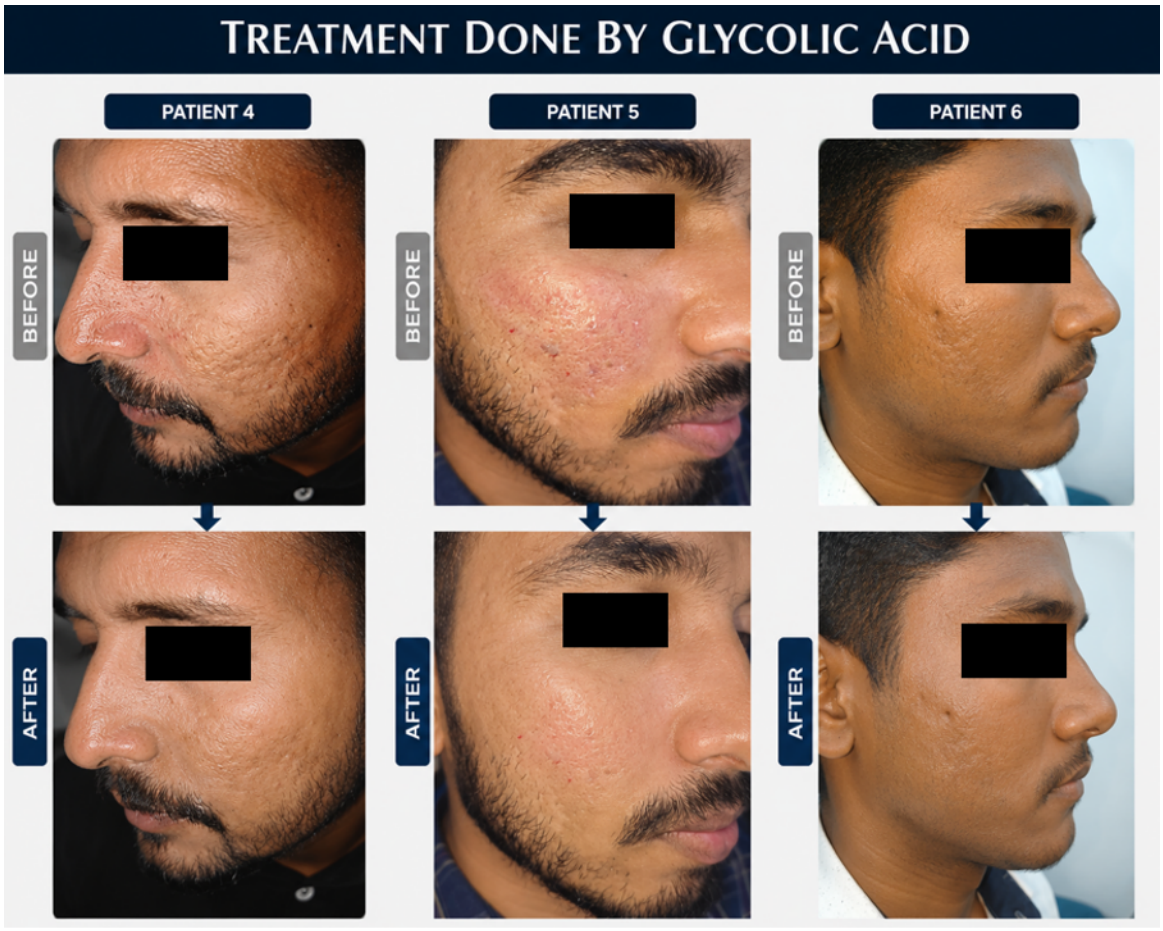

Figure 2: Representative before-and-after clinical photographs of Patients 4, 5 and 6 treated with 70% glycolic acid peel.

Discussion

The present study showed progressive improvement in facial atrophic acne scars with both peeling agents. The reduction in mean scar score was numerically greater with 30% trichloroacetic acid than with 70% glycolic acid. However, none of the between-group comparisons reached statistical significance, including the final follow-up comparison (p=0.073). This finding should be interpreted in the context of the small sample size of ten patients per group. The greater numerical response with trichloroacetic acid was accompanied by a higher frequency of crusting, dryness, acne flare and post-inflammatory hyperpigmentation.

Al-Waiz and Al-Sharqi evaluated a medium-depth peel using Jessner solution followed by 35% trichloroacetic acid in dark-skinned patients with acne scars. They reported mild-to-moderate clinical improvement and concluded that medium-depth peeling could be effective in carefully selected patients with darker skin. [7]

Sharad evaluated 35% glycolic acid as an adjunct to microneedling in patients with dark skin and atrophic acne scars. The combined treatment produced greater improvement in superficial and moderately deep scars, skin texture and post-acne pigmentation than microneedling alone. [8] Garg et al. compared 35% glycolic acid peels with a combination of 20% salicylic acid and 10% mandelic acid. Both regimens improved acne and post-acne changes. Improvement was more evident in boxcar scars, while rolling scars and ice-pick scars showed limited response. [9]

Erbagci and Akcali compared serial high-strength glycolic acid peeling with long-term daily use of low-strength topical glycolic acid. Repeated peels using concentrations up to 70% produced better improvement in atrophic acne scars, although topical treatment caused fewer adverse effects. [10]

Manjhi et al. performed a split-face comparison of 70% glycolic acid and 30% trichloroacetic acid in facial atrophic acne scars. Both agents reduced scar scores, but trichloroacetic acid produced a greater response and more treatment-related downtime. This pattern is consistent with the descriptive findings of the present study. [11]

The stronger clinical effect of 30% trichloroacetic acid may be related to its deeper protein-coagulating action and greater stimulation of remodelling. The same depth of injury may explain the increased crusting and dryness. Glycolic acid produced a more modest response but was better tolerated and may be preferred when lesser downtime is important. Chemical peeling alone is unlikely to produce equivalent improvement in every scar type. Superficial boxcar scars may respond better than deep boxcar, rolling or ice-pick scars. Deep or tethered scars commonly require combination treatment with subcision, microneedling, focal chemical reconstruction, punch techniques or laser resurfacing. The limitations of this study include the small sample size, open-label design, short 16-week follow-up and absence of blinded photographic assessment. Larger randomised studies with blinded assessment and longer follow-up are required.

Conclusion

Repeated treatment with both 70% glycolic acid and 30% trichloroacetic acid peels improved facial atrophic acne scars. The 30% trichloroacetic acid peel produced a greater numerical reduction in Goodman and Baron Scar scores but was associated with more crusting, dryness, acne flare and post-inflammatory hyperpigmentation. The 70% glycolic acid peel produced comparatively less improvement but had a better tolerability profile and lesser downtime. Treatment choice should therefore be individualized according to scar severity, skin type, patient preference and acceptable downtime.

References

1. Goodman GJ. Management of post-acne scarring: what are the options for treatment? Am J Clin Dermatol. 2000;1(1):3-17.
2. Layton AM, Henderson CA, Cunliffe WJ. A clinical evaluation of acne scarring and its incidence. Clin Exp Dermatol. 1994;19(4): 303-308.
3. Cotterill JA, Cunliffe WJ. Suicide in dermatological patients. Br J Dermatol. 1997; 137(2):246-250.
4. Jacob CI, Dover JS, Kaminer MS. Acne scarring: a classification system and review of treatment options. J Am Acad Dermatol. 2001;45(1):109-117.
5. Goodman GJ, Baron JA. Postacne scarring: a quantitative global scarring grading system. J Cosmet Dermatol. 2006;5(1):48-52. doi:10.1111/j.1473-2165.2006.00222.x.
6. Khunger N; IADVL Task Force. Standard guidelines of care for chemical peels. Indian J Dermatol Venereol Leprol. 2008;74 Suppl:S5-S12.
7. Al-Waiz MM, Al-Sharqi AI. Medium-depth chemical peels in the treatment of acne scars in dark-skinned individuals. Dermatol Surg. 2002;28(5):383-387. doi:10.1046/j.1524-4725.2002.01081.x.
8. Sharad J. Combination of microneedling and glycolic acid peels for the treatment of acne scars in dark skin. J Cosmet Dermatol. 2011; 10(4):317-323. doi:10.1111/j.1473-2165.2011. 00583.x.
9. Garg VK, Sinha S, Sarkar R. Glycolic acid peels versus salicylic-mandelic acid peels in active acne vulgaris and post-acne scarring and hyperpigmentation: a comparative study. Dermatol Surg. 2009;35(1):59-65. doi:10.11 11/j.1524-4725.2008.34383.x.
10. Erbagci Z, Akcali C. Biweekly serial glycolic acid peels versus long-term daily use of topical low-strength glycolic acid in the treatment of atrophic acne scars. Int J Dermatol. 2000; 39(10):789-794. doi:10.1046/j.1365-4362.200 0.00076.x.
11. Manjhi M, Sagar V, Yadav P, Dabas G, Gupta A, Pratap P. A comparative study of 70% glycolic acid and 30% trichloroacetic acid peel in the treatment of facial atrophic acne scars: a split-face study. J Cutan Aesthet Surg. 2024; 17(3):227-233. doi:10.25259/jcas_117_23.