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Original Article

Comparison of effectiveness and safety of 35% glycolic acid peel with microneedling versus glycolic acid peel alone in the management of acne scars

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Abstract

Objective To assess the effectiveness and safety profile of glycolic acid peel combined with microneedling versus 35% glycolic acid peel in the management of acne scars.

Methods This study was conducted from 27th September 2021 to 28th March 2022 at Outpatient Department of Dermatology, Services Hospital, Lahore. Patients of either gender, having acne scars of grade 2 to grade 4 were included. After written informed consent, they were divided randomly into two treatment groups. Patients in Group A were treated with 35% glycolic acid peel combined with microneedling while Group B was received 35% glycolic acid peel only. All patients underwent six treatment sessions at two weekly intervals. They were called for follow-up one month after the last treatment session and treatment response was noted. 'Treatment response' or efficacy was defined as Excellent response (reduction in two grades of scars), Good response (reduction in one grade) or Poor response (no reduction in grade of scars). Safety of treatments was assessed by side effects reported by patients and observed on examination.

Results Out of 60 patients, 51 (85%) were women and 09 (15%) were men with a ratio of 5.7:1. They were divided equally into two treatment groups. Group A patients had a mean age of 32.43±6.91 years while it was 33.27±7.24 years in group B patients. Majority of the patients (58.33%) were between 31 to 45 years of age. Efficacy of Group A (glycolic acid peel 35%, combined with microneedling) was seen in 29 (96.67%) patients whereas it was observed in 22 (73.33%) patients (p-value=0.011) in Group B. Two patients in combination group reported post-inflammatory hyperpigmentation, rest of the patients reported improvement in tone and texture of skin.

Conclusion This study concluded that use of glycolic acid peel 35% combined with microneedling is more effective treatment option in acne scars versus the peel alone. Patients in both the groups reported improvement in the quality of skin with a relatively good safety profile.

Key words
Acne scars; Glycolic acid peel 35%; Microneedling; Efficacy.

Introduction

Acne vulgaris constitutes a very common disorder involving pilosebaceous units on the face, chest, upper arms and back. Face is most commonly affected by scarring and its severity correlates with the severity of acne. Post-acne facial scarring is a major sequel because of the damage inflicted upon the skin during the healing of active acne. The cumulative loss of collagen in the dermis results in atrophic scars, which is a common occurrence with a prevalence of around 80-90%. Hypertrophic scars, on the other hand, are due to net gain of collagen and occur less commonly.[1] This can

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lead to anxiety, low self-esteem and decreased academic and social performance. It is also a potential risk factor for depression and suicidal ideation.[2] Treatment modalities are broadly divided into energy-based and non-energy based. Some of the non-energy based options include chemical peels, microdermabrasion, microneedling and tissue augmentation with dermal fillers.[3] Combination therapies tend to provide greater patient satisfaction than monotherapy.[4]

Chemical peeling is widely used for treatment of acne scars, causing peeling and shedding of top layer, followed by re-epitheliazation. These can be combined with other modalities for earlier and superior management of scars and pigmentation.[5] One of the commonly employed superficial chemical peel is glycolic acid (GA). Its dermal penetration is relatively better which makes it ideal for use. The strength of the peel is dependent on glycolic acid concentration and it needs to be properly neutralized to terminate its effect.[6]

Microneedling has also emerged as a major treatment option for acne scars. The principle of using microneedling is to enhance the production of new collagen. Fibroblasts migrate to the point of puncture for closure of wound and stimulate endothelial cells resulting in the formation of new micro vasculature. The duration of this natural tissue remodelling is around eight weeks and can persist up to one year.[7]

Researchers across the globe have been studying the effect of these treatment modalities; however, there is dearth of data comparing the modalities and their combinations in our part of the world. Therefore, we planned this study to observe the pros and cons of the peel alone versus the combination of peel and microneedling in acne scar management in our population.

Methods

After getting approval from Institutional Review Board, this randomized controlled trial was carried out at the Outpatient Department of Dermatology, Services Hospital, Lahore, from 27th September 2021 to 28th March 2022. Patients of either gender, having acne scars of grade 2 to 4 acne (classified using Goodman's Qualitative Acne Scarring Grading System)[8] were included using non-probability consecutive sampling. Patients aged 18 to 45 years, with Fitzpatrick skin type I-IV, having acne scars of any type or duration was included. Patients with history of glycolate hypersensitivity, bleeding diatheses or platelet disorders, or on anticoagulant therapy, patients having infectious or inflammatory skin disorders (e.g., herpes simplex infection, contact dermatitis, folliculitis), skin cancers or solar keratosis or having a history of keloidal tendency were excluded. Patients having uncontrolled diabetes mellitus or collagen vascular disease and pregnant women were also excluded. After getting written informed consent, lottery method was used to divide the patients into two random groups. Patients in Group A were treated with glycolic acid (35%) peel applied with a cotton-tipped applicator on face starting from forehead. Peel was neutralized until the endpoint (erythema) was observed. This usually takes 3 to 5 minutes. In case of appearance of frosting or if patient complained of burning or irritation, it was immediately neutralized with saline and washed with water. This was followed by microneedling on the same day using dermapen (Ultima A1, needle no. 36). EMLA (prilocaine and lidocaine) was used as local anesthetic on the face for about an hour before the treatment. After gently removing the anesthetic, Dermapen was passed in various directions with minimal pressure. Group B patients were treated with

glycolic acid (35%) peel alone. For both the groups, after each treatment session, topical antibiotic was prescribed with steroid two times per day for 3 days along with a sunscreen and moisturizing cream to be applied daily. Patients were counselled regarding the unpredictability of the results, to avoid improbable assumptions, and possible side effects such as erythema, oedema and pain. All the patients received six treatment sessions with fortnightly intervals between the sessions. They were called for follow-up 1 month after the last treatment session. 'Treatment response' or efficacy was defined as excellent response (reduction in two grades of scars), Good response (reduction in one grade) or Poor response (no reduction in grade of scars) and was determined by the same consultant. Safety of treatments was assessed by side effects reported by patients and observed on examination. All the study relevant information including patient's age and gender, type and duration of acne scars were recorded on a pre-designed proforma.

Data was analyzed using SPSS v25. Quantitative variables such as ages of the patients and acne scars' duration were presented as mean±standard deviation. Qualitative variables like gender, acne scar type and efficacy were presented as percentages and frequencies. Difference of efficacy among the groups were assessed by applying chi-square test. Role of effect modifiers like gender, age, duration of scars, and type of acne scar was analysed by stratification, taking p-value ≤0.05 as significant

Results

Ages of the patients ranged from 18-45 years (mean age 32.87±7.02 years). The mean of ages of group A patients was 32.43±6.91 years and it was 33.27±7.24 years in group B patients. Most (35) patients belonged to 31 to 45 years age group **(Table 1)**. Out of total, 51 (85.0%) patients were females and 09 (15.0%) were males, with female to male ratio of 5.7:1. Mean duration of disease was 7.13±2.65 months.

Treatment Efficacy in Group A (glycolic acid peel combined with microneedling) was seen in 29 (96.67%) patients whereas in Group B (glycolic acid peel alone), it was seen in 22 (73.33%) patients, as shown in **Figure 1** (p-value = 0.011). Stratification of effectiveness of therapy with respect to gender, age groups, disease duration and types of scar is shown in **Table 2**.

Discussion

It is estimated that around 20 percent of adolescents presenting to dermatology clinics in Pakistan suffer from acne scars.[9] Therefore, to understand the effective therapeutic balance

Table 1 Distribution of patients according to Demographic characteristics.

		Group A (n=30)		*Group B (n=30)*		*Total (n=60)*	
		Frequency	*%age*	*Frequency*	*%age*	*Frequency*	*%age*
Age (years)	18-30	12	40.0	13	43.33	25	41.67
	31-45	18	60.0	17	56.67	35	58.33
Gender	Female	26	86.67	25	83.33	51	85.0
	Male	04	13.33	05	16.67	09	15.0
Duration of disease (months)	≤6 months	16	53.33	11	36.67	27	45.0
	>6 months	14	46.67	19	63.33	33	55.0
Type of Acne Scars	Icepick	14	46.67	15	50.0	29	48.33
	Boxcar	10	33.33	11	36.67	21	35.0
	Rolling	06	20.0	04	13.33	10	16.67

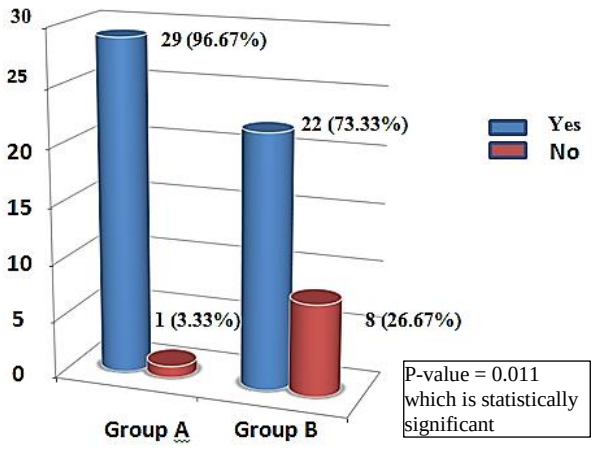

Figure 1 Comparison of efficacy in both groups.

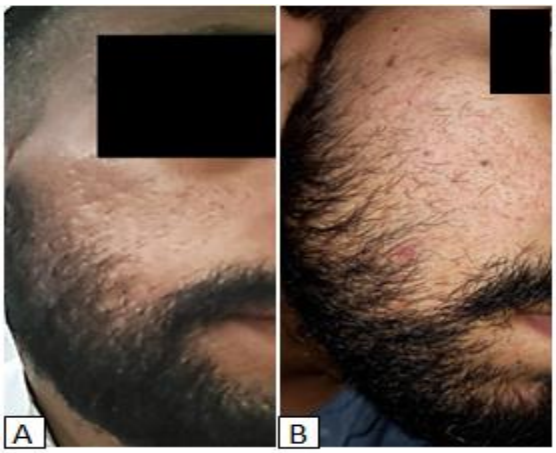

Figure 2 A) Before and B) after treatment with 35% Glycolic acid peel alone.

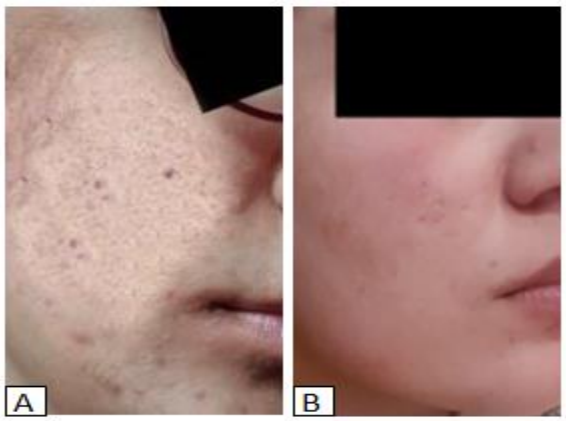

Figure 3 A) Before and B) after treatment with Glycolic acid peel with microneedling

between 35% glycolic acid peel versus peel combined with microneedling, we conducted this trial. The mean age of our patients was 32.87±7.02 years and the mean duration of acne scars was 7.13±2.65 months. Majority of the patients in our study were females. In our study, 21 (35.0%) patients had boxcar scars whereas 29 (48.33%) patients had ice pick scars and only 10 (16.67%) patients had rolling scars. We observed that glycolic acid peel alone was effective in 22 (73.33%) patients **(Figure 2)**, while 29 (96.67%) patients had effective reduction in scars after treatment with gycolic acid peel combined with microneedling along with overall improvement in skin texture **(Figure 3)**.

Saadawi *et al*. reported comparable demographics among patients from Egypt.[10] They too observed statistically significant improvement in scars in the combination group. However, they reported statistically significant improvement in both icepick and boxcars, while we observed significant improvement in icepick scars mainly. They reported several side effects of treatment including pain and aggravation of acne. We observed post-inflammatory hyperpigmentation in two patients in combination group.

Ishfaq *et al.* compared microneedling alone versus 35% glycolic acid peel alone in patients of acne scars with similar demographics. They reported significant improvement in patients after microneedling. They observed better results in icepick and rolling scars though.[11] Rana *et al.* analysed the effects of microneedling alone versus microneedling combined with 70% glycolic acid. They too concluded that the combination led to better overall skin texture and improvement in scars.[12] Another Egyptian study demonstrated better efficacy of dermaroller combined with 15% Trichloracetic acid (TCA) peel when compared to dermaroller alone.[13] It has been shown that for deeper atrophic scars like icepick scars, TCA peel is a better option due to deeper penetration.[14]

Table 2 Stratification of efficacy with respect to effect modifiers.

		Group A (n=30)		*Group B (n=30)*		*p-value*
		Efficacy				
		yes	*no*	*yes*	*no*	
Age of patients (years)	18-30	11 (91.67%)	01 (8.33%)	10 (76.92%)	03 (23.08%)	0.315
	31-45	18 (100.0%)	00 (0.0%)	12 (70.59%)	05 (29.41%)	0.013
Gender	Male	04 (100.0%)	00 (0.0%)	02 (40.0%)	03 (60.0%)	0.058
	Female	25 (96.15%)	01 (3.85%)	20 (80.0%)	05 (20.0%)	0.074
Duration of disease	≤6 months	15 (93.75%)	01 (6.25%)	08 (72.73%)	03 (27.27%)	0.131
	>6 months	14 (100.0%)	00 (0.0%)	14 (73.68%)	05 (26.32%)	0.037
Type of scar	Icepick	14 (100.0%)	00 (0.0%)	10 (66.67%)	05 (33.33%)	0.018
	Boxcar	10 (100.0%)	00 (0.0%)	08 (72.73%)	03 (27.27%)	0.075
	Rolling	05 (83.33%)	01 (16.67%)	04 (100.0%)	00 (0.0%)	0.389

Multiple trials and meta-analyses across the globe have been done for treatment of acne scars.[15] Recent cosmetology applies different treatment modalities for better management of scars and simultaneously reducing the chances of complications and side effects. Small sample size was a limitation of our study. However, it will prove as a baseline data for planning further research on effective treatment options in management of acne scars in our part of the population.

Conclusion

We conclude that use of glycolic acid peel combined with microneedling is more effective in management of acne scars as compared to glycolic acid peel alone. So, we recommend that glycolic acid peel combined with microneedling may be a better option in the management of acne scars in order to improve the social life, emotional well-being and confidence among patients suffering from acne scars.

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