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Original Article

To compare the efficacy of 35% glycolic acid along with micro-needling versus platelet rich plasma along with micro-needling in treatment of the acne scars

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Abstract

Objective To compare the efficacy of 35% glycolic acid combined with micro-needling versus platelet rich plasma combined with micro-needling in the treatment of acne scars.

Methods This randomized controlled study was conducted at Department of Dermatology, Mayo Hospital, Lahore from July 16, 2022 to January 15, 2023. 60 patients fulfilling the selection criteria were enrolled. Group A went through micro-needling combined with 35% glycolic acid (containing glycolic acid) and group B went through micro-needling combined with platelet rich plasma. Scars were examined before the first treatment session and at each follow up and scored according to Goodman and Baron's Qualitative Acne Scarring Grading System. Final visit was done after 4 weeks of last session. Both groups were compared for efficacy using Chi-square test taking p-value ≤0.05 as significant.

Results In group-A, 7(23.3%) were males and 23(76.7%) were females, while in group-B, 8(26.7%) were males and 22(73.3%) were females. The mean age of patients in group-A was 23.68±5.03 years and 24.48±4.75 years in group-B. In Micro-needling plus 35% glycolic acid group, 26(86.7%) patients had efficacy of treatment, while in Micro-needling plus PRP group, 19(63.3%) patients had efficacy of treatment ($p<0.05$).

Conclusion Micro-needling combined with 35% glycolic acid is a more effective therapeutic modality than micro-needling combined with PRP.

Key words
Acne vulgaris; Micro-needling; Platelet Rich Plasma; 35% Glycolic acid; Post-acne atrophic scars.

Introduction

Acne vulgaris is a common chronic inflammatory disease affecting pilosebaceous units of the skin and may be inflammatory or non-inflammatory in nature.[1] It is seen in about 80% of adolescents and affects worldwide 9.4% population.[2] Acne scarring is the most common physical sequelae leading to permanent disfigurement which is not only a cosmetic issue but also has negative psychological impact on patient.[3,4] Scarring affects approximately 95% of the acne sufferers.[5]

The main target of acne treatment is to control the existing lesions, limit the duration of the disorder, prevent permanent scarring as much as possible, and lessen morbidity.[6] Various modalities like chemical peels, dermabrasion, laser resurfacing, punch excision and elevation, dermal fillers, fat transfer, implantation of autologous collagen and cultured fibroblasts, and skin micro-needling (automated or derma roller) have been used to treat post-acne scars through intensification of dermal collagen.[7]

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The micro-needling is a minimally invasive, in-office and in-expensive procedure which can be used for a wide variety of conditions. Derma Pen, an instrument used for micro-needling has recently attained popularity because of its safe use with least training. Old hardened scars are broken down by the needles, allowing it to revascularize and hence heal.[8,9]

Glycolic Acid (GA) is an alpha hydroxy acid, which cleaves bonds between corneocytes and promotes skin exfoliation. So, it is commonly used as a superficial peeling agent. Results with a combination of micro needling and glycolic acid (GA) peel were superb and it was considered a safe and effective method for the treatment of acne scars.[10] In a study done by Sharad *et al*. micro-needling when combined with peeling agents like 35% glycolic acid, it showed 81% efficacy.[11] Platelet rich plasma (PRP) is portion of plasma carrying four to seven times higher concentration of platelets.[12] PRP has been found beneficial in skin rejuvenation, different types of alopecia, post acne scars, and healing of chronic skin ulcers. In a study done by Nandini et.al patients got 43% efficacy with platelet rich plasma combined with micro-needling.[13]

The purpose of this study was to compare the efficacy of 35% glycolic acid along with micro-needling versus platelet rich plasma along with micro-needling in treatment of atrophic acne scars. Very limited studies are available on this comparison and no local data available. Moreover, the combination with better results can be adopted in our routine practice to decrease the morbidity of our patients and to improve their quality of life.

Methods

The present study was a randomized controlled trial, conducted at the Department of Dermatology, KEMU/ Mayo Hospital, Lahore. After approval from the hospital ethical committee a total of 60 patients aged 18-50 years, of both genders, with acne-scars of any duration, Fitzpatrick skin type (FST) III-V were included in the study. Pregnant females, patients with active acne or other active skin disease, with HIV, hepatitis B&C infection, diabetes mellitus, bleeding disorders, herpes simplex infection (on the history and medical examination) were excluded from the study. Patients with keloidal tendency and history of chemical peel, microdermabrasion or facial laser treatment within last 8 weeks or any other topical treatment within 4 weeks were also not enrolled.

A written informed consent was taken from all patients. Patients were randomly divided into two groups (30 patients each) by using lottery method. Group A went through microneedling combined with 35% glycolic acid and group B had micro-needling combined with platelet rich plasma. Before dermapen, topical anesthetic cream was massaged into treatment area and kept under occlusion for 45 minutes in both groups. In group A, after micro-needling, pre-procedure test peel with 35% glycolic acid was applied on a small retro-auricular area for 5 minutes. If patient had no sensitivity to peel then it was applied with cotton bud on scars for 5 minutes. After which it was neutralized with saline, washed with water and patient was advised to apply moisturizer and avoid sun exposure. It was repeated every 4 weeks for 3 sessions. In group B, PRP was obtained by a double spin method. 20ml of blood was taken and after adding sodium citrate as an anticoagulant sample was centrifuged at 2500 rpm (1st soft spin) for 12 minutes. This separated blood into three layers with lower most layer of RBC's, upper most platelet poor plasma (PPP) layer and intermediate layer containing platelet rich plasma (PRP) and white blood cells (buffy coat layer). Buffy coat and PPP layer was collected by Finnpipette in

another plain test tube and centrifuged at 4000 rpm (2nd hard spin) for 6 minutes. Platelet rich plasma settled at the bottom of tube (lower 1/3). PRP was collected in 1ml insulin syringe containing 0.1ml of calcium chloride as an activator. Firstly, microneedling was done with dermapen creating small pricks. Serous ooze was wiped away with normal saline and PRP applied on the face immediately. It was done every 4 weeks for 3 sessions. At each visit, patients were photographed at anterior and 45 degrees lateral view after stabilizing chin and forehead in standard light with same digital camera. Scars were examined before the first treatment session and at each visit and were scored according to Goodman and Baron's Qualitative Acne Scarring Grading System. Final visit was after 4 weeks of last session. Each group was advised to regularly use sun block of standardized SPF 60 once daily. Efficacy was measured at the end of 16 weeks as per operational definition. Any side effects during treatment were recorded and treated as per standard treatment protocol. All the information was noted on predesigned proforma. Data was entered and analyzed by using SPSS version 21. Mean±SD calculated for age. Frequency and percentages calculated for gender, type of scars, grade of scars and efficacy. Both groups were compared for efficacy using chi-square test. Data was stratified for age, type of scar and grade of scar. Post stratification chi-square test was used taking p-value <=0.05 as significant.

Results

There were total 60 patients, 30 in each group. In group-A, 7 (23.3%) were males and 23 (76.7%) were females, while in group-B, 8 (26.7%) were males and 22 (73.3%) were females. The mean age of patients in group-A was 23.68±5.03 years and 24.48±4.75 years in group-B.

In group-A, 10 (33.3%) patients had grade-II scar at baseline, 14 (46.7%) had grade III scar and 6 (20.0%) had grade-IV scar, while in group-B, 10 (33.3%) patients had grade-II scar at baseline, 13 (43.3%) had grade III scar and 7 (23.3%) had grade-IV scar.

In group-A, 16 (53.3%) patients had grade-I scar after completion of therapy, 11 (36.7%) had grade-II and 3 (10.0%) had grade-III, while in group-B, 11 (36.7%) patients had grade-I scar after completion of therapy, 10 (33.3%) had grade-II and 9 (30.0%) had grade-III **(Table-1)**.

In Micro-needling plus 35% glycolic acid group, 13 (43.3%) patients had excellent response to treatment, 13 (43.3%) had good and 4 (13.3%) had poor response, while in Micro-needling plus PRP group, 10 (33.3%) patients had excellent response to treatment, 9 (30.0%) had good and 11 (36.7%) had poor response **(Table-2)**.

Table 1 Comparison of grade of scar after completion of treatment distribution between groups.

Grade of scar	*Groups*		*Total*
	Micro-needling plus 35% glycolic acid	*Micro-needling plus PRP*	
Grade-I	16 (53.3%)	11 (36.7%)	27 (45.0%)
Grade-II	11 (36.7%)	10 (33.3%)	21 (35.0%)
Grade-III	3 (10.0%)	9 (30.0%)	12 (20.0%)
Total	30 (100.0%)	30 (100.0%)	60 (100.0%)

Table 2 Comparison of response to treatment distribution between groups.

Response to treatment	*Groups*		*Total*
	Micro-needling plus 35% glycolic acid	*Micro-needling plus PRP*	
Excellent	13 (43.3%)	10 (33.3%)	23 (38.3%)
Good	13 (43.3%)	9 (30.0%)	22 (36.7%)
Poor	4 (13.3%)	11 (36.7%)	15 (25.0%)
Total	30 (100.0%)	30 (100.0%)	60 (100.0%)

Table 3 Comparison of efficacy of treatment distribution between groups.

Efficacy of treatment	*Groups*		*Total*	*p-value*
	Micro-needling plus 35% glycolic acid	*Micro-needling plus PRP*		
Yes	26 (86.7%)	19 (63.3%)	45 (75.0%)	
No	4 (13.3%)	11 (36.7%)	15 (25.0%)	0.037
Total	30 (100.0%)	30 (100.0%)	60 (100.0%)	

In Micro-needling plus 35% glycolic acid group, 26 (86.7%) patients had efficacy of treatment, while in Micro-needling plus PRP group, 19 (63.3%) patients had efficacy of treatment ($p<0.05$) **(Table-3)**.

Discussion

Acne scars are a frequent and unwanted product of acne vulgaris. It is a major reason for visiting a dermatologist in young population of Pakistan.[14] In South Asia, acne prevalence in younger population is 91% in males and 79% in females. All subtypes of acne are prevalent in almost all racial groups except for inflammatory acne which is more common in Asian women.[15]

Our study mainly involved FST III to V. Cohen *et al.* noted that chemical peels are associated with more deplorable outcomes in darker skin individuals. Micro-needling plus 35% glycolic acid may be considered safe in such individuals because the epidermal integrity is only partially affected promoting healing while restricting complications.[16]

Fabbrocini *et al.* compared the effects of micro-needling among different FSTs in both acne and non-acne scars. There was a striking improvement in scars in all the skin types. Additionally, there was no report of dyspigmentation in any up to one year post treatment.[17] This is analogous to our study results suggesting that micro-needling plus 35% glycolic acid may be a better modality for acne scars in skin of color.

One more study compared the micro-needling alone with a combination of micro-needling and 70% glycolic acid and found the combination superior, suggesting the combination should be explored further.[18] In an identical study, 60 patients were treated either with micro-needling alone or micro-needling with 35% glycolic acid. Mean improvement at three-month follow up was 62 percent in those undergoing combined treatment while 31% in micro-needling group.[19] Our study demonstrated a similar comparison between micro-needling plus glycolic acid and PRP, suggesting that glycolic acid and micro-needling combination is superior in treating acne scars.

Micro-needling has recently become a popular treatment because it is simple, safe, easy to perform, and is cost-effective. In our study, we found micro-needling plus 35% glycolic acid combo to be preferable in improving atrophic acne scars than micro-needling plus PRP. These results are in par with other studies performed with micro-needling plus 35% glycolic acid as a therapy for depressed acne scars, advocating that it may be a better modality than PRP and micro-needling.

However, our study did not look for the side effects of any of the treatment regimen which is a major limitation. So, a further study is needed to determine the safety of this combination therapy.

Conclusion

The present study reveals that micro-needling combined with glycolic acid at a concentration of 35% is a more effective therapeutic modality

than micro-needling combined with PRP. In addition, patients with any skin type are candidates for this combo technique since post-inflammatory hyperpigmentation is seldom seen as a result of the therapy. Moreover, the process does not require any expensive equipment.

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