VOLUME - 13, ISSUE - 04, APRIL - 2024 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Dermatology

CROSS TECHNIQUE WITH 100 % TCA VERSUS MICRONEEDLING WITH PLATELET RICH PLASMA IN TREATMENT OF ATROPHIC ACNE SCARS –A COMPARATIVE STUDY

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ABSTRACT

Introduction: Acne scarring is a common complication of acne which can have physical, social and psychological impact and significantly reduced quality of life of the patients. Cross technique with 100 % trichloroacetic acid and microneedling are established treatment for scars, although the efficacy of microneedling with platelet-rich plasma has not been explored much. **Aim And Objectives:** To compare the efficacy and safety of 100 % trichloroacetic acid and microneedling with platelet rich plasma in treatment of atrophic acne scars. **Method:** 16 patients with atrophic scars were enrolled, divided into two groups. Group A underwent cross technique with 100 % Trichloroacetic acid and group B was treated with microneedling with topical application of platelet rich plasma. four sessions were given at an interval of 2 weeks. Goodman's Qualitative scale was used for the final evaluation of results. **Result:** Sixteen patients were enrolled with a mean age of 24.00 ± 6.00 years. Both groups showed statistically highly significant improvement in the degree of acne scars severity after treatment ($p<.001$). Subjectively 60% patient showed good response,20% showed very good response and 20% showed excellent response. **Conclusion:** Both modalities represent equally effective and safe treatment options for atrophic acne scars with no statistically significant difference in the degree of improvement ($p=0.81$). moreover, it was concluded that cross technique with 100% trichloroacetic acid is effective in ice pick and shallow rolling scars, while microneedling with platelet rich plasma is efficacious in deep rolling and box scars. However, considering side effects, microneedling with platelet rich plasma showed minimal post inflammatory hyperpigmentation therefore it is a better modality for treatment of acne scars.

KEYWORDS :

INTRODUCTION

Post acne scarring is a common disorder in the adolescent age group. Scarring in acne is broadly classified as macular, atrophic and hypertrophic or keloidal scar. Atrophic scars are divided into three types which include ice pick, rolling and boxcar types (1). Scars can be assessed using Goodmans Qualitative and quantitative scarring grading scale (2,3). Different treatment modalities in acne scars have been used for acne scars such as laser resurfacing, chemical peeling, augmentation by fillers, subcision, dermabrasion, skin needling, punch excision.

Chemical reconstruction of skin scars technique (CROSS) was first described by Lee and colleagues (4). CROSS technique consists of application of high concentration of trichloroacetic acid (TCA) focally on the scar by a sharpened wooden applicator. It improves acne scars by increasing dermal thickening and collagen production.

Microneedling is a technique that involves using a sterile dermaroller that punctures the skin with a series of fine sharp needles. It causes multiple microbruises in the dermis that initiates the complex cascade of wound healing and release of growth factors and results in collagen production (5). The principle of microneedling is to initiate collagen synthesis by causing minute injury to the dermis. Autologous platelet rich plasma (PRP) contains high concentration of platelet growth factors. It also contains various growth factors, including platelet.derived growth factor, transforming growth factor, vascular endothelial growth factor, and insulin.like growth factor. These growth factors stimulate tissue remodelling and also associated with enhanced wound healing, upregulation of collagen synthesis and promotion of tissue regulation (6).

Microneedling with platelet rich plasma act synergistically to improve acne scars. The upregulation of growth factors associated with PRP is believed to augment the effects of microneedling to promote tissue remodeling.

AIMS AND OBJECTIVES

To compare the efficacy and safety of CROSS technique with 100 % TCA and microneedling with PRP in the treatment of atrophic acne scars.

MATERIALS AND METHODS

This study was a single-center, prospective clinical trial comparing a CROSS technique with 100 % TCA and microneedling with platelets rich plasma in patients with post acne scarring. Sixteen patients, 11 males and 5 females with atrophic acne scars of different durations, types, and severities were included. An informed explanatory consent was taken from all patients before initiation of the therapy. Patients were subjected to full history taking, including onset, course, and duration of scars, previous acne and acne scar treatments, and post-treatment complications such as hyperpigmentation.

Dermatologic examination to assess the skin type, scar type, the scar severity according to the Qualitative Global Acne Scarring Grading System was performed for every patient. The exclusion criteria were patients with active infections, pregnancy, lactation, history of bleeding disorders or keloidal scarring.

Patients were divided into 2 groups (A and B), each included 8 patients. Group A underwent CROSS technique with TCA 100%, and Group B was treated with microneedling with topical PRP. Each patient underwent 4 sessions at 2-week intervals. Possible side effects of each procedure such as erythema, edema, pain, prolonged downtime, and hyperpigmentation were explained to the patients.

Group A (CROSS Technique With 100% TCA)
The skin was first cleansed. Patients were treated by 100% TCA applied focally on the scars by a wooden applicator until frosting occurred (usually within 10 seconds). Patients were instructed to apply antibiotic cream until focal crust formation and to apply sunscreen.

Group C (Combined Skin Needling and PRP)
Local anesthetic cream was applied to the face 45-60 minutes before the procedure. The face was sterilized with alcohol, and 0.5 to 1 mL of PRP was applied topically to the treated area, followed by needling the skin using the needling tool (Dermaroller). It consists of 24 circular arrays of 8 stainless steel needles in a cylindrical assembly. The treatment was performed by rolling the dermaroller over the areas affected

by acne scars 6 times in 4 directions (vertically, horizontally, and diagonally right and left). Topical antibiotic and sunscreen were prescribed after the procedure.

Clinical assessment done using photographic records. The results were assessed using the Qualitative Global Scarring Grading System. Data were represented in numbers, percentage, mean, and standard deviation.

RESULTS

Out of sixteen patients, forteen patients completed the study till last setting. Age of the patients ranged from 19 to 30 years with Mean age of the patients was 25.43 years. More number of male patients were consulted for treating atrophic acne scars (table 1). There was predominant demographic of patients within age group of 26 to 30 years in both group (figure 1).

Qualitative global scarring grading system: The both groups showed highly significant improvement in the severity of acne scars after treatment ($p < 0.001$) (Figure 3 and 4)). There was no statistically significant difference in the degree of improvement between 2 groups ($p = .81$) (Table 2).

Therapeutic response according to patients satisfaction: There was an excellent response in one patient, very good response in two patients and good response in five patients treated with CROSS technique with 100 % TCA as compared to other side treated with microneedling with PRP, there was an excellent response in two patients, very good response in one patient and good response in five patients(figure 2).

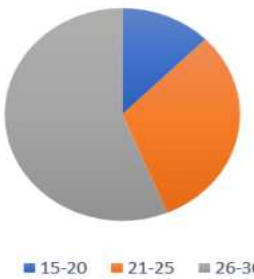

Figure 1. Demographic profile of studied group

Table1. Clinical data of studied group

	Group A	Group B	F	P
Age (years)				
Mean	24.5	26.37		
Sd	3.16	3.15	1	.9
Range	19-30	20-30		NS
Gender	N(%)	N(%)	x2	P
Male	5	6	0.29	.58
Female	3	2		NS
Skin type			x2	P
III	1	1		
IV	4	5	0.31	.85
V	3	2		NS
Scar type			x2	p
Ice pick	4	2		
Rolling	3	4	1.14	.56
Box scar	1	2		NS

NS: Not significant

Table 2. Therapeutic response according to the Qualitative Global Scarring Grading System

	Group A	Group B	X2	P
Before				
Grade2	1	1	0.32	0.86
Grade3	2	3		NS
Grade4	5	4		
After				
Grade1	1	2	0.42	0.81
Grade2	6	5		NS
Grade3	1	1		
Grade4	0	0		
P	<.001,HS	<.001,HS		

HS- highly significant improvement in severity of acne scars after treatment in each group

NS- no statistically significant difference in the degree of improvement between two group

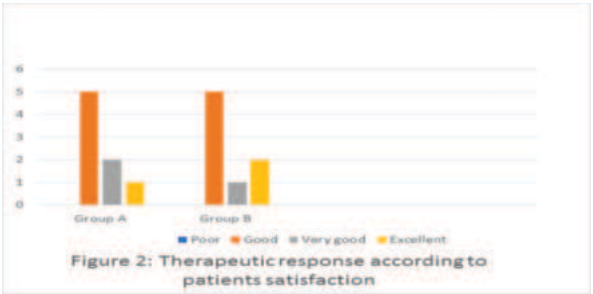

Figure 2: Therapeutic response according to patients satisfaction

Before treatment **After four session**

Figure 3. Group A (Cross technique)

Before treatment **After four session**

Figure 4. Group B (microneedling with platelet rich plasma).

DISCUSSION

Treatment of post acne scars is a therapeutic challenge and requires a combination of many techniques such as chemical peel, punch excision, subcision, dermabrasion or laser resurfacing.

In our study CROSS technique was effective in the treatment of acne scars in patients of Group A. The difference in the qualitative global score before and after treatment was highly significant($p<.001$). Our results were consistent with Lee and colleagues (4). They compared the efficacy of TCA 65% versus TCA 100% concentration and reported that TCA 100% was more effective with higher patient satisfaction than TCA 65% with no increase in the frequency of complications. The results of our study indicated that cross technique with 100% TCA is more effective on ice-pick scars and shallow rolling scar. Four patients in our study had post inflammatory hyper pigmentation that last for two weeks.

Microneedling is a relatively new minimally invasive procedure involving superficial and controlled puncturing of the skin by rolling with miniature fine needles to induce a normal wound healing process with release of several growth factors. PRP is an autologous preparation of platelets in concentrated plasma.

Our study showed that there was a significant improvement of atrophic acne scars in Group B patients treated with Microneedling with topical PRP. The difference in the qualitative global score before and after treatment was highly significant($p<.001$).

Nofal et al. (7) conducted a study included forty-five patients with atrophic acne scars were randomly assigned to three equal groups; Group A received intradermal injection of PRP, Group B received chemical reconstruction of skin scars technique with TCA 100%, and Group C was treated by combined skin needling and PRP. The three groups showed statistically highly significant improvement in the degree of acne scars after treatment ($p < .001$). similar results were found in our study.

Fabbrocini et al. (8) conducted a study and found that PRP combined with microneedling was more effective in acne scars than microneedling alone and showed that the grade of severity of the acne scars in all patients was greatly reduced after only four sessions.

Study conducted by Alam and Dover (9), where they assessed the efficacy of PRP in 40 patients with atrophic acne scars and found a mean improvement of 70% by patients and doctors at six months post-procedure.

In our study patients treated with microneedling with PRP experienced less erythema,minimal post inflammatory hyperpigmentation and less the overall downtime in comparing to patient treated with CROSS technique with 100 % TCA.

CONCLUSION

- Both cross technique with 100 % TCA and microneedling with platelet rich plasma are useful and safe treatment options for atrophic acne scars.
- Microneedling with platelet rich plasma showed better response in deep rolling and box scars.
- Cross technique with 100 % TCA showed better response in ice pick and shallow rolling scars.
- Microneedling with platelet rich plasma showed minimal post inflammatory hyperpigmentation, therefore it is a more suitable option for all Fitzpatrick skin types.

Conflict of interest: None

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