



## A SPLIT FACE STUDY EVALUATING AUTOLOGOUS PLATELET RICH PLASMA VERSUS TOPICAL VITAMIN C FOR THE TREATMENT OF ATROPHIC ACNE SCARS ALONG WITH MICRONEEDLING

### Dermatology

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### ABSTRACT

**BACKGROUND:** Scars are the most common stigmata of acne with treatment of acne scars often being the first request of patients. The commonly used procedural treatments for post-acne scarring have limited efficacy. Microneedling is a simple, safe, effective, and minimally invasive therapeutic technique being used for a wide range of indications including acne scar, acne, post-traumatic/burn scar, alopecia, skin rejuvenation, stretch marks, etc. Recently, platelet-rich plasma has become popular in many areas of medicine including plastic surgery and dermatology for scar remodelling. Vitamin C is a potent antioxidant that can be used topically in dermatology. It increases collagen synthesis, stabilize collagen fibres and decrease collagen degradation. **AIMS:** To compare the efficacy of Platelet Rich Plasma (PRP) against topical Vitamin C in treating atrophic acne scars along with microneedling. **MATERIALS AND METHODS:** Patients were included in study according to inclusion and exclusion criteria. After detailed history and investigations, 33 patients with atrophic acne scars were treated with PRP on right side and topical Vitamin C on left side along with microneedling at monthly interval for four sittings. Photographs were taken at each visit. The result was assessed using Goodman and Baron grading. **RESULTS:** Out of 33 patients, 16 males and 15 females had completed study; excellent response was seen in 11(35.48%), good response in 17 (54.84%) and poor response in 3(9.68%) patients on PRP treated site as compared to 4 (12.90%) with excellent response, 21(67.74%) with good response and 6 (19.35%) with poor response in patients on topical Vitamin C treated site after microneedling. Most common immediate side effects seen were erythema and irritation on topical vitamin C site. **CONCLUSION:** Microneedling combined with PRP proved to be better than with topical vitamin C in treating atrophic acne scars.

### KEYWORDS

Platelet Rich Plasma, Microneedling, Acne Scar, Vitamin C

#### INTRODUCTION:

95% of the acne scars occurs over the face thus impacting the quality of life.<sup>1</sup> In some patients with acne, the inflammatory response results in permanent, disfiguring scars from either increased tissue formation or due to loss or damage of tissue. There is no standard treatment option for the treatment of acne scars. Medical management of atrophic scars can be done by using topical retinoids. Surgical management can be done using punch excision, elliptical excision, punch elevation, skin grafting and subcision depending on the type of scar.<sup>2</sup> There are different novel treatment options. One novel modality of treatment is microneedling therapy also known as collagen induction therapy. Microneedling is a relatively new minimally invasive procedure involving superficial and controlled puncturing of the skin by rolling with miniature fine needles. It is popular modality as it is a simple, safe, and effective technique requiring minimal training.<sup>3</sup> Microneedling when combined with platelet-rich plasma (PRP) or Topical vitamin C seems to be a promising treatment of acne scars.<sup>1</sup>

Autologous platelet-rich plasma contains the plasma portion of autologously sourced blood with an iatrogenically high platelet concentration. Recently, platelet-rich plasma has become popular in many areas of dermatology for scar remodelling. Platelets release growth factors including platelet-derived growth factor and transforming growth factor- $\beta$ , facilitating and accelerating bone and soft tissue regeneration.<sup>4</sup>

Vitamin C, an antioxidant in human skin that is newly introduced as a topical agent for stimulation of collagen synthesis. It was found to increase the mRNA levels of collagens I and III, and their processing enzymes in humans and tissue inhibitor of matrix metalloproteinase 1 in the human dermis, also to improve the clinical appearance of photoaged skin and to reduce facial wrinkles. The topical application of vitamin C partially restores the anatomical structure of the epidermal-dermal junction and increases the number of nutritive capillary loops in the papillary dermis close to the epidermal tissue in the aged skin.<sup>5</sup>

**AIMS AND OBJECTIVE:** To compare the efficacy of Platelet Rich Plasma (PRP) against topical Vitamin C in treating atrophic acne scars along with microneedling.

**METHODOLOGY:** 33 patients with atrophic acne scars over face were included in study according to following inclusion and exclusion criteria

#### Inclusion criteria:

1. All patients presenting with grade 2 or more Goodman and Baron
2. Age group 18 to 35 years
3. Patient who give valid informed consent

#### Exclusion criteria:

1. Presence of active acne lesions
2. Keloidal tendency
3. Presence of bleeding disorder
4. Presence of active skin infection
5. Pregnancy and lactation
6. Patient with unrealistic expectations
7. Patient who did not give consent

#### Goodman And Baron Scale for Scars

- Grade 1- Macular erythematous, hypo or hyperpigmented scars.  
 Grade 2- Mild atrophy not obvious at social distance of >50 cm or easily covered by facial makeup or beard hair.  
 Grade 3- Moderate atrophy obvious at social distance of >50 cm; not easily covered by make up or beard hair; but able to be flattened by manual stretching  
 Grade 4- Severe atrophy not flattened by manual stretching of skin

- An informed written consent was obtained. They were explained about the microneedling, PRP therapy and vitamin C application and possible outcome and side effects of the treatment.
- The patients were thoroughly evaluated and grading of the acne scars was done using Goodman and Baron Scale.
- Complete blood count including bleeding and clotting time was done.
- Digital photographs of both sides of face were taken after consent.
- PRP procedure- For PRP, 10 ml of autologous whole blood was collected into tubes containing acid citrate dextrose (ACD) and centrifuged at room temperature using double rotation method:
  - 1500 rpm for 10 minutes
  - 3700 rpm for 10 minutes
 Calcium gluconate was added as an activator (1:9).
- At first sitting (week 0) under strict aseptic precautions, right side of the face was subjected to microneedling with PRP (2 ml; platelet concentration 8-9 lakhs/ $\mu$ l) and left side of the face was treated with microneedling with vitamin C (2ml, 15%).
- Similar procedures were done at intervals of 4 weeks at the 4<sup>th</sup> week, 8<sup>th</sup> week, 12<sup>th</sup> week and 16<sup>th</sup> week. The scars were graded using Goodman and Baron grading system and the response was

noted at the end of each session.

- At the end of the study, response was noted as
  - Excellent response - Change by two grades.
  - Good response - Change by one grade.
  - Poor response - No change.

**RESULT AND DISCUSSION**

A total of 33 patients were enrolled, two dropped out and 31 patients (16 males, 15 females) were included. Average Age was 26.24 years. Male: Female Ratio was 1.07:1.

Out of 31 patients who completed the treatment, baseline goodman and baron grading were Grade 4 in 10 (32.25%) cases, Grade 3 in 12

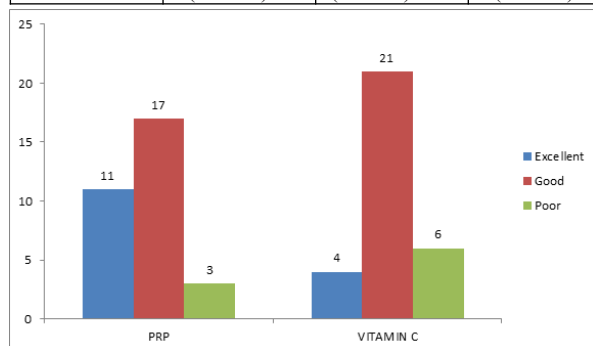
(38.71%) cases, Grade 2 in 9 (29.03%) cases and Grade 1 in 0 cases.

**Goodman and Baron grading:**

Grade	Baseline	At the end of the study	
	No. of patients	PRP site	Vit C site
1	0 (0%)	12 (38.71%)	8 (25.80%)
2	9 (29.03%)	14 (45.16%)	12 (38.71%)
3	12 (38.71%)	5 (16.13%)	11 (35.48%)
4	10 (32.35%)	0 (0%)	0 (0%)
Total	31	31	31

**Physician's assessment of response to Microneedling with PRP and with topical Vitamin C (AT THE END OF STUDY),**

	EXCELLENT RESPONSE		GOOD RESPONSE		POOR RESPONSE		NO. OF PATIENTS
	PRP	Vit C	PRP	Vit C	PRP	Vit C	
MALES	6(19.35%)	2(06.45%)	7(22.58%)	12(38.71%)	3(09.68%)	2(06.45%)	16(51.61%)
FEMALES	5(16.13%)	2(06.45%)	10(32.26%)	9(29.03%)	0(00.00%)	4(12.90%)	15(48.39%)
TOTAL	11(35.48%)	4(12.90%)	17(54.84%)	21(67.74%)	3(09.68%)	6(19.35%)	31(100%)



**Physician's assessment on response to PRP and topical Vitamin C**

**SIDE EFFECT**

Erythema was seen in 3 patients who underwent microneedling with PRP and 5 patients who underwent microneedling with vit C. Irritation was seen in 2 patients in PRP site whereas in 4 patients in vit C treated site. Post inflammatory hyperpigmentation were seen in 2 patients who underwent microneedling with PRP in comparison to 3 patients who underwent microneedling with vit C.

**DISCUSSION**

Acne scars are big cosmetic concern presenting with varied morphology like ice-pick, rolling and boxcar scars and it needs multimodal approach to treat effectively rather than a single modality.<sup>6</sup> Microneedling therapy breaks collagen bundles in the superficial layer of the dermis that are responsible for scars with subsequent induction of more collagen immediately under the epidermis.<sup>7</sup> PRP contains several growth factors, including platelet-derived growth factor, transforming growth factor B and vascular endothelial growth factors. PRP along with microneedling would intensify the natural wound healing cascade because of the high concentration of patients own growth factors. It acts synergistically with growth factors induced by skin needling in order to enhance the wound healing response.<sup>1</sup>

Vitamin C has been shown to stimulate both type I and type III collagen synthesis and is well known for its antioxidant properties.<sup>1</sup>

We had used Goodman and Baron's quantitative acne scar grading system. In our study excellent response was seen with microneedling combined PRP in 19.35% males and 16.13% females and 06.45% males and 06.45% females show excellent response with microneedling combined with vitamin C.

In Similar type of Study done by Simran Chawla<sup>1</sup> PRP combined with microneedling is a better treatment option than microneedling with vitamin C in treating atrophic acne scars, 18.5% patients show excellent in PRP treated site and 7% patients in Vit C treated site.

Fabbrocini et al. and Yogesh et al. conducted a study with microneedling with PRP vs microneedling and found that PRP combined with microneedling was more effective in acne scars than microneedling alone.<sup>8,9</sup>

**CONCLUSION**

PRP combined with microneedling is a better treatment option than

microneedling with vitamin C in treating atrophic acne scars.

**REFERENCES**

- Chawla S. (2014). Split Face Comparative Study of Microneedling with PRP Versus Microneedling with Vitamin C in Treating Atrophic Post Acne Scars. Journal of cutaneous and aesthetic surgery, 7(4), 209-212. <https://doi.org/10.4103/0974-2077.150742>
- Garg S, Baveja S. Combination therapy in the management of atrophic acne scars. J Cutan Aesthet Surg 2014;7:18-23
- Singh A, Yadav S. Microneedling: Advances and widening horizons. Indian Dermatol Online J 2016;7:244-54
- Faghihi G, Keyvan S, Asilian A, Nouraei S, Behfar S, Nilforoush-zadeh MA. Efficacy of autologous platelet-rich plasma combined with fractional ablative carbon dioxide resurfacing laser in treatment of facial atrophic acne scars: A split-face randomized clinical trial. Indian J Dermatol Venereol Leprol 2016;82:162-8
- NADA, E., Abdo, R., Mostafa, M., Mohhmed, R. (2018). Efficacy of microneedling with topical vitamin C in treatment of acne scars. Sohag Medical Journal, 22(1), 163-170. doi: 10.21608/smj.2018.40958
- Narayanan S, Nallu K, Venu S, Ganapathi AR. Combined treatment modalities in atrophic acne scars: a prospective study. Int J Res Dermatol 2019;5:243-6.
- El-Domyati, M., Barakat, M., Awad, S., Medhat, W., El-Fakahany, H., & Farag, H. (2015). Microneedling Therapy for Atrophic Acne Scars: An Objective Evaluation. The Journal of clinical and aesthetic dermatology, 8(7), 36-42.
- Fabbrocini G, De Vita V, Pastore F, Panariello L, Fardella N, Sepulveres R, et al. Combined use of skin needling and platelet-rich plasma in acne scarring treatment. Cosmet Dermatol. 2011;24:177-83
- Patel Y, Parmar B, Umrigar D. A Comparative Study Of Combined Microneedling With Platelet Rich Plasma Versus Microneedling Alone In Acne Scar. International Journal Of Scientific Research. 2020; 9(11), 63-64.