

Efficacy of Platelet Rich Plasma in Treatment of Acne Scars

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Abstract

History: Scarring is a typical consequence of acne vulgaris; acne scarring frequently takes place on the face leading to psychological trauma and social impairment, particularly nowadays when a self-confident appearance is very necessary with all those cosmetic methods. The aim of the work is to estimate the effectiveness of plasma-rich platelet injection in atrophic scar patients. Methods: PRP injection was compared to the left side of the same patient's face for the therapy of acne scars by 2 sessions – one month apart. The research includes 20 participants, and follow-up photographs (pre- and post-treatment) before 1 month after the last session. The evaluation was carried out with the use of the qualitative and quantitative scar method. Results & Conclusion: major improvements have been made on the right side (PRP side).

Keywords: PRP, Gel Plasma, Acne.

1. Introduction

Acne takes place in areas of the body where pilosebaceous glands are large, but appears in particular on the face, back and stomach. Post-acne atrophic scarring is an unfortunate effect of harm caused to and around the pilosebaceous units during active acne with a net collagen loss. Severe scarring induced by acne in teenagers is correlated with physical and psychological distress [1].

Multiple forms of scars are nevertheless commonly found in one human, rendering it impossible to differentiate [2]. Atrophic scars are categorised due to the extent and depth of damage.

Icopic scars make up between 60 and 70% of atrophic injuries. This thin epithelial tubes of less than 2mm form V have a sharp edge, extending vertically to the deep dermis or subcutaneous tissue, Boxcar scars make up between 20% and 30% of atrophic scars. These scars are broader, 1,5- to 4,0 mm, circular to oval with sharp vertical edges, Rolling scars make up 15-25% of atrophic injuries. These wounds are the most often undulated in appearance [1].

Acne scarring is a simpler surgical challenge, since minimally aggressive treatments are used for skin rejuvenation, straining, and scar remodeling [3]. They boost dermal extra-cellular matrix proteins without ablation of the epidermis, including chemical peels, microdermabrasion, mesotherapy, PRP therapy and non-ablative lasers (El-Domyati et al, 2015).

Platelet-rich plasma (PRP) is an extremely enriched autologous plasma solution generated from patients' own blood. It includes plasmas that are supposed to release various growth factors and are valued in a wide range of dermatological applications including androgenetic alopecia and scar revision, acne scars.

The aim of the work is to estimate the effectiveness of plasma-rich platelet injection in atrophic scar patients.

2. Patients and methods

This study was performed at Dermatology Outpatient Clinic, Benha University Hospital in the period from October 2019 to June 2020 after approval from the Department of Dermatology and Andrology and

The Research Ethics Committee (DermaREC) in Benha University

The study included 20 patients with acne scars, they were chosen randomly.

2.1. Inclusion criteria.

- Patients with atrophic acne scars.

2.2. Exclusion criteria

- Patients with positive history of platelet disorder or bleeding.
- Patients with HIV and hepatitis.

Photographed before and after the sessions, the patients were assessed before and after treatment according to Goodman's qualitative and quantitative scar scale. [5]

2.3. PRP preparation

Ten cc of venous blood is harvested under full aseptic conditions from the antecubital vein. The whole blood sample was obtained in sodium citrate tubes (10:1). The citrated whole blood was then subjected to two measures of centrifugation. Centrifugation of the nucleus and plasma from the red and white cells in 1419 g for 7 minutes ("soft" spin). The resulting supernatant plasma containing the suspended platelets (and may include a component of "buffy" white cell) is harvested for 5 minutes in a second centrifugal phase ("hard" rotation) leading to the splitting of the plasma into two portions: plasma-poor and plasma-rich platelets, respectively.

Usually, the plasma is the lower 1-2 cc (10% of the original autologous blood volume is yielded during centrifugation as platelet-rich plasma concentrates). Then the calcium chloride injection was triggered directly before injection using an intradermal insulin syringe and subcutaneously with a ratio of 10:1 (0.1 cm of calcium chloride per 1 cm of platelet-rich plasma) administered by 0.1 cc of platelet-rich plasma per point under each scar[6].

2.5. Statistical analysis

Data entry, processing and statistical analysis was carried out using Statistical package for social sciences (IBM-SPSS), version 24 (May 2016); IBM- Chicago, USA will be used for statistical data analysis. Tests of

significance (Kruskal-Wallis, Wilcoxon's, Chi square, logistic regression analysis, and Spearman's correlation) were used. Data were presented and suitable analysis was done according to the type of data (parametric and non-parametric) obtained for each variable. P-values less than 0.05 (5%) was considered to be statistically significant.

Table (1) Demographic characteristics in the study group

Demographics		
Age (years)	Mean \pm SD	25 \pm 4.2
Gender	Males n (%)	10 (50.0)
	Females n (%)	10 (50.0)

There was non significant difference between the right & left sides as regard to quantitative assessment before injection, (P-value = 0.192), Mean quantitative assessment was significantly lower in right side (8.8) compared left side (12.4). (P value was <0.001). Indicating more improvement of the rt side of the patient,

3. Results

This study was done on 20 patients suffering from acne scars; all patients were selected from the Outpatient Clinic of Dermatology and Andrology of Benha University Hospitals.

The mean age of the patients was 25 \pm 4.2 . As regard gender, 50% of the studied patients were females, while 50% were males, Table (1)

Qualitative assessment pre and post-injection showed a significant difference on the right side (P-value <0.001). Before injection, 50.0% showed mild degree, 25% were moderate, and 25% were severe, while after injection, 25% were macular, 45% were mild, 15% were moderate, and 15% were severe.

Table (2) Qualitative assessment before & after injection in right & left sides

		n	%	P-value
Right side	Macular	0	0.0	<0.001
	Mild	10	50.0	
	Moderate	5	25.0	
	Severe	5	25.0	
	Macular	5	25	
After injection	Mild	9	45.0	
	Moderate	3	15	
	Severe	3	15	

The sign test was used

There was in significant relation between the improvement in the right side with age, gender and positive family history of scars ., Table (3)

Table (3) Correlation between degree of improvement and demographic data on the right side

		Improved (n = 9)	Not improve (n = 11)	P value
Age (years)	Mean \pm SD	22 \pm 4	27 \pm 8	0.236
Gender	Males n (%)	5	6	0.13
	Females n (%)	4	5	
+ve family history of scar	n (%)	5	7	0.129

Mann Whitney U test was used for numerical data. Categorical data were compared using Fisher's exact test
NA = Not applicable

4. Discussion

This trial was conducted to test the effectiveness of platelet rich plasma (PRP) intradermal injection on the right side of the face of acne scars patients.

With regard to the right side treated with PRP, substantial improvements were registered on the right side.

The results of the current study were in line with several studies showing that acne scars received with PRP injection were mildly improved in a single treatment line,

Ibrahim et al.[7] were trying to compare microneedling with and without topical PRP in a split facial study and also found that the PRP-treated side showed greater improvement but was not statistically significant. Gupta et al.[8] showed no additional benefits to the topical use of PRP in acne scars over microneedling. The addition of plasma rich in platelets to fractional laser carbon dioxide was observed by Faghihi et al.[9], not to have statistically meaningful synergistic results, but to lead to further erythemas and oedema and longer downtimes attributable

to the accumulated platelets contributing to the initiation and dissemination of the inflammatory phase.

In comparison, Ibrahim et al. [7] demonstrated the maximum change rate associated with microneedling, PRP injection and combined treatment, accompanied by microneedling and then PRP injection at the lowest rate. Intercellular matrix synthesized components and new collagen fibre arrangement.

5. Conclusion

The present study showed a significant improvement in the right side (PRP side) indicating a potential role of PRP in treatment of acne scars in the future.

References

- [1] G.Fabbrocini and S.Cacciapuoti, "Evaluation, Prevention, and Management of Acne Scars: Issues, Strategies, and Enhanced Outcomes Do Not Copy Penalties Apply Do Not Copy Penalties Apply," vol. 17, pp. 44–50, 2018.
- [2] D.Connolly, H.L.Vu, K.Mariwalla, and N.Saedi, "Acne scarring- pathogenesis, evaluation, and treatment options," *J. Clin. Aesthet. Dermatol.*, vol. 10, pp. 12–23, 2017.
- [3] S.Bhargava, P.R.Cunha, J. Lee, and G. Kroumpouzou, "Acne Scarring Management: Systematic Review and Evaluation of the Evidence," *Am. J. Clin. Dermatol.*, vol. 19, pp. 459–477, 2018, doi: 10.1007/s40257-018-0358-5.
- [4] M.S.Leo, A.S.Kumar, R Kirit, R.Konathan, and R. K. Sivamani, "Systematic review of the use of platelet-rich plasma in aesthetic dermatology," *J. Cosmet. Dermatol.*, vol. 14, pp. 315–323, 2015, doi: 10.1111/jocd.12167.
- [5] Y.S.Soliman, R.Horowitz, P.W.Hashim, J.K.Nia, A. S.Farberg, and G. Goldenberg, "Update on acne scar treatment," *Cutis*, vol. 102, p. 21, 2018.
- [6] Z.A.Ibrahim, A.A.El-Ashmawy, and O. A. Shora, "Therapeutic effect of microneedling and autologous platelet-rich plasma in the treatment of atrophic scars: A randomized study," *J. Cosmet. Dermatol.*, vol. 16, pp. 388–399, 2017, doi: 10.1111/jocd.12356.
- [7] M. K. Ibrahim, S. M. Ibrahim, and A. M. Salem, "Skin microneedling plus platelet-rich plasma versus skin microneedling alone in the treatment of atrophic post acne scars: a split face comparative study," *J. Dermatolog. Treat.*, vol. 29, pp. 281–286, 2018.
- [8] M. Gupta, K. D. Barman, and R. Sarkar, "A comparative study of microneedling alone versus along with platelet-rich plasma in acne scars," *J. Cutan. Aesthet. Surg.*, vol. 14, p. 58, 2021.
- [9] G.Faghihi, S.Keyvan, A.Asilian, S. Nouraei, S.Behfar, and M. A. Nilforoushzadeh, "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. Dermatology, Venereol. Leprol.*, vol. 82, pp. 162, 2016.