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Research Article

Management of Surgical Scars by Microneedling

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Abstract

Background: For unexplained reasons, surgical scars are specific to humans and do not exist in other animals. Excessive collagen synthesis and deposition by fibroblasts results in surgical scars. The current study's objective is to compare the effectiveness of microneedling alone to its use combined with platelet rich plasma (PRP) in the treatment of surgical scars. **Methods**: The present study included 20 patients suffering from disfiguring surgical scars seeking for better cosmetic appearance. Patients were divided into 2 equal groups: group I (microneedling only) and group II (microneedling plus PRP). **Results:** Clinical improvement was statistically significantly higher in group II; 42.1 ± 18.0% vs. 31.6 ± 8.3%, p= 0.05. Mild, moderate and good cases among group II were 2 (20.0%), 5 (50.0%) and 3 (30.0%) respectively vs. 4 (40.0%), 6 (60.0%) and 0 (0%) in group I respectively (p= 0.04). **Conclusion:** For the treatment of surgical scars, microneedling combined with PRP works better than microneedling alone.

Keywords: Micro-needling; PRP; Surgical Scars

Introduction

The final result of an unhindered spontaneous healing process following wounds is a normal cutaneous scar. Usually, a well-defined biologic process of secondary healing will cause an injured skin surface to recover on its own [(1)].

Numerous scar kinds, from a "normal" fine line to a range of aberrant scars like extensive, atrophic, contractures, hypertrophic, and keloid scars, are the consequence of skin tissue repair [(2)].

Treatment plans fall into three categories: leave-alone, invasive, and non-invasive. Compression therapy is one non-invasive therapeutic option; surgical excision and suture are examples of invasive treatments [(3)].

Combining microneedling with platelet rich plasma (PRP) or a laser or light device with non-laser technology like radiofrequency are two examples of uncorrelated and distinct procedures that are used in combination therapy [(4)].

Percutaneous collagen induction therapy, another name for microneedling, is a relatively new treatment option in dermatology [(5)].

PRP, or platelet-rich plasma, is a cutting-edge technique for the treatment of various scars. PRP is a plasma fraction that has a higher platelet concentration than whole blood, usually three to seven times the mean concentration of platelets in whole blood [(6)].

Subjects and Methods

20 Patients were selected from the Dermatology Outpatient Clinic and Plastic Surgery Outpatient Clinic at Minia University Hospitals. The study was approved by the ethical committee for Postgraduate Studies and Research.

This comparative study was carried out on 20 patients presented with surgical scars. The patients were divided into 2 equal groups: group I: included 10 patients, subjected to microneedling only (DP) and group II: included 10 patients, subjected to combined microneedling and PRP (DP+PRP).
Pregnant and lactating female, psychiatric patient, patient with disturbed mentality, patient with history of bleeding tendency or anticoagulant therapy, patient on oral steroid therapy, patient with active skin infection, patient with uncontrolled diabetes, renal disease, liver disease or any major medical illness and patients with history of psoriasis, vitiligo and lichen planus (risk of koebnerization) were excluded from the study.

The patients' full medical history was obtained, including their name, age, and place of residence; current medical history; the onset, progression, and duration of surgical scars; and previous and family histories of the same ailment.

To determine the amount and distribution of surgical scars, a thorough dermatological examination as well as a general checkup were performed on each patient. Additionally, standard laboratory tests were carried out to weed out those who weren't fit.

Regarding the course of therapy, the surgical scar under occlusion was covered with local anesthetic under occlusion which was removed after 45 to 60 minutes.
Treatment areas were split into two categories: in group 1 (microneedling only) and in group 2 (microneedling with PRP). Eight vertical passes were made with a needle in the treatment area (stamping technique). The occurrence of consistent pin-point bleeding was the goal for every therapy session.

In group II, PRP was applied topically in the scar following the microneedling process. Each patient had six microneedling sessions, one every two weeks.
For the purpose of clinical assessment, digital photos were taken before to, during, and following the surgery. It was obtained prior to and three months following medication, with using camera (Olympus; digital camera E-330 SLR, USA).

Every visit and two weeks following the conclusion of the treatment were used to evaluate the clinical response, side effects, or problems. A five-point rating system was used by two dermatologists who were blinded to assess the clinical improvement: none (0%), mild (1-25%), moderate (26-50%), good (51-75%), and very good improvement (76-100%).

Statistical Analysis
IBM SPSS (SPSS for Windows, Version 16.0, copyright©; SPSS Inc., Chicago, IL, USA) was used to analyze the data. For quantitative data, the expressions included mean ± standard deviation, median, and interquartile range (IQR); for category data, they included % and number.

Results
This comparative study was carried out on 20 patients presented with surgical scars in different sites of the body. The patients were divided into 2 equal groups: group I: included 10 patients, subjected to microneedling only (DP) and group II: included 10 patients, subjected to combined microneedling and PRP (DP+PRP).

The overall clinical improvement was statistically significantly higher in group II compared with group I; 42.1 ± 18.0% vs. 31.6 ± 8.3%, p= 0.05 (table I).
Mild, moderate and good cases among group II were 2 (20.0%), 5 (50.0%) and 3 (30.0%) respectively vs. 4 (40.0%), 6 (60.0%) and 0 (0%) in group I respectively, p= 0.04 (table II).

Table I: Clinical improvement %

Clinical improvement %		**Groups N=20 n (%)**
Group1 DP	**Mean ± SD**	31.6 ± 8.3
Group2 DP+PRP	**Mean ± SD**	42.1 ± 18.0
p value	**Group 1 Vs Group 2**	0.05*

Table II: Clinical improvement (none, mild, moderate, good and very good)

Clinical improvement		**Groups N=20 n (%)**
Group1 DP	**None**	0
	Mild	4 (40.0%)
	Moderate	6 (60.0%)
	Good	0
	Very good	0
Group2 DP+PRP	**None**	0
	Mild	2 (20.0%)
	Moderate	5 (50.0%)
	Good	3 (30.0%)
	Very good	0
p value	**Group 1 Vs Group 2**	0.04*

- Mann- Whitney test for non-parametric quantitative data between the two groups.
- Wilcoxon signed rank test for non-parametric quantitative data within the same group.

*: significant level at p value ≤0.05

* *: Highly significant level at p value ≤0.001

A few adverse effects included;

- Pain during the procedure.
- Transient erythema and edema.

Discussion

An undesired variation in the wound-healing process is surgical scarring. Scar formation is primarily induced by an uncontrolled increase in collagen and fiber dimensions during the restoration of the damaged area, which is a mechanism that is rather well understood [7].

Patients suffer greatly psychologically from the deformities, pain, itching, and contracture deformity brought on by hypertrophic scars, which also lowers their quality of life [8].

Scar treatment involves a variety of techniques, including surgery, topical medications, compression, physiotherapy, and more, but each technique has its drawbacks [9].

Tiny needling is a straightforward office-based technique that promotes wound healing by making pinhole wounds with several sterile tiny needles [10].

Furthermore, recent researchers suggested that PRP injections can help to heal scarring [11].

Thus, the goal of this study was to evaluate the effectiveness of microneedling both by itself and in conjunction with PRP for the treatment of hypertrophic scars. The effectiveness of PRP in treating hypertrophic scars has been studied.

Following fractional carbon dioxide laser treatment, a split face investigation revealed no discernible variations between topical and intradermal L-PRP treatment [12].

Few research have compared the effectiveness of PRP injections with microneedling; most have focused on intradermal PRP injections.

A study comparing the effectiveness of intralesional PRP microneedling versus intralesional distilled water microneedling found improvements of 62% and 45.8%, respectively [13].

Ibrahim et al. treated 90 patients: 28 received monthly microneedling, 34 received PRP injections intradermally, and 28 received alternate sessions of microneedling and PRP injections. The mean improvement for each patient was 39.71±13.06, 48.82±23, and 70.43± 13.32, respectively, with a higher response observed in those receiving microneedling and PRP injections [14].

On the other hand, a split face research comparing microneedling with PRP against microneedling alone was conducted by Ibrahim et al., on 35 patients. After three months, the patients underwent four sessions and a final assessment, although neither side showed any progress [15].

Conclusion

The results obtained indicate that the combination of microneedling and PRP is a more successful treatment for surgical scars than microneedling alone. Nevertheless, the improvement was statistically significant.

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