Original Article

EFFICACY OF MICRO NEEDLING IN PATIENTS WITH POST-ACNE SCARRING

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ABSTRACT

Background: Multiple minimally invasive sessions of skin micro-needling are an effective treatment for post-acne scars as it stimulates the repair processes with the advantage of being a relatively risk-free, in-office procedure with minimal patient recovery time. The study aimed to determine the efficacy of micro-needling for the treatment of patients with post-acne scars presenting to tertiary care hospitals.

Material and Methods: It was a Quasi-experimental study conducted at the Department of Dermatology, Sharif Medical City Hospital, Lahore. The study was carried out over a period of six months from 26-05-2019 to 25-11-2019. The sample size of 83 cases was calculated using a 95% confidence level, 10% margin of error and taking an expected percentage of effectiveness of micro-needling as 31%. Non-probability consecutive sampling was used.

Results: Patients ranged between 18-35years of age. Patients with acne scars in grade 3 and grade 4 were enrolled in the study based on Goodman and Baron grading system. As regards baseline grades of acne scars, 45 patients (54.2%) were having grade III and 38 patients (45.8%) had grade IV acne scars. At the end of treatment, 40 patients (88.88%) having grade III scars showed improvement in their grades whereas 5 patients (11.11%) showed no improvement according to the set definition. There was a total of 38 patients (45.8%) presenting with grade IV acne scars of which 32 patients (84.21%) showed improvement by 2 grades whereas 6 patients (15.78%) did not meet the desired results.

Conclusion: The efficacy of micro-needling was found in 72 patients (86.7%).

Key Words: Acne vulgaris, Wound healing, Fibroblasts

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INTRODUCTION

Being the most commonly encountered skin disorder, Acne vulgaris needs prime consideration by dermatologists. It primarily affects teenagers; however, it may present at any age.[1] As per the definition, Acne is a multifactorial chronic inflammatory disease that affects pilosebaceous glands.

Underlying pathogenic mechanisms include increased production of sebum, follicular hyper-keratinization, and colonization by Propionibacterium acne with various products of inflammation. It may present as papules, pustules, seborrhea, comedowns', and less frequent nodules or pseudocysts, ultimately leading to scar formation in about 95%of the cases.[2]

Being a psychologically distressing condition, Acne scarring creates a great challenge for the treating Dermatologist. The patient suffers from low self-esteem and is psychologically distressed as a result of these scars. So, an effective treatment will help them in improving physical as well as

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mental status.[1] Different treatment options are available for its management including but not limited to Chemical peels, Derma abrasion, Resurfacing, Acne fillers, electrodesiccation and collagen-induced therapy.[3]

Each treatment option carries its limitations and has its pros and cons. Microneedling had been introduced lately for treating such complications of acne. Controlled skin injury is produced by creating small punctures using microneedles without damaging the epidermis. As a result of this, there are small bleeding points seen, which create a healing cascade and release of growth factors needed for wound healing.[4,5] Old scars are also broken down by the needle and allowed to revascularize. There is migration and multiplication of fibroblasts leading to new collagen synthesis and neovascularization. Within five days of the injury, a fibronectin matrix is formed that determines collagen deposition causing tightening of the skin which may last for five to seven years in the form of Collagen III.[6,7]

It is cost-effective, handy equipment with ease of only having outpatient visits. The efficacy and safety of micro-needling are already established in multiple global studies including in Asian skin. This modality has recently been introduced locally but limited data is available. The literature has reported considerable variation in its effectiveness ranging from 31%-72.2%.[4,5]

This study's objective is to determine the efficacy of this new modality in a psychologically disturbing complication of Acne Vulgaris, in patients presenting to the dermatology department of a teaching hospital. Thus, evidence will be generated to help dermatologists' decision-making regarding the use of micro-needling for the treatment to decrease the morbidities associated with post-acne scars.

MATERIAL AND METHODS

This Quasi-experimental study was carried out in the Dermatology Unit of Sharif Medical and Dental College, Lahore, after soliciting ethical approval from the institutional research and ethic boards. A total of 83 patients with grade 3 and 4 atrophic facial scars selected according to the Goodman and Baron grading scale[8], of both gender with Ages 18 to 35 years having a mean age of 27.0±5.2 years were included in this study. WHO calculator was used for determining the sample size comprising 83 cases which were calculated using a 95% confidence level, 10% margin of error, and taking the expected percentage of effectiveness of micro-needling as 31%.[1] These patients have enrolled in the Dermatology Unit of Sharif Medical and Dental hospital over a period of six months.

Exclusion of Patients was made with the tendency of having keloid scarring, history of recurrent herpes or active acne lesion (determined on clinical examination), and Patients with clotting disorders (deranged PT > 14sec and APTT > 33 sec). Patients taking anticoagulant or steroid therapy during the last 3 months (determined on history and medical record), uncontrolled diabetes, uncontrolled hypertension, and history of collagen vascular disease.

Informed consent was taken. Afterward, the patient's skin was cleansed with an alcohol swab, followed by the application of topical 10 % Lidocaine cream. Microneedling was carried out using Derma pen®. With slight pressure, it was rolled on the treatment area four times in all directions. The appearance of pinpoint bleeding points or mild erythema was considered an endpoint for the session. Post-procedure the patients were instructed to apply a topical anti-bacterial ointment and strictly advised sun protection. A total of three sessions were carried out each with an interval of one-month post-procedures photographs was taken after every session and their record was maintained on a pre-designed proforma. Patients were also inquired about any side effects after each session. Two-grade improvement was considered to be "effective" using Goodman and Baron grading scale.[8] The confidentially of the data was ensured.

The SPSS version of 17.0 was used for data entry and analysis. Frequencies were calculated for gender, base, and line acne grading. Mean ± SD was calculated for age, and duration of disease. Data were stratified for age, gender, duration of disease, and baseline acne grading. Post-stratification Chi-square test was applied by taking a p-value of ≤ 0.05.

RESULTS

Patients having Grade III and Grade IV acne scars were enrolled in the study according to Goodman and Baron grading scale.[8] Patients were graded for their initial acne scars based on the Goodman and Baron grading system[8] and micro-needling using standard treatment protocol was done on all the patients for 3 sessions one month apart. At the end of treatment, the scars were graded again and the effectiveness of treatment was labeled as a decrease in 2 grades of scarring based on Goodman the and Baron grading system and noted in proforma.

Before treatment, 45 patients (54.2%) were having Grade III scars while 38 patients (45.8%) were having Grade IV acne scars.

At the end of treatment 40 patients (88.88%) having grade III scars showed improvement in their grades as per the defined criteria whereas 5 patients (11.11%) showed no improvement according to the set definition. There was a total of 38 patients (45.8%) presenting with grade IV acne scars of which 32 patients (84.21%) showed improvement by 2 grades whereas 6 patients (15.78%) did not meet the desired results. Hence, the response to three sessions of micro needing was significantly better in those patients who had grade III acne scarring as compared to those who had grade IV acne scars.

After 3 sessions of micro-needling, the Grades of acne scars were found as, 44 patients (53%) had Grade I acne scars, 29 patients (35%) have grade II acne scared 10 patients (12%) had Grade III acne scars. The efficacy of micro-needling was found in 72 patients (86.7%). Stratification about age, gender, duration of disease, and base, line acne grading was carried out. Patients were categorized into two age groups. It was observed that patients in Group A (18-25years) had significantly better results than Group B (26-35years). Out of the 21 males, 19 patients (90.47%) showed efficacy for micro-needling while 2 patients (9.52%) showed no improvement. Of the 62 females treated for their post-acne scars, 53 patients (85.48%) showed efficacy for micro-needling while 9 patients (14.51%) did not improve according to set criteria; 2-grade improvement from the baseline. No adverse were noted apart from temporary redness and patients tolerated the procedure with minimal pain. No hindrance was observed in the patient's daily activity after the sessions except for mild crusting that lasted for 1 or 2 days. Patients resumed their routine duties on the same day.

After 3 sessions of micro-needling in intervals of 4 weeks, it was found that 72 (86.7%) of the patients had effective responses to the therapy. The remaining 11 (13.3%) did show some response (one-grade improvement in scoring scale) but did not achieve as per defined criteria, that is to say, improvement in 2 grades from the baseline.[8]

Comparison of Pre- and Post-Treatment Acne Scarring Grades

Pre-Treatment Grade			Post-Treatment Grade		
Grade	**Number (n)**	**Percentage (%)**	**Grade**	**Number (n)**	**Percentage (%)**
Grade I	Not Enrolled	Not Enrolled	Grade I	44	53.0
Grade II	Not Enrolled	Not Enrolled	Grade II	29	35.0
Grade III	45	54.2	Grade III	10	12.0
Grade IV	38	45.8			
Total	**83**	**100.0**	**Total**	**83**	**100.0**

Efficacy of Micro-needling

Efficacy	Number(n)	Percentage (%)
Yes	72	86.7
No	11	13.3
Total	**83**	**100.0**

Stratification for baseline acne grading

Baseline acne grading	Improvement		Total	p-value
	Yes	No		
Grade III	40	5	45	P≤0.05
Grade IV	32	6	38	
Total	**72**	**11**	**83**	

DISCUSSION

Less invasive techniques are used as modern modalities for collagen building, tightening of the skin, and its reuse, nation. There is no damage to the epidermis while at the same time enhancing dermal protein formation, with minimal side effects and no downtime.[9,10]

In the current study, the efficacy of micro-needling was evaluated for post-acne scars. It is a minimally invasive modality with very little downtime. We performed micro needling three times at four weeks intervals. We found it effective in 86.7% of patients. These results are comparable with most of the local and international literature.

To attain the desired results, multiple sittings of micro-needling are needed. Approximately four weeks are recommended between two sittings. In other studies, sessions varied from two to six sittings. However, the total number of sessions needed to achieve the anticipated results is not established yet.

In research conducted by Dr. Ummer Yaseen in 2017 at Mubarak Hospital Srinagar, a total of thirty-five patients with post-acne scars were included after being graded using the Goodman and Baron's qualitative score. They combined micro-needling with Platelet-rich plasma injections at 2 weekly intervals alternatively. A total of six such sittings were carried out. Pre-treatment and post-treatment scars were graded. The patient's self-perception of improvement was also considered.

Results showed that twelve patients had grade IV acne scars, eight (66.6%) of which subsequently improved to grade II, and 4 (33.3%) improved to grade III scars. 15 patients had grade III scars, of which eight (53.3%) upgraded to grade I, and 7 (46.6%) improved to grade II. Eight (100%) patients with grade II scars upgraded to grade I.

Overall results were highly satisfactory for the treated patients. It proved to be a good combination of treatments for scars of all grades.

In the current study, statistically significant improvement was noted by the treated patients in terms of reduction in scars, and improvement in the texture of the skin. After two sessions only moderate satisfaction was seen. However, the desired results were obtained after three sessions using micro needling as a single modality of treatment with greater patient satisfaction.[11,12]

K Varma, S Bhargava, and U Kumar conducted a study in 2018 in Hong Kong. 36 cases were included in the study. Patients of age ranging from nineteen years to thirty-five years (mean 24.8 years) were selected. It included twenty females and sixteen males. Before the treatment, eighteen patients had Grade-III scars while fourteen patients had Grade-IV scars and four patients had Grade-II scars. Out of these, 4 patients could not remain in the follow-up.

Three sessions were carried out at four weekly intervals. The patient's scars improved to grade II significantly from eleven percent to thirty-eight percent (p=0.006). The patients with grade-III scars remained almost the same (p=0.81) as 9 cases from grade IV had upgraded to grade III. After the study, the overall number of patients with grade-IV scars declined significantly from thirty-nine percent to fourteen percent (p=0.01).

We evaluated the responses about age and gender in our study population but to the best of our knowledge, no existing research has such an evaluation.

The results of the present study agree with the studies conducted by K Varma, S Bhargava, and U Kumar, which evaluated the effect of micro-needling on post-acne scars.[12-14]

CONCLUSION

Micro-needling has proven to be a minimally invasive and relatively risk-free procedure with proven efficacy in the treatment of patients with post-acne scars. Multiple sessions are however required to promote the repair process in scars with very minimal downtime.

Micro needling was significantly effective for a P value ≤ 0.05 in the younger age group and patients with grade III acne scarring. However, the results were not prominently different as per gender distribution and duration of disease. It was found to be a safe procedure due to minimal side effects.

Further research is however required to evaluate its efficacy in other grades of acne scarring. It is also recommended to combine this therapeutic option with other modalities like PRP and chemical peeling to establish its efficacy in acne scarring in patients with Fitzpatrick 4 and 5 skin types.

AUTHOR'S CONTRIBUTION

AA: Conception of idea, data collection and manuscript writing

SK: Data collection and collection of reference

UA: Results and discussion, overall supervision of project

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