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ORIGINAL ARTICLE

Efficacy of Microneedling with Dermaroller Alternating with CROSS Peeling with 30% TCA in Management of Acne Induced Scarring

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ABSTRACT

Objective: To study the effect of combination of two therapies i.e. Microneedling with Dermaroller alternating with Chemical Reconstruction Skin Scar (CROSS) peeling with 30% TCA in management of acne induced scarring.

Patients and Methods: This experimental study was conducted in the department of Dermatology, Benazir Bhutto Hospital, Rawalpindi from March 2017 to December 2017. A total of 20 patients underwent microneedling with dermaroller at week=0 (baseline) and were subjected to CROSS peeling with 30% TCA on follow up after 2 weeks. Four sessions of each procedure were repeated at 2 weeks' interval. Photographs were taken at baseline and 4 weeks after the end of therapy (week=18). The baseline and final photographs were assessed for acne scar grading as per Goodman and Baron qualitative scale by two dermatologists who were blinded to the whole study.

Results: Out of 20 patients, 16 (80%) of the patients had grade IV acne scarring and 4 (20%) had grade III scarring at baseline (week=0). On assessment at 4 weeks after the end of therapy (week=18), 16 patients who were having grade IV acne 6 (37.5%) improved to grade III, and 10 (62.5%) improved to grade II. Out of 4 patients who were initially having grade III at week=0, all 4 (100%) improved to grade II by week=18. A Wilcoxon signed rank test showed highly significant improvement in the grading of scarring (z=-3.92, p=0.00008).

Conclusion: The combination therapy of microneedling with dermaroller, alternating with CROSS peeling with 30% TCA was highly effective in treating all types of atrophic acne scarring.

Key words: Acne, Microneedling, Scarring, TCA CROSS.

Author`s Contribution
[1] Conception, synthesis, planning of research and manuscript writing Interpretation and discussion
[2] Data analysis, interpretation and manuscript writing, Active participation in data collection.

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Introduction

Acne vulgaris, commonly known as acne, pimples or zits is a chronic disorder of the pilosebaceous unit.[1] It is the most common dermatological presentation in the USA.[2] The disorder results from the blockage of the sebaceous duct by keratinocytes and over production of sebum resulting in overgrowth of Propionibacterium *acnes*, which eventually initiates a cascade of inflammatory and immune responses that manifest as comedones, papules, pustules, nodules or cysts depending on the severity of the disease. The genetic and environmental factors, severity of acne and the delay in seeking medical consultation contribute towards formation of post acne scarring.[3] The acne scarring is in turn, responsible for low self-esteem and psychological morbidity. The acne scarring can be classified into atrophic, hypertrophic and keloidal varieties. The atrophic scarring, the commonest variant, is further sub-classified into ice pick, rolling and boxcar types. Within this commonest variant of acne

scarring, the ice pick is most prevalent followed by boxcars.[4] Numerous options for treating these scars have been explored over time with variable success. The major modalities for treatment of acne scarring include the energy based devices, chemical peels and surgical methods.

Acne scarring is a major concern of many patients presenting to the dermatology outpatient departments of the public sector hospitals in Pakistan. In our government hospitals, energy based devices (lasers, fractional radiofrequency, IPL) are less commonly used because of the high cost required to carry out these procedures. However, chemical peels and microneedling are frequently employed to manage such patients. A wide range of chemical peels are available for treating acne scarring and are classified on the basis of their penetration depth into very superficial, superficial, medium and deep penetrating peels. These peels cause chemical destruction of the defective cutaneous layer, which prompts remodeling and reduce scarring.[5] The chemical peels are generally safe, however, deep peels may have serious side effects and also require pre-procedural topical anaesthesia. Microneedling denotes puncturing skin at multiple sites repeatedly using a dermaroller and is used to treat a number of dermatological conditions including acne scarring.[6] The procedure is usually safe and well tolerated, however, topical anaesthesia is essential to control the pain associated with microneedling.

As mentioned earlier, we see a large number of patients with complaint of acne induced scarring in our setup i.e. a tertiary care public sector hospital of Pakistan. The aim of our study was to compare the efficacy of microneedling using dermaroller alternating with chemical reconstruction of skin scars (CROSS) using a medium depth penetrating chemical peel, 30% trichloroacetic acid (TCA). The rationale for using this combination was to see the effects of two minimally invasive, relatively safe & cheap procedures brought together for supposedly better management of acne scars.

Patients and Methods

This experimental study was carried out Department of Dermatology, Benazir Bhutto Hospital, Rawalpindi from March 2017 to December 2017. A total of 20 patients with severe acne scarring grade IV/ III and aged 18 to 35 years of either gender with otherwise good health, were included in the study. Patients with keloid tendency, active herpes virus; bacterial or fungal infections, any allergy to topical anaesthesia, local or systemic disease, altering wound healing, concurrent use of antiplatelet or anticoagulants and pregnant plus lactating mothers were excluded from the study. On successful selection of the subjects in study, after written informed consent and keeping in view the inclusion and exclusion criteria, his baseline digital photographs of the face were taken including frontal and lateral views. The demographic details of the subjects along with duration and type of acne scarring were noted. Acne scar grading was done by two dermatologist blinded to the study otherwise, on the basis of the digital photographs at baseline using Goodman and Baron qualitative acne scarring scale.[7]

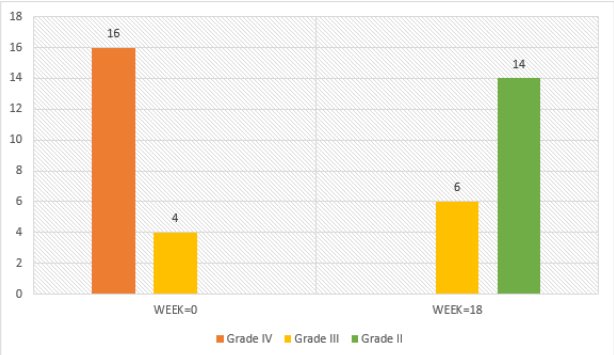
At week 0, patients were subjected to microneedling with dermaroller. Before the procedure, a local anaesthetic agent (Lignocaine 2%) was applied for 45 minutes. It was then removed and microneedling done with dermaroller containing 540 needles with needle length of 1.5 mm. For microneedling, movements were performed in eight directions vertical up and down, horizontal right and left, and both diagonal directions. Multiple movements were performed until fine bleeding points were seen. Blood was cleaned with Gauze piece and sunblock was applied. Post procedure strict photo-protection was advised and patient was requested to follow up after 2 weeks. At week 2, CROSS peeling with 30% TCA was done in all the patients and patients were advised strict photo-protection after the procedure and requested to follow up again after 2 weeks. Four sessions, each of microneedling with dermaroller (weeks= 0, 4, 8 and 12) and CROSS peeling with 30% TCA (weeks= 2, 6, 10, 14) were performed two weeks apart in this manner. By the end of 14 weeks from baseline (week 0) the therapy was completed. The patients were advised to continue strict photo-protection for the next 4 weeks and follow up again afterwards. Digital photographs of the face of patients including frontal and lateral views were taken again after 4 weeks of the end of therapy or 18 weeks from baseline (week 0) with the same device as used earlier. The two dermatologist (blinded to the whole procedure and study) who graded the patients' scars at baseline (week=0) were

requested again to go through the photographs and grade the scarring again using Goodman and Baron qualitative acne scarring scale at week=18. Throughout the study, a record of adverse events reported by the patients was maintained. Statistical analysis was done using SPSS version 23.

Results

Out of a total of 20 subjects who took part in the study, 11 (55%) were males and 9 (45%) were females. The mean age of the participants was 24.5 ± 4.0 years. The mean duration of acne scarring was 2.4 ± 2.0 years. Predominantly a combination of various types of atrophic acne scarring was observed in the subjects. Among 20 patients, 6 (30%) patients had only one type of acne scarring and it was rolling type in all individuals. Rolling type of atrophic acne scarring was present in 19 (95%), both ice pick and boxcar types were present in 12 (60%) of the patients. At baseline (week=0), 16 (80%) of the patients had grade IV acne scarring and 4 (20%) had grade III scarring. At assessment on 4 weeks after the end of therapy (week=18), Out of 16 patients who were having grade IV acne 6 (37.5%) improved to grade III and 10 (62.5%) improved to grade II. Out of 4 patients who were initially having grade III at week=0, all (100%) improved to grade II by week=18, shown in graph I and figures 1-3.

A Wilcoxon signed rank test was used to evaluate the significance of improvement in the grade of scarring. The test revealed a significant improvement in the score of the participants at 4 weeks after the end of therapy (week=18) as compared to baseline (week=0), (z=-3.92, p=0.00008).



Graph I: Grades of acne scarring at baseline (week =0) as compared to the grades 4 weeks after the end of treatment (week=18)

No serious adverse reaction by the therapy was seen. A few patients reported mild transient erythema and oedema more so after microneedling but it settled after application of emollients.

Discussion

Acne scarring is a major and common complication of acne vulgaris. The most common type is atrophic scarring.[8] The cosmetic concern has dire consequences on the mental health of the individual. Various modalities are available for the treatment of acne scarring. These can be broadly divided in to energy and non-energy based modalities.[9] The energy based devises are costly but the results are relatively promising and include lasers, fractional radiofrequency & IPL. These modalities also have a high proportion of side-effects and relatively longer downtime.[10] On the other hand, non-energy based devises are accessible to more people and have proved to be quite effective as well. The non-energy based modalities include chemical peels, dermabrasion, microneedling, etc. Currently, the treatment of acne scarring is individualized depending on the demand and expectations of the patients plus the availably of expertise and equipment. Combinations of various modalities are being explored extensively in order to reach a consensus for the best therapy of acne scarring.

Microneedling with either derma-pen or dermaroller combined with various chemical peels and other agents like platelet rich plasma (PRP) and glycolic acid has been researched extensively to find out the right combination with best results.[11-13] We also used such a combination that included microneedling with dermaroller, alternating with a medium depth chemical peel 30% TCA and the results have turned out be highly significant for improvement in acne scar grading from baseline.

The improvement was observed more in the acne scars having grade IV at baseline (week=0) as compared to the ones having grade III. However, all of the patients showed some improvement with either grade IV or III with no failure rate. There were no major side-effects associated with this combination therapy and was well-tolerated by all the patients. Moreover, all sub-types of atrophic post acne scars responded to our treatment. The rating was done by two well trained and experienced dermatologists that were

Figure 1: Patient with grade IV acne scrring improved to grade II after treatment

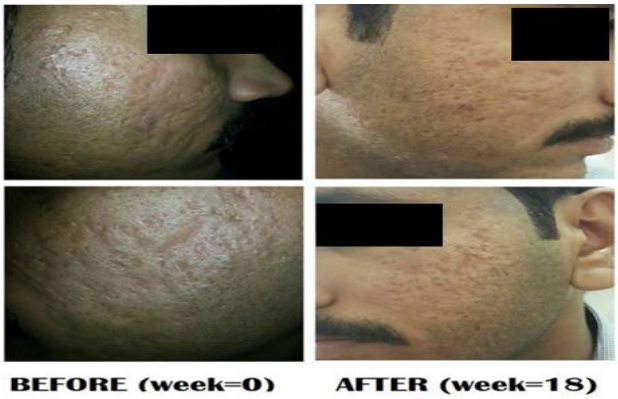


Figure 2: Patient with grade IV acne scarring improved to grade III after treatment

Figure 3: Patient with grade IV acne scarring improved to grade III after treatment

completely blinded to the whole study including the sampling of the patients and the procedure done on the subjects which, in turn, improved the reliability of the results. As microneedling opens the pores of the epidermis and results in more penetration of the topical agents applied, the microneedling was done before each of the CROSS peeling with 30% TCA for better results. Moreover, the technique that we used is cheap, an outpatient procedure and does not require a lot complex technology. These advantages are imperative for our patients as most of them are under-privileged.

Conclusion

Our study proved that four sessions, each of microneedling with dermaroller alternating with CROSS peeling with 30% TCA at an interval of two weeks in-between is a cheap and effective procedure for treating all types of atrophic acne scarring particularly having grade IV initially as per Goodman and Baron qualitative scale for acne scarring. It does not require complex and expensive equipment; moreover, adverse events related to regimen are minimal.

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