

Effects of Jessner's solution chemical peeling in the treatment of acne vulgaris

Uzma Dost Muhammad Rajar, Asher Ahmed Mashhood*, Attiya Tareen**

Department of Dermatology, Isra University, Hyderabad.

* Department of Dermatology, Combined Military Hospital, Rawalpindi.

** Department of Dermatology, Fauji Foundation Hospital, Rawalpindi.

Abstract

Objective Chemical peeling is a process of skin resurfacing that is frequently been used for the purpose of aesthetics and facial rejuvenation. Hence the present study is aimed to determine the effects of chemical peeling performed using a Jessner's Solution (JS) chemical peeler as an agent in the management of acne vulgaris.

Methods A study was conducted on 100 acne vulgaris patients to whom four sessions of chemical peeling procedure was performed to determine its impact on acne scarring.

Results Most of the patients had a scarring at cheeks 48%, at both forehead and chin the number of patients with scarring were 25%, around 17% have scarring at cheeks and chin, 6% have scarring at cheeks and forehead where as 4% had scarring on complete face.

Conclusion The study has concluded that chemical peeling performed by using a JS chemical peeler found to be significantly effective among patients with acne vulgaris.

Key words

Acne Vulgaris; Jessner's Solution; Epidermis.

Introduction

Acne vulgaris (AV) is the most common skin disease that affects 85% of general population once in their lives.¹⁻² Sites that are most commonly affected includes face, upper back and chest.¹ It is caused by the over activity of sebaceous glands and an obstruction in the duct that leads to the formation of comedones due to proliferation of *Propionibacterium acne*.² Condition of continuous inflammation and blockage of sebaceous duct resultantly leads to the formation of papules, pustules, nodules and scarring.³ The disease negatively impact an

individual's life by affecting appearance and self-esteem hence creates anxiety, depression and poor quality of life.⁴⁻⁵ Multiple acne management therapeutic strategies are available that included systemic therapies (oral antibiotic and retinoid), topical therapies (benzoyl peroxide) and physical modalities (laser therapies and chemical peeling).⁶⁻⁷ But for the purpose of this study the effort has been made to understand the effects of chemical peeling for the management the of acne vulgaris.

Chemical peeling involves process of skin resurfacing that is frequently been used for the purpose of aesthetics and facial rejuvenation.⁸⁻⁹ The process involved causing a manageable injury to skin by application of acid, type of vehicle, appropriate buffer and duration of acid contact with the skin thereby, later allowing the

Address for correspondence

Prof. Uzma Dost Muhammad Rajar
Department of Dermatology,
Isra University, Hyderabad.
Ph: 03008374117
Email: dr.udmr22@gmail.com

skin to regenerate fresh epidermal and dermis.¹⁰ The depth of injury to the affected skin site during the process is mainly controlled through acid concentration and length of acid contact to skin.¹¹ It is therefore on the basis of depth of skin injury the process is classified as superficial (injuring the epidermis), moderate (injury extended to papillary dermis and upper reticular dermis) and deep (injury involving fragment or even extend to mid reticular dermis). Mostly the process of superficial chemical peels are used to treat AV and deep peels are created to treat scars.¹²⁻¹³ Various chemical agents are used for the purpose of chemical peeling that includes α -hydroxy acid (AHA), amino fruit acid (AFA), Glycolic acid (GA), Mandelic acid (MA), Tartaric acid (TA), β -Hydroxy acid (BHA), Salicylic acid (SA), Azelaic acid (AZA), Lipohydroxy acid (LHA), Jessner's Solution (JS), Pyruvic acid (PA), Retinoic acid (RA) and Trichloroacetic acid (TCA).¹⁴ Of all the agents that were used JS is a premixed formula that contains SA, lactic acid and resorcinol 14% each.¹⁴

Although AV pathogenesis is yet unclear the multiplication of *Propionibacterium* acne increases levels of inflammatory cytokines, sebum and causes follicular hyperkeratinization.¹⁵⁻¹⁶ Evidences from literatures revealed that process of peeling have all antiseptic, anti-inflammatory, ketolytic and comedolytic effects along with the ability to reduce sebum production and hence therefore widely used for the purpose of treatment of acne vulgaris.¹⁷⁻¹⁸ Despite the fact that process of chemical peeling is widely used the evidence regarding its effectiveness are scarce and it is therefore the treatment strategy of chemical peeling is placed in level B evidence as per recommendation of care for the treatment of acne vulgaris (2016) because of inconsistent and limited quality patient oriented evidence.¹⁹⁻²⁰ It is therefore, authors are intended to determine

the effects of chemical peeling performed using a JS chemical peeler as an agent in the management of acne vulgaris after four chemical peeling sessions with each subsequent session being performed after a gap of ten to fifteen days from a preceding sitting.

Methods

This study was conducted on 100 acne vulgaris patients that attended the dermatology clinic of Isra University Hospital, Hyderabad. It was a quasi-experimental designed study in which the patients were provided chemical peeling procedure based on 4 sessions each subsequent session was performed with a gap of 15 days.

Patients with acne vulgaris with in an age group of 20-30 years, including both male and female population with no concomitant infection and were found not responsive to conventional treatment.

Patients with any of the following characteristics were excluded. Pregnancy, active skin disease, viral, fungal, bacterial involvement, herpetic infection, dermatitis, eczema, rosacea, tropical allergy, history of irregular scarring, keloids and isotretinoin use within previous six months.

The procedure was performed by trained dermatologist. Patient's face was cleaned by alcohol swab and JS chemical peeler was applied for initial 5 to 10 seconds on right side of the face and observed for any reaction the same was repeated on left side of the face if patient tolerated the first application of agent than subsequent application was performed for a duration of 60 seconds till visible frosting. After subsequent intervals during a session face of the patient was neutralized using a cold saline wipes and a noncomedogenic moisturizer was applied. Topical antibiotics were prescribed for twice daily along with an instruction to limit sun

exposure. Evaluation of the patients were performed twice at baseline and after completion of 4 sessions of treatment so that the effects of treatment protocol can be estimated.

The effectiveness of the treatment protocol was determined on the basis of Goodman’s qualitative global scarring grading system.²¹⁻²² Photographs of patients were taken before the start of the treatment session and after 4 sessions by a similar person using a (Nikon D3500, 23.5mm x 15.6mm camera. The efficacy of the treatment was determined by reduction in 1 rating from initial assessment according to Goodman’s qualitative global scarring grading scale. Further in order to avoid outcome biasness the photographs of patients taken at pre and post session were evaluated by independent dermatologist and on four point patient satisfaction scale²³ represented in **Table 1**.

Data Analysis

Data was analyzed using SPSS version 20. Demographical details were represented in the form of frequency and percentages. Parametric tests were applied to determine base line and post treatment differences. Level of significance was kept $p > 0.05$ at 95% of Confidence Interval (CI).

Results

A total of 100 acne vulgaris patients were recruited on the basis of simple randomization method for the purpose of this study.

Table 1 Patient satisfaction scale.

| Grade | Level of Satisfaction |
|-------|-----------------------|
| 0 | No Satisfaction |
| 1 | Slightly Satisfied |
| 2 | Moderately Satisfied |
| 3 | Highly Satisfied |

The demographic description of the patients revealed that the mean age of the patients recruited in the study was 24.82 ± 2.62 . With a total number of male patients were 40 and a female patients were 60 (**Table 2**). Most of the patients had a scarring at cheeks 48%, at both forehead and chin the number of patients with scarring were 25%, around 17% have scarring at cheeks and chin, 6% have scarring at cheeks and forehead where as 4% had scarring on complete face (**Table 3**).

Analysis of pre-post difference based on Goodman’s qualitative global scarring grading system it was found that a significant $p < 0.05$ (t stats -11.112) improvement in the grade had been observed where the average baseline scarring score of patients was 49.65 ± 4.9 that was reduced to 41.48 ± 7.58 with a mean difference (MD) of -8.1 ± 7.35 (95% of CI; -9.62 to -6.71) (**Table 4; Figure 1**).

Similarly a significant number of patients were found satisfied with the treatment protocol where 58% of the patients were found moderately satisfied, 33% were slightly satisfied, 4% were highly satisfied and 5% were found not satisfied with the results of the treatment protocol.

Table 2 Demographical descriptions of patients.

| Variables | Total patients ‘n’ | Mean Age in years | Standard Deviation |
|-----------|--------------------|-------------------|--------------------|
| Male | 40 | 25.5 | 2.5 |
| Female | 60 | 24.4 | 2.6 |
| Total | 100 | 24.8 | 2.6 |

Table 3 Percentages of patients with scarring site.

| Variable | Area involved | Patient Percentage |
|---------------|---------------------|--------------------|
| Scarring Site | Cheeks | 48% |
| | Forehead and Chin | 25% |
| | Cheeks and Chin | 17% |
| | Cheeks and Forehead | 6% |
| | Complete face | 4% |



Figure 1 Representing Acne Scars in patients graded as per acne grading scale.

Table 4 Goodman’s qualitative global scarring grading system (within the group Analysis).

| Variables | Mean values \pm SD (Pre) | Mean values \pm SD (Post) | Mean Difference \pm SD (MD) (95%of CI) | t-stats | p-value |
|-----------|----------------------------|-----------------------------|------------------------------------------|---------|---------|
| Score | 49.65 \pm 4.9 | 41.48 \pm 7.58 | -8.1 \pm 7.35 (-9.62 to -6.71) | -11.112 | <0.05 |

Table 5 Percentages of patients with different levels of satisfaction.

| Grades | Variable | Percentages |
|--------|----------------------|-------------|
| 0 | No Satisfaction | 5% |
| 1 | Slightly Satisfied | 33% |
| 2 | Moderately Satisfied | 58% |
| 3 | Highly Satisfied | 5% |

Discussion

The findings of our study revealed that four sessions of chemical peeling that was based on two months of duration was turned out to be significantly effective $p < 0.05$ in reducing the values acne scarring score based on Goodman’s qualitative global scarring grading system. Besides that the level of patient’s satisfaction as recorded on four point scale from 0 to 3 where 0 represents no satisfaction and 3 represents highest satisfaction also suggested that most numbers of patients were found satisfied with the result of JS based chemical peeling. The findings of our results were according to the findings of another study in which the authors have determined the effects of chemical peels on the basis of patient’s perspective and the study had concluded that superficial to medium depth

chemical peels were considered as a useful adjuvant therapies in acne vulgaris besides that it was identifies that use of SA, GA, JS and TCA agents in peeling at variable concentration were provided an effective results.² Moreover in another study a comparative analysis was performed to determine the effectiveness of combination peel therapy versus chemical peel applied for only once in the treatment of AV. The study was based on three groups of patients, the patients in group A were provided combination sequential peels therapy based on JS, followed by TCA 20% applied on the right side of the face and TCA 30% applied on left side, for group B salicylic 20% and mandelic 10% (SM) was applied on right part of the face and salicylic acid (30%) was applied on left side no mandelic was used in making a peel for application on left side. In group C combination sequential peeling of MJ and TCA was applied on right and SM was applied on left. It was concluded that combination therapy had provided better results than single peels application. In addition to that the study provided evidence that combination sequential

peels provided best results.²⁴ A Systematic review that was conducted with an aim to evaluate the evidences provided in Randomized Controlled trials (RCTs) regarding the effects of chemical peels for AV, the authors had evaluated a total of 12 trials that consists of 387 patients and they concluded that chemical peel produced better results among patients with mild to moderate acne, however due to limited evidence a robust conclusion cannot be drawn.¹⁴ In a prospective randomized study the effects of combining oral low dose of isotretinoin (0.2-0.4mg/kg/day) with SSA 30% was determined on acne vulgaris patients and its effects were determined with monotherapy based on isotretinoin. Analysis of the findings revealed that combination therapy was not only safe but had provided better results than monotherapy not only in combination therapy shown significant results on GAGS score, count of lesion and skin indices evaluated on the basis of melanin, erythema, skin pore and texture but in fact the combination therapy had provided earlier results and hence considered as time effective approach in managing acne vulgaris.²⁵ A comparative analysis was performed between micro needling and chemical peel therapy (GA 30%). The target population of this study Fitzpatrick Skin Phototype IV to VI with atropic acne scars to whom treatment was given for 12 weeks two days per week. Results revealed that micro needling treatment protocol had provided better results than chemical peel.²⁶ In another such study efficacy of a combine chemical peel containing a mixture of SA, PA and RA was provided once every three week for 4 time plus exfoliating home care treatment was given and the effects of treatment were determined on Michaelson's acne severity score Subject Global Aesthetic Improvement Scale, and Face Skin Q questionnaire. Results revealed that combination therapy had shown better results and hence authors recommended that physician can use a combination therapy as an effective treatment

for acne vulgaris patients.¹⁰

Conclusion

It is concluded from the study that chemical peeling performed by using a JS chemical peeler found to be significantly effective in improving Goodman's qualitative global scarring grading and patient's satisfaction among acne vulgaris patients. The protocol of this study incorporates a total of four sessions. Every succeeding session was given with a gap of 15 days from the previous sitting. Although the findings of this study supported clinical peeling as an effective method in the treatment of acne vulgaris yet further evidences particularly in the form of RCTs are needed for more robust findings.

References

1. Zaenglein al. Acne vulgaris. *New Engl J Med*. 2018;**379**(14):1343-52.
2. Al-Talib H, Al-Khateeb A, Hameed A, Murugaiah C. Efficacy and safety of superficial chemical peeling in treatment of active acne vulgaris. *Anais brasileiros de Dermatologia*. 2017;**92**:212-6.
3. Kiyozuka A, Kajiyama A, Ootsuki R, Hosokawa M, Miyaki M, Takagi Y. Efficacy of the continuous use of a lotion with carbon dioxide on male subjects with mild acne. *J Cosmet Dermatol*. 2023;**22**(2):577-85. doi: 10.1111/jocd.15456. Epub 2022 Nov 21.
4. Stamu-O'brien C, Jafferany M, Carniciu S, Abdelmaksoud A. Psychodermatology of acne: psychological aspects and effects of acne vulgaris. *J Cosmet Dermatol*. 2021;**20**(4):1080-3.
5. Alanazi Ms, Hammad Sm, Mohamed Ae. Prevalence and psychological impact of acne vulgaris among female secondary school students in arar city, saudi arabia, in 2018. *Electronic Physician*. 2018;**10**(8):7224.
6. Barbieri JS, Spaccarelli N, Margolis DJ, James WD. Approaches to limit systemic antibiotic use in acne: systemic alternatives, emerging topical therapies, dietary modification, and laser and light-based

- treatments. *J Am Acad Dermatol*. 2019;**80(2)**:538-49.
7. Leung Ak, Barankin B, Lam Jm, Leong Kf, Hon Kl. Dermatology: how to manage acne vulgaris. *Drugs Context*. 2021; 10: 2021-8-6.
 8. Conforti C, Zalaudek I, Vezzoni R, Retrosi C, Fai A, Fadda S, Di Michele E, Dianzani C. Chemical peeling for acne and melasma: current status and innovations. *Giornale Italiano di Dermatologia e Venereologia*. 2020;**155(3)**:280-5.
 9. O'connor Aa, Lowe Pm, Shumack S, Lim Ac. Chemical peels: a review of current practice. *Australas J Dermatol*. 2018;**59(3)**:171-81.
 10. Calvisi I. Efficacy of a combined chemical peel and topical salicylic acid-based gel combination in the treatment of active acne. *J Cosmet Dermatol*. 2021;**20**:2-6.
 11. Lee Kc, Wambier Cg, Soon Sl, Sterling Jb, Landau M, Rullan P, Brody Hj, Society Ip. Basic chemical peeling: superficial and medium-depth peels. *J Am Acad Dermatol*. 2019;**81(2)**:313-24.
 12. Pathak A, Mohan R, Rohrich Rj. Chemical peels: role of chemical peels in facial rejuvenation today. *Plast Reconstruct Surg*. 2020;**145(1)**:58e-66e.
 13. Soleymani T, Lanoue J, Rahman Z. A practical approach to chemical peels: a review of fundamentals and step-by-step algorithmic protocol for treatment. *J Clin Aesthet Dermatol*. 2018;**11(8)**:21.
 14. Chen X, Wang S, Yang M, Li L. Chemical peels for acne vulgaris: a systematic review of randomised controlled trials. *BMJ Open*. 2018;**8(4)**:e019607.
 15. Kontochristopoulos G, Platsidaki E. Chemical peels in active acne and acne scars. *Clin Dermatol*. 2017;**35(2)**:179-82.
 16. Lewis Dj, Chan Wh, Hinojosa T, Hsu S, Feldman Sr. Mechanisms of microbial pathogenesis and the role of the skin microbiome in psoriasis: a review. *Clin Dermatol*. 2019;**37(2)**:160-6.
 17. Soleymani T, Lanoue J, Rahman Z. A practical approach to chemical peels: a review of fundamentals and step-by-step algorithmic protocol for treatment. *J Clin Aesthet Dermatol*. 2018;**11(8)**:21.
 18. Wang L, Wen X, Hao D, Li Y, Du D, Jiang X. Combination therapy with salicylic acid chemical peels, glycyrrhizin compound, and vitamin c for riehls melanosis. *J Cosmet Dermatol*. 2020;**19(6)**:1377-80.
 19. Zaenglein Al, Pathy Al, Schlosser Bj, Alikhan A, Baldwin He, Berson Ds, Bowe Wp, Graber Em, Harper Jc, Kang S, Keri Je. Guidelines of care for the management of acne vulgaris. *J Am Acad Dermatol*. 2016;**74(5)**:945-73.
 20. Castillo De, Keri Je. Chemical peels in the treatment of acne: patient selection and perspectives. *Clin Cosmet Invest Dermatol*. 2018;**11**:365.
 21. Salameh F, Shumaker PR, Goodman GJ, Spring LK, Seago M, Alam M, Al-Niaini F, Cassuto D, Chan HH, Dierickx C, Donelan M. Energy-based devices for the treatment of Acne Scars: 2022 International consensus recommendations. *Lasers Surg Med*. 2022;**54(1)**:10-26.
 22. Goodman GJ, Baron JA. Postacne scarring—a quantitative global scarring grading system. *J Cosmet Dermatol*. 2006;**5(1)**:48-52.
 23. Abdel Hay R, Hegazy R, Abdel Hady M, Saleh N. Clinical and dermoscopic evaluation of combined (salicylic acid 20% and azelaic acid 20%) versus trichloroacetic acid 25% chemical peel in acne: an RCT. *J Dermatol Treat*. 2019;**30(6)**:572-7.
 24. Nofal E, Nofal A, Gharib K, Nasr M, Abdelshafy A, Elsaid E. Combination chemical peels are more effective than single chemical peel in treatment of mild-to-moderate acne vulgaris: A split face comparative clinical trial. *J Cosmet Dermatol*. 2018;**17(5)**:802-10.
 25. Ye D, Xue H, Huang S, He S, Li Y, Liu J, Wang Z, Zeng W. A prospective, randomized, split-face study of concomitant administration of low-dose oral isotretinoin with 30% salicylic acid chemical peeling for the treatment of acne vulgaris in Asian population. *Int J Dermatol*. 2022;**61(6)**:698-706. doi: 10.1111/ijd.16127.
 26. Ishfaq F, Shah R, Sharif S, Waqas N, Jamgochian M, Rao B. A Comparison of Microneedling versus Glycolic Acid Chemical Peel for the Treatment of Acne Scarring. *J Clin Aesthet Dermatol*. 2022;**15(6)**:48.