



Original Research Article

A study of efficacy and safety of newer chemical peels for acne vulgaris grade 1 to grade 3

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ABSTRACT

Background: Acne is a common and complex and multifactorial skin disease that affects individuals of all ages. It commonly presents as Seborrhoea and formation of comedones, papules and pustules. Aim of our study is to evaluate various new chemical peeling agent for search of treatment which stand out with maximum efficacy and least side effect.

Materials and Methods: A total 120 patients were included in our study. Grading of acne was done according to Pillsbury classification and divided into five Treatment groups: Group A: Azelaic peel (20% Azelaic acid peel) Group B: Black peel (8% Acetic acid peel) Group C: Kojic acid peel (12% kojic acid peel) Group D: Lactic acid peel (90% lactic acid peel) Group E: Mandelic acid peel (35% mandelic acid peel). Patients in each arm were subjected to respective chemical peels at an interval of 15 days for a total of 6 sessions. Last visit was done at 12th week. Evaluation done by dermatological examination for acne including counting the number of comedones, papules and pustules.

Results: Patients with improvement at the end of 12 weeks the overall reduction rate was 60.4%, 72.4%, 24.1%, 35.2% and 50.1% with Azelaic peel, Black peel, Kojic acid peel, Lactic acid peel and Mandelic acid peel respectively.

Conclusion: Our study thus concluded that the efficacy of Black peel is highest in the treatment of acne vulgaris grade I to III in Indian patients. The resolution was also observed good with Azelaic acid and Mandelic acid while response was not up to the mark by Lactic acid and Kojic acid peel. However, immediate erythema and burning sensations were more common side effects with black peel. Though the side effects observed with these peels reduced by itself, application of emollients, mild steroids and sun screeners hastened the recovery.

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1. Introduction

Acne is a common and complex and multifactorial skin disease that affects individuals of all ages. It commonly presents as Seborrhoea and formation of comedones, papules and pustules. Patients may either present with few blackheads or even with severe pustular deep lesions, abscesses, and scarring, and rarely with the involvement

of the joints, as in the case of acne fulminans. Different factors such as increased production of sebum, the release of inflammatory mediators in the skin, hyperkeratosis and colonization by anaerobic Propionibacterium acnes, genetic predispositions, hormonal abnormalities, immunological disorders, psychological, environmental, and iatrogenic factors are involved in the etiopathogenesis of acne. Chemical peeling is a technique used to improve the appearance of the skin. A chemical solution is applied

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to the skin, which causes it to separate, peel off, and allows new skin to regenerate. The new skin is smoother and less wrinkled than the old skin and may also be more even in color. Chemical peeling is a widely used procedure in the management of acne and acne scars. It causes controlled destruction of a part of or the entire epidermis, with or without the dermis, leading to exfoliation and removal of superficial lesions, followed by regeneration of new epidermal and dermal tissues. The most frequently used peeling agents are salicylic acid, glycolic acid, pyruvic acid, lactic acid, mandelic acid, Jessner solution, trichloroacetic acid, and phenol.¹ Dermatologists have used various peeling agents for decades and are experts in performing all types of this chemical surgery. This concept dates back to Roman times. Superficial and medium depth skin peeling with trichloroacetic acid has been a well-documented therapy in United States since at least 1960. Dr. Baker and Gordon pioneered chemical peeling with phenol in the year 1961. Chemical peeling one of the latest treatments available for the about disease in modern era. Superficial and medium depth skin peels can create dramatic improvement in the skin, but the results were not long lasting as those with phenol peels. The use of retinoic acid alpha hydroxyl acids, broad spectrum sunscreens and skin bleaches as part of a post-peel maintenance programmed has allowed patients maintain the improvement in skin for far longer.²

2. Aims and Objectives

To compare efficacy and safety of Azelaic peel (20% Azelaic acid peel), Black peel (Acetic acid 8% peel), Kojic acid peel (12% kojic acid peel), Lactic acid peel (90% lactic acid peel), Mandelic acid peel (35% mandelic acid peel) in treating patients of acne vulgaris grade I to III.

3. Materials and Methods

The study was conducted in Outpatient department of Dermatology in tertiary care center with prior ethics committee approval. Study duration was 2 years. After screening with the inclusion and exclusion criteria, a total 120 patients were included in our study. All selected patients were informed about the nature of the study and informed written consent was obtained. The demographic data such as age and sex of the selected patients, occupation, marital status and duration of the disease were taken. Other histories like family histories of acne, use of cosmetics and other precipitating factors was noted. Patients were subjected to general and systemic examination. A thorough dermatological examination was done and other existing dermatological lesions apart from acne if present were recorded. Local examination included counting the number of comedones, papules and pustules over face.³ Grading of acne was done according to Pillsbury classification: Grade

1: Mostly comedones Grade 2: Mostly papules Grade 3: Mostly pustules.⁴ Patients in each arm were subjected to respective chemical peels at an interval of 15 days for a total of 6 sessions. Last visit was done at 12th week. Clinical photographs of the lesions were taken before commencement of therapy, followed by at every visit for 7 visits. Method of randomization followed was temporal sequential allocation into five groups as they got enrolled in the study. Treatment groups: Group A: Azelaic peel (20% Azelaic acid peel) Group B: Black peel (8% Acetic acid peel) Group C: Kojic acid peel (12% kojic acid peel) Group D: Lactic acid peel (90% lactic acid peel) Group E: Mandelic acid peel (35% mandelic acid peel). The patients were advised to avoid cosmetics and were primed at home by using adapalene 0.1% gel at night for 2 weeks prior to planned procedure. Then after cleansing peeling procedure was done. In all groups, there was no definite endpoint of peeling. If erythema occurred, it was washed immediately with water. After applying the peel to full face, it was left for three to six minutes, after this patient was asked to wash with water until the burning subsided and slight massage with ice pack was done. The face was patted dry. Sunscreen was applied to whole face and patients were advised strict photo protection using sunscreen every 3 hourly for 3-4 times a day. Post peel care was advised. Peeling procedure was repeated every two weeks for 6 sessions and patients were followed up every fortnight. Clinical photography was done at every visit. All patients were followed up till the end of the study period, and during each visit dermatological examination for acne including counting the number of comedones, papules and pustules was done. Subjective assessment was done by based on subjective interquartile range grading based on their perception of improvement. Side effects attributed to peel were recorded on every visit. The local tolerability of peel was evaluated by recording the degree of irritation, erythema, dryness, burning and peeling at every visit. Any delayed side-effects like post inflammatory hyperpigmentation or hypopigmentation, milia, vesiculation, superadded infections and scarring were noted.

4. Results

A total 120 patients with acne vulgaris were included in our study, 20 out of which were lost to follow up, who were not considered for the final data analysis. In our study mean age of the patients was 22.54 ± 2.93 years and more than half of the patients 54%(n=54) were male and rest 46%(n=46) were female with male to female ratio of 1.17:1. Majority of the patients 70% (n=70) were between 21 to 25 years of age and next common age group was 15 to 20 years 21% (n=21). Around two third of the patients 69% (n=69) were students, others were employees in various sectors. None of them were employed in occupation involving substance, which are acnegenic. All groups were

comparable in baseline parameters and numbers of lesions except number of pustules were relatively higher in group B and group C.

Average reduction of the comedones was increasing in all the treatment groups over the period of 12 weeks. Highest reduction of the comedones was observed with Black peel and Azelaic acid. Table 1

Average reduction of the Papules was increasing in all the treatment groups over the period of 12 weeks. Better reduction of the Papules was observed with Black peel and Azelaic acid. Table 2

Average reduction of the pustules was increasing in all the treatment groups over the period of 12 weeks. Black peel and Azelaic acid had the higher reduction of the pustules compared to other peels. Table 3

Above table shows the comparison of percentage of reduction in acne lesions after every 2 weeks in all groups. Average reduction of the lesions was increasing in all the treatment groups over the period of 12 weeks and maximum in black peel.



Fig. 3: Kojic peel



Fig. 1: Azelaic acid peel



Fig. 4: Lactic acid peel



Fig. 2: Black peel

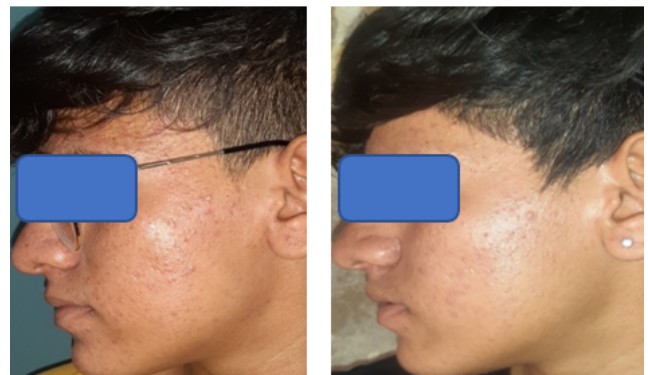


Fig. 5: Mandelic acid peel

Table 1: Comparison of percentage of reduction in Comedones after every 2 weeks in all groups

Weeks	Azelaic peel	Black peel	Kojic acid peel	Lactic acid peel	Mandelic acid peel
2	11.2	15.5	3.4	15.2	4.2
4	18.4	27.8	8.6	20.3	7.6
6	27.7	41.3	11.5	22.2	22.9
8	36.9	58.3	17.8	26.6	25.4
10	46.6	63.9	19.5	32.9	48.3
12	58.2	74.8	26.4	36.7	50.8

Table 2: Comparison of percentage of reduction in Papules after every 2 weeks in all groups

Weeks	Azelaic peel	Black peel	Kojic acid peel	Lactic acid peel	Mandelic acid peel
2	11.0	14.8	2.7	8.1	4.7
4	22.8	23.1	7.3	14.8	14.1
6	29.4	30.2	13.3	18.1	23.4
8	44.9	41.2	18.0	25.7	34.4
10	55.1	58.8	21.3	28.1	42.2
12	61.7	69.2	24.0	34.3	47.9

Table 3: Comparison of percentage of reduction in Pustules after every 2 weeks in all groups

Weeks	Azelaic peel	Black peel	Kojic acid peel	Lactic acid peel	Mandelic acid peel
2	7.8	11.0	1.1	3.9	9.1
4	23.3	24.5	4.8	11.7	11.4
6	31.1	37.5	11.2	17.2	34.1
8	40.0	50.5	12.2	24.2	36.4
10	55.6	61.5	17.0	29.7	38.6
12	58.3	72.0	22.3	34.4	50.0

According to Subjective quartile grading scale, marked improvement was observed with Black peel and Azelaic acid peel, moderate response was observed with Mandelic acid and lactic acid peel while mild improvement was observed with Kojic acid peel.

All treatment group were well tolerated. Immediate erythema and burning sensation were most common side effects. Though the side effects observed with these peels reduced by itself, application of emollients, mild steroids and sun screeners hastened the recovery. Peeling of skin occurred in all patients predominantly during the first three sittings. The differences in side effect profile in terms of erythema, burning and irritation were statistically significant (p value = 0.0001). There were no delayed side effects like post inflammatory hyperpigmentation or hypopigmentation, milia, vesiculation, superadded infections and scarring seen in our study.

5. Discussion

Acne therapy aims at reduction of sebum production, correcting the abnormal ductal keratinization, reducing the colony of propionibacterium acnes and preventing the release of inflammatory mediators that are basically responsible for the pathogenesis of acne. However, the appropriate peeling should be chosen based on the patient's preferences as well as on the skin type, acne activity, and

type of acne scars. It is also important to note, that positive results and reduction in symptoms of chronic acne only be maintained by the ongoing use of peeling treatments.

In present study, the overall reduction rate was 60.4% at the end of 12 weeks with Azelaic acid chemical peel. In A. Szymanska et al.⁵ study, highly significant values determining the overall number of acne lesions and the severity of the disease decreased between the period before and after the six treatments. In a study done by Rosario et al.,⁶ however, compared 12% Glycolic acid with 10% Azelaic acid and found Azelaic acid to be significantly better than Glycolic acid with p -value of <0.001 in their studies. Chilicka et al.⁷ study results indicate that acne severity and negative QOL symptoms significantly decreased in both Azelaic acid or Pyruvic acid peels groups. In present study, erythema was observed in 60% and dryness in 15% of patients while no side effect was observed in 30% of patients. In A. Szymanska et al.,⁵ most patients reported a slight discomfort with tingling or pinching than sudden burning and erythema appeared in 31% of the subjects. An important advantage of Azelaic acid peels is their lack of phototoxicity. Based on the analysis of available studies, it may be concluded that Azelaic acid is a nonphototoxic or light-allergenic compound. It means that it can be safely used at any time of the year, unlike peels containing salicylic, glycolic, or pyruvic acid.

Table 4: Comparison of percentage of reduction in acne lesions after every 2 weeks in all groups

Grading of response	Improvement	Peel
Grade 1: <25% improvement	Minimal improvement	Kojic acid peel
Grade 2: 26%-50% improvement	Moderate improvement	Lactic acid peel and mandelic acid peel
Grade 3: 51%-75% improvement	Marked improvement	Black peel and azelaic acid peel
Grade 4: >75% improvement	Near total improvement	None

Table 5: Comparison of immediate side effect in all treatment groups

Immediate Side effects	Azelaic peel	Black peel	Kojic acid peel	Lactic acid peel	Mandelic acid peel
None	6	0	16	17	16
Dryness	3	0	2	3	4
Erythema	12	20	1	0	0
Burning	0	7	0	0	0
Irritation	0	6	1	0	0

At the end of 12 weeks most of the lesions subsided with an overall reduction of 72.4% with black peel in present study. Erythema was observed in all the patients, Burning in 35% of patients and immediate effect in 30% of patients with black peel in present study. Kumar R et al.⁸ also showed similar results with the difference that none of the patient showed poor response. Post treatment was observed by them with excellent response in 55% patient and good response in 45% patients. Preliminary study using “black peel” for acne patients was conducted on 13 patients in Department of Dermatology, Sungkyunkwan University School of Medicine, Kangbuk Samsung Hospital, Seoul, Korea showed that it is different from previously used chemical peel in aspect of its composition, safety and efficacy. 3 sessions of black peel for a total of 6 weeks were performed; excellent response to treatment with complete clearance of acne was observed in 69% patients; good response with almost clear skin having rare non-inflammatory papules was observed in 23% while poor response was observed in 7% patients.⁹

In present study, the overall reduction at the end of 12 weeks with Kojic acid peel was 24.1%. Erythema was observed in 5%, Dryness in 10% and immediate effect in 5% of patients with Kojic acid peel. The overall reduction was very low as compared to other chemical peeling used in this study.

In present study, with the use of lactic acid peel 35.2% of lesions had subsided at the end of 12 weeks. Nearly matched with our results, Garg et al.,¹⁰ in a clinical study on 22 acne patients evaluated the efficacy of topical lactic acid in which reduction of the inflammatory lesions was achieved in 40.9% patients and of the non-inflammatory lesions in 22.7% patients. The prospective study was carried out by S. Sayed et al¹¹ on 40 patients with mild and moderate acne, treated with lactic acid peel weekly for 2 months, showed excellent to good improvement in 50% of the patients, higher than present study. In Sachdeva S et al.,¹² at the end of 3 months, significant improvement

(greater than 75% clearance of lesions) occurred in one patient (14.28%), good improvement (51–75% clearance) in three patients (42.84%), moderate improvement (26–50% clearance) in two patients (28.57%), and mild improvement (1–25% clearance) in one patient (14.28%) with lactic acid. In present study, dryness was observed in 15% and no any side effect was observed in rest 85% of patients with Lactic acid peel. Burning sensation was experienced in 82.5% of the patients and erythema developed in 5% treated by lactic acid peel in S. Sayed et al study.¹¹

In present study, the mean total lesions reduced from 23.6 to 11.8 over 12 weeks showing 50.1% of overall reduction with mandelic acid. In S R. Jartarkar et al,¹³ good to significant clearing of acne was seen in 53.4% of patients and the mean total score reduced from 30 to 13 over 12 weeks. Non-inflammatory lesions (comedones) and inflammatory lesions like papules, pustules and nodules had decreased significantly at the end of treatment. In Dayal et al.,¹⁴ the percentage decrease in mean papule and pustule count in mandelic acid peel group was more than SA peel group at the end of the therapy, but it was not statistically significant. This is in contrast to the study by Anwar S et al.,¹⁵ where they have reported that 10% Glycolic acid peel to be significantly superior over 10% Mandelic acid peel as monotherapy in the treatment of mild to moderate acne. In present study, only dryness was observed in 20% of the patients with Mandelic acid group. In S R. Jartarkar et al¹³ and Dayal et al.,¹⁴ mandelic acid peel was found well tolerated in terms of other side effects like erythema, burning, and stinging sensation. It can be attributed to the large structure of mandelic acid, leading to its slow and uniform penetration in the epidermis, making it an ideal peeling agent for the sensitive skin of the patients with severe acne and hyperpigmentation.

Despite new and emerging modalities in the field of dermatology, chemical peeling holds its own as a safe and efficacious technique to address a myriad of skin disorders which we treat on a daily basis. Chemical peeling

produces consistent reproducible results in people with dark complexions.

6. Conclusion

Our study thus concluded that the efficacy of Black peel is highest in the treatment of acne vulgaris grade I to III in Indian patients. The resolution was also observed good with Azelaic acid and Mandelic acid while response was not up to the mark by Lactic acid and Kojic acid peel. However, immediate erythema and burning sensations were more common side effects with black peel. Though the side effects observed with these peels reduced by itself, application of emollients, mild steroids and sun screeners hastened the recovery.

7. Limitations

Long term prospective studies including a follow-up period of at least 6 months to 1 year with larger sample size are required to substantiate our findings.

8. Conflict of Interest

The authors declare they have no conflict of interest.

9. Source of Funding

None.

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