

Study of glycolic acid and salicylic acid peels as a sole therapy in treatment of acne vulgaris

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Abstract

Introduction: Acne vulgaris is a very common physiological condition of adolescents, better regarded as a disease due to some inflammatory component. In spite of various modalities of treatment available, it still poses a therapeutic problem to the dermatologists. The advent of new and potent topical therapeutic modalities such as chemical peeling has resulted in significant improvement in the treatment of acne. This study aims to observe the therapeutic response of two chemical peels, 35% glycolic acid and 30% salicylic acid on active acne lesions, when given as monotherapy. **Materials & Methods:** A total of 200 patients of either sex with acne were randomly selected and enrolled for the study, two groups of 100 patients each were made of 35% GA and 30% SA respectively. No other concurrent therapy was given. Individual lesions of each type were calculated before and after completing 6 treatment sessions and the numbers were observed to know the effect of both the acids on different types of lesions. **Results:** After 6 sessions, in the glycolic acid group the reduction in average number of comedones was 88.45%, inflammatory papules 88.65%, pustules 89.62% & nodules/cysts 83.33%. Whereas, in the Salicylic acid group, the reduction was 89.00%, 90.36%, was 84.87% & 100% in comedones, papules, pustules & nodules/cysts respectively. **Conclusion:** In our observation, both 35% glycolic acid and 30% salicylic acid are significantly effective as monotherapy in patients of acne. They not only clear the acne lesions but also show improvement in post acne scar and hyperpigmentation to some extent.

Keywords: Acne vulgaris, Chemical peeling, Glycolic acid, Salicylic acid

Introduction

Dermatologists have used various peeling agents for decades. 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 till 1960, when Dr. Baker and Gordon pioneered chemical peeling with phenol in the year 1961[1]. Chemical peeling is a technique used to improve the appearance of the skin. A chemical solution is applied 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 one of the latest treatments available for many dermatological conditions 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 and beta hydroxy acids, broad-spectrum sunscreens and skin bleaches as part of a post-peel maintenance programme has allowed patients maintain the improvement in skin for longer period of time [2]. Acne vulgaris is a very common physiological condition of adolescents but it is better regarded as a disease due to inflammatory component and the disfigurements it produces on socially and psychologically most important body region. Even though various modalities of treatment are available for acne, it still poses a therapeutic problem to the attending dermatologist.

The advent of new and potent topical therapeutic agents such as chemical peeling has resulted in significant improvement in the treatment of acne. This study

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attempts to find the therapeutic response of the two chemical peels, 35% glycolic acid and 30% salicylic acid on active acne lesions when given as monotherapy.

Materials & Methods

The study was conducted at skin OPD of Index Medical College over a period of 10 months from May 2014 to February 2015. A total of 200 patients of either sex with acne vulgaris were enrolled for the above study. The study was prospective observational study.

Inclusion Criteria

- 1) Patients of either sex with acne vulgaris.
- 2) Age between 15 to 30 years.
- 3) Patients with lesions limited to face only.
- 4) Both new and already treated patients who have stopped therapy for at least 4 weeks.

Exclusion Criteria

- 1) Taking any acne inducing drugs.
- 2) Hormonal acne (patient with known h/o PCOD, menstrual irregularities and patient on hormonal therapy for acne)
- 3) Patients with occupations prone to develop acne.

Treatment Protocol and Methodology: Patients selected were informed the nature of the study and written consent was obtained from the patients. The Demographic data such as age and sex of the selected patients, and duration of the disease were taken. Other history, like family history of acne, use of cosmetics, treatment history like topical and oral treatment for acne, topical steroids and other precipitating factors such as home remedies (mud, curd, honey etc.) were noted.

Results

Age distribution: Majority of patients (95%) were in the age group of 15-25 years which is in accordance with the well known fact that acne is the disease of the young and adolescents. (Table 1)

Table-1: Age Distribution

Age Groups (years)	No. of Cases	
	No.	Percentage
15-20	86	43%
21-25	104	52%
26-30	10	5%
Total	200	100%

Patients were subjected for general and systemic examination. A thorough Dermatological examination was done and other existing Dermatological lesions apart from acne were recorded. Dermatological examination for acne included the grading of acne as 1 to 4 as follows [3]

Grade 1 – only comedones few papules

Grade 2 – inflammatory papules and comedones

Grade 3 – predominant pustules, papules and comedones

Grade 4 – nodulocystic

A total of 200 patients of either sex with acne were randomly selected and enrolled for the study, two groups of 100 patients each were made of 35% GA and 30% SA respectively. No other concurrent therapy was given. Individual lesions of each type were calculated before and after completing 6 treatment sessions and the numbers were observed to know the effect of both the acids on different types of lesions.

Clinical photographs of the face were taken before commencement of therapy and after completion of 6 sessions therapy. 100 patients who fulfilled the inclusion criteria were selected and were applied 35% glycolic acid on the face and similarly 100 other patients were applied 30% salicylic acid on the face every 15 days for a total of 6 sessions. Patients were advised to avoid cosmetics and were started on priming with retinoic acid at night for 1 week.

The results were noted by counting the individual lesions (comedones, papules, pustules, nodules & cysts) before and at the end of the treatment. The Mean standard deviation of individual lesions were calculated and paired 't' test was performed with P value < 0.05 considered statistically significant.

Sex distribution: 64% of our patients were females and 36% were males. (Table 2)

Table-2: Sex Distribution

Sex	No. of Cases	
	No.	Percentage
Male	72	36%
Female	128	64%
Total	200	100%

Grading of acne vulgaris: Comedonal acne was the most common morphological variant of acne (64%) followed by papules, pustules and nodules/cysts (Table 3). Table 4 demonstrate response with 35% glycolic acid peels.

Table 3: Acne grading

Grade	No.	Percentage
Grade I	128	64%
Grade II	22	11%
Grade III	38	19%
Grade IV	12	6%

Table-4: Effect of peel on acne lesion observed in glycolic acid peels

Morphology of Lesions	Glycolic Acid Session I (Mean)	Glycolic Acid Session VI (Mean)	Mean Percentage of Reduction
Comedones	5.37 ± 2.4	0.62 ± 0.79	88.45±0.15
papules	5.11±2.35	0.58 ± 0.7	89.16 ±0.15
Pustules	1.06 ± 1.78	0.11 ± 0.37	31.47±0.45
Nodules	0.06 ± 0.24	0.01 ± 0.1	5.0±0.22

Effect of peel on acne lesions observed in 100 patients of glycolic acid group.

- 1) There was reduction of both non- inflammatory and inflammatory acne.
- 2) After 6 sessions the reduction in average number of
 - a) Comedones was 88.45 %, P value = 0.000 (highly significant)
 - b) Inflammatory papules was 88.65%, P value = 0.000 (highly significant)
 - c) Pustules was 89.62% with P value =0.000 (highly significant) &
 - d) Nodules/cysts were reduced by 83.33% with P value = 0.25(not significant)
- 3) GA showed improvement in superficial scarring and skin texture. It also resolved post acne hyperpigmentation to some extent.

Table 5 demonstrate response with 30 % salicylic acid peels.

Table-5: Effect of peel on acne lesion observed in salicylic acid peels

Morphology of Lesions	Salicylic Acid Session I (Mean)	Salicylic Acid Session VI (Mean)	Mean Percentage of Reduction
Comedones	5.18± 2.43	0.57 ± 0.71	89.00± 0.21
Papules	5.29 ± 2.43	0.51 ± 0.73	90.36 ±0.13
Pustules	1.19 ±2.05	0.18± 0.45	28.3 ± .42
Nodules	0.04 ±0.24	0.00± 0.00	.03± 0.4

Effect of peel on acne lesions observed in 100 patients in salicylic acid group,

- 1) Reduction of both non-inflammatory and inflammatory acne was observed.

- 2) After 6 sessions, the reduction in average number of
 - a) Comedones was 89.00% with P value of 0.000 (highly significant)
 - b) Inflammatory papules were reduced by 90.36%, with P value 0.000 (highly significant)
 - c) Pustules was 84.87% with P value of 0.000 (highly significant)
 - d) Nodules were reduced by 100%. With P value of 0.41 (not significant)
- 3) SA showed improvement in post acne hyperpigmentation and overall appearance. It also resolved post acne scarring to some extent.
- 4) Side effects like Erythema-95%, burning sensation-100%, Dryness -98% & Peeling - 95% were more with salicylic acid peel group in comparison to glycolic acid peel group.

Table-6: Response to treatment

Lesions	% of reduction with 35% GA	% of reduction with 30% SA	Mean standard deviation		P value
			GA	SA	
Comedones	88.45	89.00	-0.88 ± 0.15	-0.90 ± 0.13	0.41
Papules	88.65	90.36	-0.89 ± 0.15	-0.90 ± 0.13	0.53
Pustules	89.62	84.87	-0.31 ± 0.45	-0.28 ± 0.42	0.673
Nodules/cysts	83.33	100	-0.05 ± 0.22	-0.03 ± 0.17	0.47

A similar study by Kessler et.al of glycolic and salicylic acid peels found similar efficacy of both peels on acne with salicylic acid to be showing fewer side effects [4].

Discussion

Alpha hydroxy acids and beta hydroxy acids are the most commonly used as peeling agents. Glycolic acid peels (AHA), thin the stratum corneum, promote epidermolysis and disperse basal layer melanin [5].

Salicylic acid is a beta hydroxyl acid agent which removes intracellular lipids that are covalently linked to the cornified epitheloid cells. The most efficacious concentration for acne scars in 30% in multiple session, 3-5 times, every 3-4 weeks [6,7,8].

Acne vulgaris, the “Stigma of Adolescence” exceeds all other causes of suffering in adolescence age group. Many patients do not seek physician’s advice. Only a few cosmetically conscious adolescents who are to be married shortly came for treatment, however mild the condition may be.

Acne therapy aims at reduction of sebum production, correcting the abnormal ductal keratinisation, reducing the colony of propionibacterium acnes and preventing the release of inflammatory mediators that are basically responsible for the pathogenesis of acne.

Age and sex distribution- In our study maximum number of patients of acne vulgaris (52%) were between 21-25 years of age as more were the college

students. with earlier observations as reported by Atzori L et al (1999) [9] where maximum patient were in age group 13-40 years commoner being the females, in our study also there was female preponderance being 64% female out of 200 patients.

35 % glycolic acid group: Patients in this group showed a good response in both inflammatory and non-inflammatory lesions at the end of treatment. At the end of treatment comedones, papules and pustules showed 88.45%, 88.65% and 89.62% improvement respectively. Various studies showing good results of glycolic acid on all the different types of acne lesions have been documented. Wang et al reported 90% improvement of overall acne lesions with glycolic acid Grover C et al reported good response in 78% patients[10]. Wang et al also observed 69% improvement in scarring and hyperpigmentation.

In this study we observed mild to moderate improvement in hyperpigmentation and moderate to good improvement in acne scarring with glycolic acid. The side effects such as erythema, burning and peeling of skin and dryness which have been seen in all patients in the present study have also been noted in the literature. These side effects were mild to moderate type and were well tolerated by patients. Not a single patient

complained of severe side effects. No patient developed inflammatory hyperpigmentation or scarring or allergic reaction.

30 % Salicylic Acid Group: In this group reduction of both inflammatory and non-inflammatory lesions was better than glycolic acid. Comedones showed 89.6% improvement whereas papules had slightly better improvement (90.36%) than in glycolic acid group. The basis of this is salicylic acid inhibit microcomedones formation, thus leading to decrease in follicular openings [11]. Salicylic acid showed better result than glycolic acid in treating pustules. They were decreased by 94.83%. In a study conducted by Grimes, salicylic acid peel on acne showed an excellent to moderate response in 88% and mild clearance in 12% [12].

Side effects were noted in all the patients. Erythema, burning, dryness and peeling of skin were severe. The side effects were more in salicylic acid than glycolic acid. No patient developed inflammatory hyperpigmentation or scarring or allergic reaction. Application of mild steroids and emollients resulted in reduction of the side effects.

In this study salicylic acid was better than glycolic acid in treating comedones, papules and pustules. This is because of the unique lipophilic and is hydrophilic, which makes it a weaker comedolytic agent. Furthermore it doesn't have anti-inflammatory properties of salicylic acid [11]. Both the agents were effective for post-acne hyperpigmentation. The same observations have been reported by Vijay Kumar Garg et al [11].

Salicylic acid improves post acne hyperpigmentation by slightly different mechanisms than GA peels. Salicylic acid is anti-inflammatory and thus serves to decrease existing post acne hyperpigmentation and prevent further inflammation. In addition, some studies found salicylic acid to have a whitening effect on the skin. This effect was seen in present study also.

Conclusion

Both, Glycolic acid and Salicylic acid are effective in treatment of acne vulgaris, post acne scarring and hyperpigmentation.

Glycolic acid and salicylic acid peels additionally decrease superficial scarring and improve skin texture.

Both the acids were tolerated well in both immediate and post peel period. However erythema, burning, dryness and peeling were seen more with salicylic acid peel but these complications were temporary.

On the basis of lesion counts and overall visual scale improvement, glycolic acid and salicylic acid both are effective agents as monotherapy in the treatment of acne. However, cost of therapy and frequent visits might be a limiting factor to patient compliance and treatment adherence.

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