

A Comparative Study of 50 % Glycolic Acid Peel and 30 % Salicylic Acid Peel in Mild to Moderate Acne - A Split Face Study

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ABSTRACT

BACKGROUND

Acne vulgaris is a commonly encountered disorder at dermatology clinics. For decades, chemical peeling has been used as an effective therapeutic option in the treatment of active acne lesions. Although various peeling agents are available, studies comparing their efficacy in active acne are lacking. The aim of the study was to evaluate the comparative efficacy of 50 % glycolic acid (GA) peel and 30 % salicylic acid (SA) peel in mild to moderate acne.

METHODS

This is an interventional, split face study involving thirty patients aged more than 12 years with active acne. The patients underwent peeling sessions every 2 weeks with 50 % glycolic acid and 30 % salicylic acid in the right and left half respectively, for a total of six sessions. Lesion count was recorded at baseline and at every follow-up session. Acne severity scoring was noted at each visit to evaluate the response. Patient VAS and Physician VAS were also used to measure the response. Photographic record was maintained.

RESULTS

The mean acne severity scores improved significantly as compared to baseline on both the sides at each of the follow ups ($p = 0.000$). On inter group comparison; the fall on SA side was significantly better than the GA side at all the follow ups. VAS-patient and VAS-physician scores also showed a significantly better response on SA side as compared to GA side. No serious side effects were noted on either side. Six sessions of both GA 50 % and SA 30 % peels at 2 week intervals showed good response in the management of mild to moderate acne measured by Acne severity score, Patient VAS and Physician VAS. However, SA peel showed a still better and faster response probably owing to its penetration into the sebaceous glands by virtue of its lipophilic nature. No significant side effects were noted by either peel.

CONCLUSIONS

Both GA 50 % and SA 30 % peels are effective in mild to moderate acne vulgaris. SA 30 % peel is more effective and provides faster response in treatment of mild to moderate acne vulgaris.

KEYWORDS

Salicylic Acid, Glycolic Acid, Chemical Peel, Acne, Acne Score (MAS)

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BACKGROUND

Acne vulgaris is a relatively common skin disorder in adolescents and young adults. Acne frequently resolves with time to leave behind sequel in the form of scarring / pigmentation. Acne vulgaris has been graded using a simple system, which classifies it into four grades.¹ Grade 1 is mild acne consisting of comedones and very few papules. Grade 2 is moderate acne consisting of papules, comedones, and occasional pustules. Grade 3 is severe acne consisting predominantly of pustules, abscesses, nodular lesion and Grade 4 acne manifests mainly as nodular cysts, abscesses and widespread scarring.

Conventionally topical and systemic medications (antibiotics, benzoyl peroxide, retinoids), have been used in the treatment of acne vulgaris. In today's era, apart from these conventional treatment, aesthetic procedures like chemical peeling, laser therapy and photodynamic therapy are increasingly being used as an adjunctive therapy or as second line therapy in recalcitrant or resistant cases of acne.

Chemical peeling is a skin resurfacing procedure intended to regenerate normal skin from the application of exfoliative agents. For decades, chemical peeling has been used as an effective modality in the management of active acne. They are often used as an adjuvant and started along with first line therapies such as topical and systemic retinoids and antibiotics.^{2,3} Their addition to the other treatment regimens is preferred and it results in better therapeutic outcome and rapid response in lesional count as well as improvement in skin texture.⁴ Glycolic at 20 - 50 % and salicylic at 5 - 30 % strength are commonly used as superficial peeling agents in the management of mild to moderate acne. There is a paucity of studies that have compared glycolic and salicylic chemical peels as a standalone modality in the management of mild to moderate acne in darker skin types.

METHODS

This was a split face, interventional study conducted at HIMSR & HAH Hospital, Delhi between from March 2019 to February 2020. The study included thirty patients with active acne, grade 1 and 2, aged more than 12 years (Fitzpatrick skin types, IV – VI). Detailed history and dermatological examination was noted on a case record proforma. Patients who had taken any topical treatment in the past 1 month and oral treatment in the past 3 months were excluded. Patients with clinical features of hormonal acne were excluded. Patients with active / recurrent herpes infection or a history of hypertrophic scarring / keloid were excluded. Patients with hypersensitivity to aspirin, those who had a history of oral isotretinoin intake in the past 6 months and pregnant and lactating women were also excluded. Patients were handed over the patient information sheet and those giving written informed consent were enrolled in the study. In patients less than 18 years of age, parents' consent was taken. The patients were examined by a dermatologist and a detailed clinical history and examination was conducted

and recorded in a predesigned proforma. Evaluation of severity of acne was done using Acne Severity Score as per Michaëlsson and colleagues grading system (Table 1).⁵

Lesion Type	Severity Index	Definition
Comedone	0.5	Horny follicular plug and pinhead-sized follicular papules
Papule	1	Infiltrated papules (2 – 8 mm)
Pustule	2	Pustules (42 mm) with surrounding inflammation
Infiltrate	3	Nodules and infiltrates (48 mm) and coalescent papules where individual papules cannot be distinguished
Cyst	4	Lesions where infiltrate has broken down to form discharging cyst

Table 1. Michaëlsson and Colleagues Grading for Acne²

A 50 % glycolic acid peel was applied to right half of the face and a 30 % salicylic acid peel was applied to left half every 2 weeks for a total of six treatments. No other treatment was prescribed.

Procedure

Patients were instructed to lie down in reclining comfortable position. After degreasing with acetone swab, a single coat of 50 % glycolic peel was first applied with peeling brush on right half of patients face for 5 min. Then, the peel was neutralized using neutralizing solution and washed with running water. Similarly, salicylic peel was applied on the left half of face in same session. For salicylic acid peel, the end point was the pseudo-frost formation, when the salicylic acid crystallizes. Similar six peeling session was performed every 2 weeks. All participants were asked to avoid direct sun exposure, heat and friction on the treated areas. They were instructed to apply sunscreen of sun protection factor (SPF) 30 regularly. All study subjects were advised to report immediately, in case they experienced any side effects.

Evaluation of the response was done using Acne Severity Score⁵ on 3 occasions at 3rd session (1st follow up), at 5th session (2nd follow up) and 2 weeks after the last (6th) session (3rd follow up) separately for both the sides of face. A Visual Analogue Scale (VAS) was also used to evaluate the response done by both patients and physician 2 weeks after the last (6th) session. A photo graphic record was maintained to assist in Physician satisfaction scoring.

Primary Outcome Measure

1. Comparison of mean Acne Severity Scores on the both sides of face at the last (6th) follow up.

Secondary Outcome Measures

1. Comparison of mean Acne Severity Scores on the both sides of face at 1st and 2nd follow up.
2. Comparison of mean reduction in Acne Severity Scores at all the follow ups.
3. Comparison of VAS (patient) at the last follow up.
4. Comparison of VAS (physician) at the last follow up.

Statistical Analysis

A Student's t-test and paired t-test were conducted to assess whether there were statistically significant

differences in mean score for inter-group and intra-group comparison, respectively. Proportions were compared using chi-square or Fisher's exact test, depending on their applicability. Analysis was conducted with the help of software SPSS 22.0 version.

RESULTS

The mean age of the patients in the study was 22.1 ± 4.9 years. The youngest patient was 14 years of age, whereas the eldest patient was 30 years of age. There were equal number of males and females (15 each) in the study. The mean age of onset of acne was 12.0 ± 2.1 years. The mean duration of active acne lesions was 1.6 years.

Acne Severity Score

The mean acne scores at baseline were 24.4 ± 7.2 and 23.3 ± 7.1 on glycolic acid (GA) side and salicylic acid (SA) side, respectively (p = 0.543). The scores fell to 16.7 ± 6.3 and 12.7 ± 5.5 at first follow up, 9.9 ± 4.6 and 5.8 ± 3.5 at second follow up, and 5.5 ± 3.9 and 2.2 ± 2.6 at third follow up on GA side and SA side, respectively. (Table 2) (Figure 1)



Figure 1. Pre-Peel (a) and Post-Peel Photograph (b) on GA Peel Side. Pre-Peel (c) and Post-Peel (d) Photograph on SA Peel Side in the Same Patient at Last Follow Up

On intra group comparison, the mean scores improved significantly as compared to baseline in both the groups at each of the follow ups (p = 0.000). On inter group comparison, the fall on SA side was significantly better than the GA side at all the follow ups. (p = 0.011, 0.000 & 0.000 at 1st, 2nd & 3rd follow up, respectively)

Mean reduction in Acne Severity Score was 7.7 and 10.6 at first follow up, 14.6 and 17.5 at second follow up, and 18.9 and 21.1 at third follow up on GA side and SA side, respectively. Percentage reduction in Acne Severity Score was 30.1 % and 45.5 % at first follow up, 59.6 % and 74.9 % at second follow up, and 77.5 % and 90.6 % at third follow up on GA side and SA side, respectively. Statistically significant reduction was noted in the score since 1st follow up onwards on both the sides. (Table 3)

Follow Up	Glycolic Acid Mean ± SD	Salicylic Acid Mean ± SD	P Value
Baseline	24.43 ± 7.21	23.30 ± 7.14	0.543
1 st Follow Up	16.73 ± 6.34	12.70 ± 5.47	0.011
2 nd Follow Up	9.86 ± 4.58	5.83 ± 3.49	0.000
3 rd Follow Up	5.50 ± 3.91	2.20 ± 2.63	0.000

Table 2. Mean Acne Score at Baseline and Follow Ups

Follow Up	Glycolic Acid			Salicylic Acid		
	Mean Reduction from Baseline	Percentage Reduction	p Value	Mean Reduction from Baseline	Percentage Reduction	P Value
1 st Follow Up	7.70	30.12 %	0.001	10.60	45.49 %	0.001
2 nd Follow Up	14.57	59.59 %	0.001	17.47	74.95 %	0.001
3 rd Follow Up	18.93	77.48 %	0.001	21.10	90.55 %	0.001

Table 3. Mean Reduction in Acne Score after Treatment

Score	Patient VAS		Physician VAS	
	GA (%)	SA (%)	GA (%)	SA (%)
1	16.7	3.3	20.0	6.7
2	43.3	10.0	30.0	10.0
3	40.0	86.7	50.0	83.3
p Value	0.001		0.024	

Table 4. VAS Score of Improvement at Last Follow Up after Treatment

Visual Analogue Scale (VAS) - Patient

A VAS score of 3 was reported by 86.7 % patients on SA side as compared to only 40 % on GA side. VAS-patient scores showed a significantly better response on SA side as compared to SA side. (p = 0.001) (Table 4)

Visual Analogue Scale (VAS) - Physician

A scoring system similar to VAS-patient was used by the Physician also to grade the response. Physician evaluations of comparative photos showed similar results with marginal differences. A VAS score of 3 was reported by 83.3 % physicians on SA side as compared to only 50 % on GA side. The response as per VAS-physician score was also better on SA side. (p = 0.024) (Table 4)

Side Effects

All patients completed the study and there were no drop out because of the side effects. One patient reported post inflammatory hyperpigmentation on glycolic acid side that subsided within 14 days after prescribing topical treatment.

DISCUSSION

Acne is a common chronic treatable skin disease of adolescents and young adults. In 2002, a community based study done on Asian population found 91.3 % prevalence of self-reported acne in 15 – 25 years age group.⁶ Asian acne patients have the lesser incidence of nodulocystic acne than Caucasian patients.⁷ However, management of Asian patients poses a challenge due to their higher propensity to develop post acne hyper pigmentation.^{7,8} Because of this, superficial peeling agents have been mainstay of therapy in Asian skin as medium and deeper depth peels carry an increased the risk of post-inflammatory hyper pigmentation. Superficial chemical peels are frequently used in acne vulgaris treatment. Glycolic acid (GA), salicylic acid (SA), trichloroacetic acid (TCA) and Jessner's solution (JS) are frequently used chemical peeling agent in treatment of acne and acne scars.⁹

Glycolic acid peel in concentration range from 20 to 50 % have been used for superficial chemo-exfoliation with higher concentrations (70 %) entering the medium-depth category of alpha hydroxy peels.¹⁰ Mechanism of action of GA peel includes decrease in adhesion between corneocytes, normalization of infundibular dyskeratinization, decreased plugging in keratinocyte which results in reduced follicular occlusion.^{11,12}

A concentration of 5 to 30 % salicylic acid is used for superficial peeling in acne therapy.¹³ At these concentrations, it is safe, and its penetration is self-neutralizing; hence, no neutralizing agents are required. Salicylic peel possess strong keratolytic and comedolytic properties. Owing its lipophilic property, it can easily enter in the sebaceous glands, thus affecting keratinization process and normalize it. It also acts on arachidonic acid cascade leading to reduced inflammation in acne lesions.¹³

Previous studies had shown that glycolic acid do not exhibit anti-inflammatory activity, making it inferior to salicylic acid in the management of acne.⁹ However current studies shows that GA leads to significant clinical improvement in inflammatory lesions as well.^{12,14} In our study, we used a concentration of 50 % for GA and 30 % for SA peel as this was the highest possible concentration of these peels with superficial peel action and are frequently used in acne vulgaris.¹⁵ Kessler et al, although find they have used the 30 % concentrations of both the peel in acne vulgaris.¹¹ Although GA and SA peel has been widely used in clinical practice, but there were very few studies comparing the efficacy and safety of these peeling agents.

In our study, both GA 50 % and SA 30 % peels were found to be effective in the treatment of mild to moderate acne vulgaris. On inter-group comparison, SA 30 % peel was found to be more effective. Our results are in concordance with the study by Garg et al., which concluded that SA had better efficacy and lesser side effect in most of the active acne lesions and post acne pigmentation.¹⁵ Kessler et al., although found no significant differences in effectiveness between the two peels but SA showed sustained effectiveness and lesser adverse events as compared to GA peel.¹¹ In a recent study by Sarkar et al., comparing 35 %

glycolic acid, 20 % salicylic, 10 % mandelic acid, and phytic acid peels, the authors concluded that the inflammatory lesions responded better to salicylic-mandelic acid peel as compared to other agents.¹⁶

Although both glycolic and salicylic peels are effective in terms of superficial exfoliation but salicylic acid by virtue of its lipophilic nature demonstrates penetration through the lipid barriers of the epidermis in addition.⁹ Clinically, this property renders it highly effective in the treatment of cutaneous disorders involving excess sebum production like acne vulgaris. Probably because of this property, salicylic acid peel had better and faster results than glycolic peel in our study.

CONCLUSIONS

Both glycolic acid 50 % and salicylic acid 30 % peel are effective and safe in the treatment of moderate and mild grade of acne vulgaris. Salicylic acid 30 % peel is more effective and provides faster response in treatment of mild to moderate acne vulgaris.

Limitations

Out of convenience, small sample size was selected. Other limitation was that response of either peels in relation to type of acne lesion was not evaluated.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

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