

SALICYLIC ACID VERSUS LACTIC ACID PEELING IN MILD AND MODERATE ACNE VULGARIS

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ABSTRACT

Background :Chemical peels are popular tools for treating acne vulgaris. Many chemicals have been used such as Jessner's solution, glycolic acid, salicylic acid and lactic acid. **Objective** :To compare the effectiveness of treatment and patient's satisfaction after treating facial acne by two agents, 30% salicylic acid and 85% lactic acid. **Methods** :Forty patients with facial acne (20 patients with mild acne and 20 patients with moderate acne) were treated with 30% salicylic acid (applied to the right side of the face) and 85% lactic acid (applied to the left side of the face) weekly for 2 months. All patients were assessed at the end of treatment regarding the improvement of facial acne and the satisfaction they experienced. **Results** :Patients treated with 30% salicylic acid showed excellent and good improvement more frequently (30% and 50%, respectively in patients with mild acne and 30% and 40%, respectively in patients with moderate acne) than those treated with 85% lactic acid (15% and 35%, respectively in patients with mild acne and 10% and 25%, respectively in patients with moderate acne). However, there were no significant differences ($p < 0.05$) between the two methods. **Conclusion**: Both peelings were effective in treating mild and moderate acne. However, the improvement was more favorable with salicylic acid peel.

INTRODUCTION

Acne vulgaris is a common cutaneous disorder of the pilosebaceous follicle. , affecting up to 98% of all adolescents [1]. Typically, lesions are pleomorphic and range from open and closed comedones to inflammatory papules, pustules, cysts, nodules, and scarring may result, this is why the disease has a significant effect on patients' self-esteem. The pathogenesis is only partially understood and is multifactorial [2].

Chemical peeling is the application of a chemical agent to the skin, which causes controlled destruction of a part or the entire epidermis, with or without the dermis, leading to exfoliation, removal of superficial lesions, followed by regeneration of new epidermal and dermal tissues. In spite of the advent of newer techniques and LASER, peeling still considered as a simple procedure, requiring hardly any instrumentation to rejuvenate the skin [3].

Lactic acid (2-hydroxypropanoic acid) is a mild alpha hydroxy acid (AHA) derived from sour milk. The exact mechanism of action of AHAs is not known; however, it has been demonstrated that AHAs applied topically in lower concentrations diminish corneocyte cohesion which reduces stratum corneum thickness. At higher concentrations, these acids cause epidermolysis [4,5]. There are several other factors that determine whether AHA peels result in desquamation or epidermolysis such as the pH, the degree of buffering or neutralization with sodium bicarbonate, the vehicle formulation, the frequency of application, the conditions of delivery, the amount of acid delivered to the skin over a given period, and, most importantly, the duration of time that the acid remains on the skin [6].

Salicylic acid (SA) is a beta-hydroxy acid. It is a hydroxyl derivative of benzoic acid and represents a carboxylic acid attached to an aromatic alcohol, phenol [7]. Salicylic acid is the only member of the beta-hydroxy acid family,

so named because the aromatic carboxylic acid has a hydroxy group in the beta position [8].

Salicylic acid exhibits keratolytic properties as it solubilizes intracellular cement. Its lipid solubility permits the interaction with multilamellar structures surrounding the keratinocytes in the stratum corneum and hair follicle, thereby exhibiting follicular atrophy and comedolytic action within the sebaceous unit [9]. So, it is effective in comedonal and inflammatory acne [10]. It also facilitates resolution of post inflammatory hyperpigmentation of face [11,12].

PATIENTS AND METHODS

This study was carried out at the Dermatology, Venereology and Andrology Department, Assiut University Hospitals, in the period between December 2010 and February 2012. The study design was approved by the Institutional Ethics.

A total of 40 adult patients with Fitzpatrick skin types III-V, with facial acne vulgaris; mild (n=20) and moderate (n=20), were participated in this study. The participants had undergone split face chemical peeling (salicylic acid 30% peels on the right half of the face and Lactic acid 85% peels on the left half of the face) weekly for 2 months.

The concept, advantages and complications of the procedures were explained to the participants. Informed consents were obtained from the patients. All patients were subjected to full history taking including age, sex, occupation and sun exposure.

Patients with acne were classified according to Pochi and his colleagues [13]. Exclusion criteria included patients having severe acne, those under recent treatment for acne or pigmentation within the last month, history of systemic

isotretinoin within the last 6 months, pregnant females, active bacterial or viral infection, history of drug with photosensitizing potential, uncooperative patient and patient with unrealistic expectations.

All patients were pretreated with retinoic acid cream 0.05% for one week before starting the sessions. Every patient was treated by weekly sessions for 2 months. Before each session the face was cleansed by alcohol and sun block was applied after each session. Emollients were prescribed for the patient to use in between the sessions. The patients were instructed to avoid sun exposure and to use sun block regularly. Response was assessed by clinical photographs judged by two dermatologists. The following graded scale was used: excellent (76- 100%), good (51- 75%), fair (26- 50%) and poor (0- 25%) [14]. Patient satisfaction was measured on a scale from 1-5, where >2 was considered satisfied [15]. The adverse effects (burning sensation, immediate (transient) and prolonged erythema and pigmentary changes) were also assessed.

Salicylic acid (30%):

Salicylic acid was applied to the right half of the face using a cotton ball, beginning from the forehead to the temples and cheeks, followed by the nose, lips, and chin. Two to three coats were applied until a white frost appeared which was considered the clinical end point. Subjects experienced a stinging and burning sensation which was increasing over the next 2 minutes, reaching a crescendo at 3 minutes and then rapidly decreased to baseline over the next minute. Then the patient was instructed to wash the face with water.

Lactic acid peel (85%):

Lactic acid was applied to the left half of the face in the same manner as salicylic acid. A maximum of two coats were applied. The peel was kept on patient's skin for a minimum of 2-3 minutes. depending upon patient's tolerance.

The endpoint was mild pink erythema. The peel was neutralized with the ice-cold sponges.

Statistical analysis

Data was analyzed using SPSS software package version 17. Descriptive statistics were done in the form of mean and SD. The Mann–Whitney U test and fisher exact test were applied to analyze the data. Values were considered significant when *P* values were less than or equal to 0.05.

RESULTS

The age of the recruited patients ranged from 15- 35 years with a mean \pm SD of 24.90 ± 5.42 , most of them were females (n=36, 90%) and most of the patients were of skin type IV (75%) followed by skin type III (17.5%) and type V (7.5%).

Patients with mild acne who were treated with salicylic acid (right side of the face), showed excellent improvement in 30% of the patients, 50% showed good improvement, and 20% showed fair improvement (Table 1, Fig. 1). On the other hand, 15% of the patients with mild acne who were treated with lactic acid (left side of the face) showed excellent improvement, 35% showed good improvement and 30% showed fair improvement (Table 1, Fig. 2).

Comparison between salicylic acid and lactic acid peeling revealed that excellent improvement was more frequent among patients with mild acne treated with salicylic acid peeling compared to those treated with lactic acid peeling. However, the results were not statistically significant ($p > 0.05$) (Fig. 3).

Also, no statistically significant difference ($p > 0.05$) could be detected between both types of peels among patients with moderate acne although excellent and good improvement were more frequent (30% and 40%, respectively) among those treated with salicylic acid peeling compared to those

treated with lactic acid peeling (10% and 25%, respectively) (Table 1, Fig. 4,5 and 6).

Table (1): Comparison between salicylic acid and lactic acid peel according grade of acne

Percentage of improvement	Salicylic acid (n= 40)		Lactic acid (n= 40)		P-value
	No.	%	No.	%	
Mild (n=20):					
Excellent	6	30.0	3	15.0	0.451
Good	10	50.0	7	35.0	0.523
Fair	4	20.0	6	30.0	0.716
Poor	0	0.0	4	20.0	0.106
Moderate (n=20):					
Excellent	6	30.0	2	10.0	0.235
Good	8	40.0	5	25.0	0.501
Fair	5	25.0	8	40.0	0.501
Poor	1	5.0	5	25.0	0.182

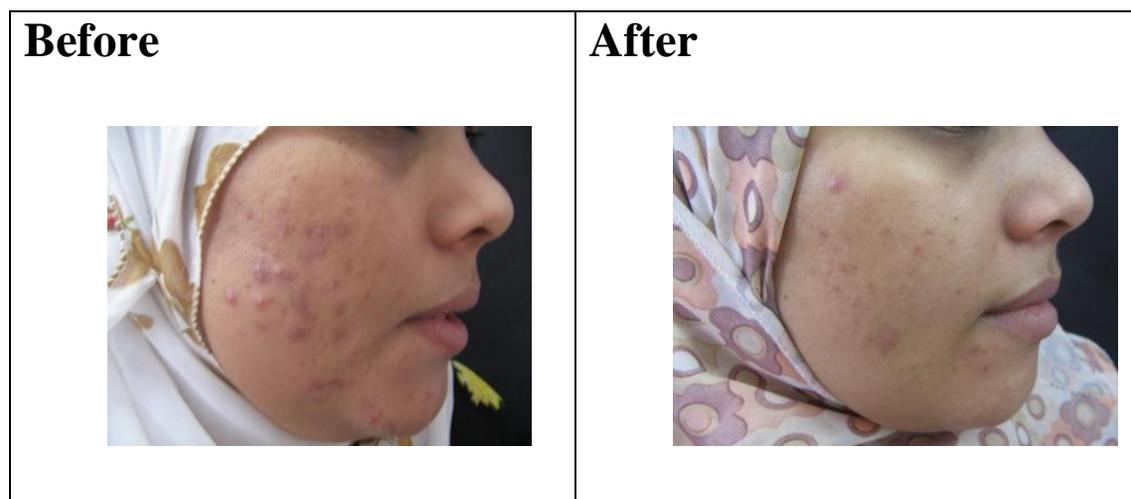


Figure (1): Good improvement in patient with mild acne following salicylic acid peel.



Figure (2): Good improvement in patient with mild acne following lactic acid peel.

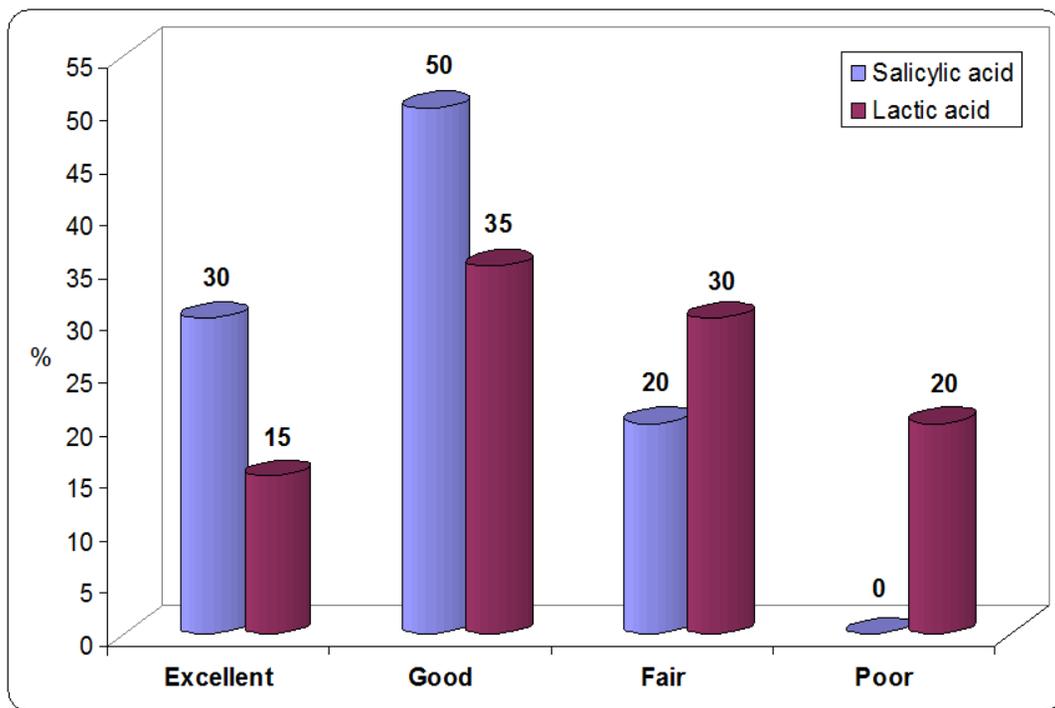


Figure (3): Comparison between the improvement after salicylic acid and lactic acid peeling among patients with mild acne.



Figure (4): Excellent improvement in patient with moderate acne following salicylic acid peel.



Figure (5): Good improvement in patient with moderate acne following lactic acid peel.

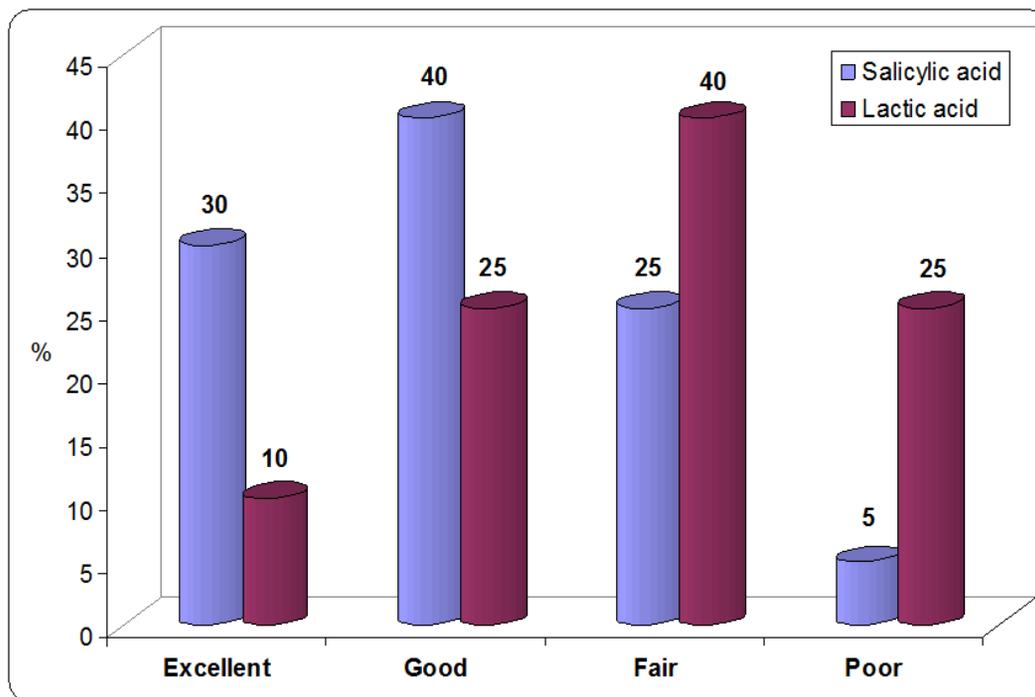


Figure (6): Comparison between the improvement after salicylic acid and lactic acid peeling among patients with moderate acne.

As regards the adverse reactions burning sensation that lasted for few minutes was experienced in most of the patients (35 patients treated with salicylic acid and 33 patients treated with lactic acid peel). Immediate and transient erythema was experienced by 3 patients treated with salicylic acid and only 2 patients treated with lactic acid peel. None of the patients developed post-inflammatory hyper-pigmentation or persistent erythema.

Further evaluation of the results was based on patient's satisfaction. In mild acne group, higher patients' satisfaction was observed on the side of the face treated with salicylic acid compared to the other side treated with lactic acid peel (85% and 65%, respectively). Similarly, patients with moderate acne, expressed higher level of satisfaction after salicylic acid in comparison to lactic acid peel (70% and 45%, respectively). However no statistically significant differences were found between the outcomes of both therapeutic modalities (Table 2).

Table (2): Patient satisfaction after salicylic acid and lactic acid peel according grade of acne

Level of satisfaction	Right (n= 20)		Left (n= 20)		P-value
	No.	%	No.	%	
Mild(n=20):					0.273
Satisfactory	17	85.0	13	65.0	
Unsatisfactory	3	15.0	7	35.0	
Moderate(n=20):					0.200
Satisfactory	14	70.0	9	45.0	
Unsatisfactory	6	30.0	11	55.0	

DISCUSSION

Acne is the most common problem that presents to dermatologists [16]. Diagnosing acne is easy. However, treatment must be adapted to the type and severity of acne, and must also take into account the impact of acne on patients' quality of life [17].

This prospective study was carried out on 40 patients (36 females and 4 males, Fitzpatrick skin types III-V) with mild and moderate acne. The participants had undergone split face chemical peeling (salicylic acid 30% peel on the right half of the face and Lactic acid peel 85% on the left half of the face) weekly for 2 months.

In patients with mild and moderate acne, the right side of the face treated with salicylic acid peel showed excellent to good improvement in 80% and 70%, respectively, of the patients. These results may be due to the fact that salicylic acid is an excellent keratolytic agent. It is thought to function through solubilization of intercellular cement, thereby reducing corneocyte adhesion and because of its lipophilic nature; salicylic acid has a strong comedolytic effect.

Salicylic acid also exhibits anti-inflammatory capabilities through its effect on the arachidonic cascade [12, 18].

Our results were concomitant with other studies [9, 12, 19, 20]. Lee and Kim [12] reported that salicylic acid peel was effective in reducing both inflammatory and non-inflammatory acne lesions. The majority of their patients (77.1%) reported moderate or good improvement.

Kessler et al. [20] compared between 30% glycolic acid and 30% salicylic acid peels in the treatment of mild to moderately severe facial acne vulgaris, where salicylic acid peels demonstrated significant decrease in acne lesions.

On the other hand, the left side of the face, treated with lactic acid peel, in patients with mild and moderate acne, showed excellent to good improvement in 50% of the patients. This could be explained by the mechanism of action of lactic acid in acne vulgaris in which it dissolves the intercellular desmosomes to promote exfoliation. Its antimicrobial and anti-inflammatory properties make it effective in the treatment of acne and sensitive skin conditions and its comparatively larger molecule also allows it to penetrate slowly, which reduces treatment-induced inflammation [18].

Nearly matched with our results, Garg et al. [21], in a clinical study on 22 acne patients evaluated the efficacy of topical lactic acid 5% lotion twice a day for 1 year. At the end of the year, 90-100% reduction of the inflammatory lesions was achieved in 40.9% patients and of the non-inflammatory lesions in 22.7% patients. Thus, most of the patients showed significant reduction in the lesion counts.

Comparison between the percentage of improvement of both modalities in treating mild and moderate acne revealed that salicylic acid peel was more efficient than lactic acid peel but this difference did not reach a statistically significant value. To the best of our knowledge, up to date, there are no similar

studies comparing salicylic acid versus lactic acid peel in treating mild and moderate acne.

The adverse effects in our study were expected and easily manageable and did not affect the patients' compliance. Burning sensation was experienced after salicylic acid in 87.5% of the patients and in 82.5% of the patients after lactic acid peel. Transient erythema developed in 7.5% of the patients treated with salicylic acid and in 5% treated by lactic acid peel. These results were similar to Bari et al. [22] and Sharquie et al. [23].

On evaluating patients' satisfaction, there are many possible parameters for perception of satisfaction. Reduction in number and size of the lesions as well as the degree of post inflammatory hyperpigmentation or skin textural changes and tightening are the most obvious by the patient [5, 19].

Patients with mild and moderate acne were more satisfied with salicylic acid peel (85% and 70%, respectively) compared to lactic acid peel (65% and 45%, respectively). However, the differences were not statistically significant.

CONCLUSION

We conclude that salicylic acid and lactic acid peel are efficient, well tolerated and reasonably safe procedure that can be used as treatment modality in acne vulgaris. However, the improvement was more favorable with salicylic acid.

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