

## TREATMENT OF ACTIVE ACNE VULGARIS BY CHEMICAL PEELING USING 88% LACTIC ACID

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### Abstract

**Introduction:** The etiopathogenesis of acne vulgaris is multifactorial, and its therapy is prolonged course that might be not accepted by many patients. Most recently TCA 35% one session peeling gave complete clearance and full remission for active acne vulgaris. Lactic acid has been used effectively as therapeutic topical agents for many skin diseases.

**Aim:** To evaluate the efficacy and safety of chemical peeling using 88% lactic acid solution in the treatment of active acne vulgaris.

**Material and Methods:** This clinical, interventional, therapeutic study was done at the Department of Dermatology, Baghdad Teaching Hospital, during the period from October 2012 to October 2013.

Twenty five patients with active acne vulgaris were included, 15 (60%) females and 10 (40%) males and their ages ranged from 16-36 (21.5000±5.46279) years. Fifteen patients were associated with acne scars.

Three chemical peels using 88% lactic acid solution was carried out two weeks apart for patients with active acne vulgaris with or without scarring. Scoring for active acne vulgaris and acne scar was done for each case before and after operation to evaluate the severity of acne and the degree of scar before and after treatment.

All patients were with Fitzpatrick's skin types III and IV. Patients were followed up every two weeks during period of therapy and monthly for 3 months after stopping the treatment.

**Results:** Twenty five patients with active acne vulgaris were treated with 3 sessions of lactic acid, fifteen patients had associated acne scar. Scoring for active acne vulgaris including papules and pustules showed highly statistically significant reduction after 2 weeks of therapy (p=0.0001), after 4 weeks (p=0.0001) and after 6 weeks (p=0.0001), with percent reduction 87.2% for papules and 94% for pustules after end of sessions while after 3 months follow up the reduction rate for papules 93.8% and p-value (p=0.001) and for pustules 97.6% and (p=0.0001). While the scarring reduction was moderate in 3 (20%) patients, marked in 3 (20%) patients and excellent in 9 (60%) patients with statistically significant reduction (p=0.002).

All patients had full satisfaction about the results of peeling. Post inflammatory hyperpigmentation was observed few weeks after peeling but follow up for 3 months showed complete clearance of pigmentation with lightening and tightening of skin.

**Conclusions:** Chemical peeling using 88% lactic acid is an effective mode of therapy for active acne vulgaris and acne scar in patient with dark complexion.

**Key words:** Chemical peeling; lactic acid; active acne vulgaris; acne scarring; dark complexion

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### Introduction

Acne is a common chronic inflammatory skin disease experienced by most adolescents and young adults and the pathogenesis of acne vulgaris is a multifactorial. The four major identified factors that are involved in pathogenesis of active acne lesion formation and scarring are: excess sebum production, follicular epidermal hyperkeratinization, the proinflammatory effects of *propioni bacterium acnes* and other normal skin flora,

and immunological reactions [1,2].

Although there are many topical and systemic agents that are used in treatment of acne vulgaris, still many patients don't use these therapies as the course of treatment is prolonged, other patients have no time to use drugs or they don't like to use it or they have phobia from their side effects [3-10]. Accordingly we are looking as a researcher for topical effective therapy that used for short time.

Lasers have been used in treatment of active acne vulgaris but there is controversy regarding their effectiveness as one study showed using Diod laser is an effective therapy in clearing lesions by application three sessions, two weeks apart. Also, another study using Pulse Dye Laser (PDL) showed clearance of inflammatory acne vulgaris lesions using one session while another study also using Diod laser didn't show significant improvement of facial acne [11-15].

Most recently one session trichloroacetic acid (TCA) peel 35% had been used effectively in treatment of active acne vulgaris with or without scarring and the result were very encouraging as induced both clearance of the lesions and remission of disease. In addition, scarring was reduced tremendously. This stimulated us to conduct the present work using lactic acid 88% in treatment of active acne vulgaris [16-20].

Lactic acid is a member of alpha hydroxy acids (AHA) which has been used in treatment of many skin diseases [21] including: Lactic acid used in treatment of recurrent aphthous ulcer as oral gargle by increasing spontaneous secretion of endothelial growth factor from keratinocytes and by its antibacterial action [22].

Also, lactic acid has antioxidant action and this might help in repigmentation of patch of vitiligo as topical 15% lactic acid solution has been used as new mode of therapy for the treatment of localized type of vitiligo [23].

Lactic acid cream 6% has been found effective in the treatment of melasma as topical therapy and also LA 88% has been tried as effective peeling agents for melasma [24]. Topical 15% lactic acid solution was found to be an effective therapy for alopecia areata [25].

The two major side effects of alpha hydroxy acids are irritation and sun sensitivity [26].

Hence, the aim of present work is to treat patients with active acne vulgaris with associated scars by 88% lactic acid as peeling agents and to compare its efficacy with TCA 35% peels.

## Material and Methods

This clinical, interventional, therapeutic study was carried out at the Department of Dermatology, Baghdad Teaching Hospital, during the period from October 2012 to October 2013. Twenty five patients with active acne vulgaris were included in this study, 15 (60%) females and 10 (40%) males and their ages ranged from 16-36 with mean and SD of  $21.5000 \pm 5.46279$  years. Fifteen patients were associated with acne scars 10 (66.6%) females and 5 (33.4) males.

The nature and target of this study were explained for each patient and formal consent was taken for each patient before starting the therapy, after full explanation about the nature of the disease, course, the procedure of treatment, follow up, prognosis and the need for pre and post treatment photographs by Sony-Digital, high sensitivity, 16.1 megapixels, 5 x optical zoom camera in the same place with fixed illumination and distance. Also, ethical approval was given by the scientific committee of the Scientific Council of Dermatology and Venereology-Iraqi Board for Medical Specializations. Statistical analysis was carried out using T test and Chi square.

History and dermatological examination were performed for all patients regarding all demographic points related to the disease. The severity of acne was graded using the following score:

- Mild acne in which the count of pustules is less than 20 and the count of papules is less than 10.

- Moderate acne in which the count of pustules is ranging between 20-40 and the count of papules is ranging between 10-30.

- Severe acne in which the count of pustules is more than 40 and the count of papules is more than 30.

Patients who had scarring in addition to active lesions the following score was used to evaluate the severity of scarring before and after peeling:

Score 0 = 0 No change or baseline.

Score 1 = 1%-25% Mild reduction.

Score 2 = 26%-50% Moderate reduction.

Score 3 = 51%-75% Marked reduction.

Score 4 > 75%-100% Excellent reduction.

Patients satisfaction to response to therapy was evaluated according to satisfaction score that classified into:

1) Full satisfaction. 2) Partial satisfaction. 3) No satisfaction.

In addition to active lesions, some patients had white and black comedones. All patients were with Fitzpatrick's skin types III and IV.

Exclusion criteria are coexistence of any other dermatoses involving the face and allergy to medications, plus patients who had used any topical and systemic treatments in the previous one month, pregnant and lactating women, recurrent herpes infection, immunocompromised patients, diseases or drugs that interfere with clotting systems, patients with medical diseases like diabetes mellitus, epilepsy and patients with other types of acne like drug induced acne, cosmetic acne, post-hair epilation acne, occupational acne, peri-oral dermatitis, mechanical acne, and acne aestivalis.

## Technique of peeling

Lactic acid (GAINLAND CHEMICAL COMPANY, UK) was used in concentration of 88%. Patients were prepared by cleansing and degreasing the whole face by using acetone or 70% alcohol soaked-gauze. The area was rubbed vigorously until it loses the greasy texture and becomes dry with faint erythema. Then the whole face was coated with lactic acid by using cotton-tipped applicator and generally rubbed in with pressure, and number of coating ranged from 1 - 3 applications with a mean 2, with three minutes apart, until fine frosting occurred. Three sessions of lactic acid peel was done for all 25 patients of active acne, even patients with scars, two weeks apart.

## Post operative instructions and follow up

The skin of the treated area was washed with water immediately after the procedure, then cold wet compresses were applied immediately after the peel. After that hydrocortisone 1% ointment or zinc oxide ointment was applied for whole face. Patients were told that stinging will crescendo for 2 minutes and then will subside. All patients were given instruction leaflets that also specify dates for the patients follow up visit. For the entire first week, the patient is instructed to use topical fusidic acid (Leo-Pharma Company) ointment and systemic antibiotic include Augmentin (amoxicillin/ clavulanate potassium) 625mg /3times daily. In addition antihistamine were prescribed for patients, we asked the patients to wash the face 3-4 times/day with potassium permanganate solution (1/10000) or using an acetic acid solution (1 tea spoon white vinegar in 1 pint warm water) in the first five days following peeling.

And after five days onward, the patient could resume washing the face and scalp with non irritant soap and water. Also, the patients were advised to use sun screen at morning, this sunscreen contains titanium dioxide (ISIS, MADE IN FRANCE) and topical hydrocortisone at night. Follow up after 6 weeks, follow up was carried for 3 months to monitor the clearance of lesions and improvement in the scars and any relapse.

## Results

Lactic acid peeling was used three times 2 weeks a part in patients with active acne vulgaris and scarring. Scoring for active acne vulgaris included papules and pustules showed highly statistically significant reduction after 2 weeks of therapy ( $p=0.0001$ ), after 4 weeks ( $p=0.0001$ ), after 6 weeks

( $p=0.0001$ ) with percent reduction 87.2% for papules and 94% for pustules after end of sessions while after 3 months follow up the reduction rate for papules 93.8%,  $p$ -value ( $p=0.001$ ) and for pustules 97.6%,  $p$ -value ( $p=0.0001$ ), (Tabl I).

While the acne scar scoring reduction after 3 sessions of therapy was ranged from 26-50% in 3 patients (moderate reduction) and 51-75 % in 3 patients (marked reduction), while was more than 75% in 9 patients (excellent reduction), with statistically significant reduction ( $p=0.002$ ) following peeling. There was mild post inflammatory hyperpigmentation. After 3 months of follow up the reduction of scars was not significantly different from the time after sessions but there was obvious tightening and whitening of the skin of whole face (Tabl. II).

	Pre therapy	(2nd visit) 1st session	(3rd visit) 2nd session	(4th visit) 3rd session	Percent reduction**	Follow up	Percent reduction**
papule	33.7±14.5	13.1±4.1	7.2±2.1	3.7±1.9	87.2%	2.1±0.8	93.8%
*p- value		0.0001	0.0001	0.0001		0.001	
pustule	33.1±10.7	13.6±5.1	6.5±2.2	2±0.9	94%	0.8±0.6	97.6%
P- value		0.0001	0.0001	0.0001		0.0001	

**Table I. Results of patients with active acne vulgaris that was treated by 88% lactic acid peels.**

\*Percent Reduction =  $(A-B)/A \times 100$ , A is an initial value, B is a final value

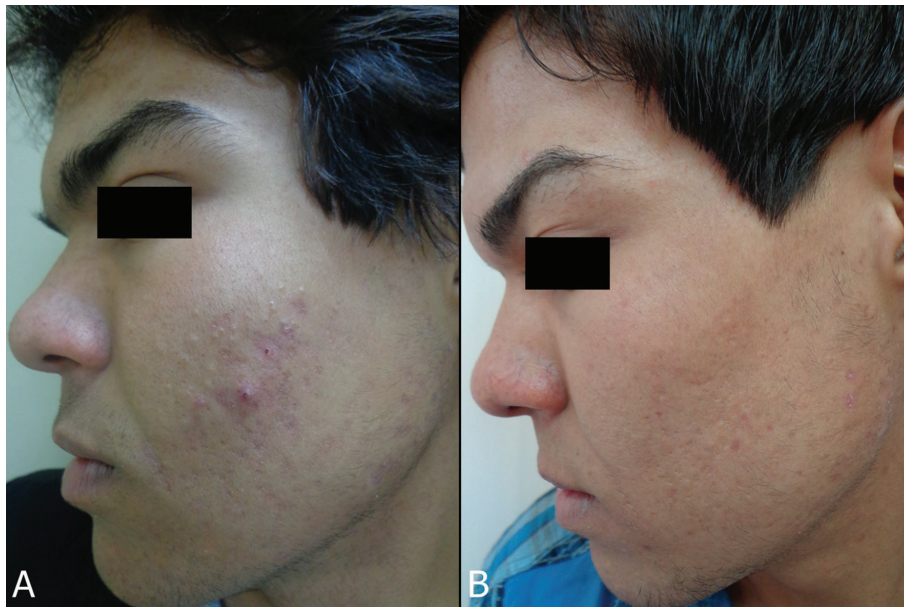
Reduction rate	No. of patients	%	P value
Excellent (75-100%)	9	60%	0.002
Marked (51-75%)	3	20%	
Moderate (26-50%)	3	20%	
Total	15	100	

**Table II. Results of peeling of scarring that associated with acne lesions.**



**Figure 1. Twenty four years old female with active skin lesions. (A) Before treatment; (B) Showing clearance of active lesions after 88% lactic acid peels.**





**Figure 1. Twenty four years old female with active skin lesions. (A) Before treatment; (B) Showing clearance of active lesions after 88% lactic acid peels.**

## Discussion

There are many therapies for active acne vulgaris for clearance of lesions and preventing scars but all of these need long term of treatment at least 6 months. Still there are many non compliant patients for many reasons mainly because there are not ready to use treatment for long time or they are afraid from their side effects [3-8]. Accordingly researcher are looking for single therapy that used over short time in order to induce recovery from active lesions.

Laser sessions are effective for acne scars but give controversial results in treatment of active acne vulgaris in addition its high cost therapy and not available in centers [11-15].

Most recently, TCA 35% had been used in treatment of active acne vulgaris and the result very satisfactory for patients in inducing long term remission of acne lesions and reducing scarring [20].

The present work using 88% LA showed significant improvement of active acne vulgaris including papules and pustules after 3 session of peeling in patients with active acne lesion and the associated scarring was effectively reduced.

When the result of peeling of TCA compared with peeling result of lactic acid, we observed almost similar result both in the clearance of active lesions and reducing of scars at the end of course of therapy and at the end of 3 months follow up (Tabl. III).

Accordingly one session of TCA peeling is as effective as 3 sessions of lactic acid.

Hence the present study showed that LA peeling is a cost effective therapy for treatment of active acne vulgaris and its associated scarring that could be advised as treatment for patients that they don't like to use topical and oral therapy in a long term regimen.

Dermabrasion and peeling by lasers or acids are not well advised in patients with dark complexion as post inflammatory hyperpigmentation might be complication of these therapy but we have noticed from daily clinical practice that postinflammatory hyperpigmentation is not a complications of dermabrasion or

peeling although all our patients have Fitzpatrick's skin types III and IV. In contrary these patients have whitening of their skin [18-20].

It is difficult to explain the mechanism of action of lactic acid peeling but we can suggest through the following actions: through reduction of microflora of acne lesions mainly *Propionibacterium acnes* and other bacteria that causing acne, also might reduce the size of sebaceous glands that is involved in pathogenesis of the acne and thirdly LA might change the immunological reaction present in the acne lesions hence inducing clearance of lesions and reducing the scars.

In conclusion, lactic acid 88% peels is low cost mode of therapy for active acne vulgaris and associated scarring with no complications.

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	TCA35%			TCA35%			LA88%			LA88%		
	End of therapy			End of follow up			End of therapy			End of follow up		
papule	11.78±9.21	73.7%	>0.0001	2.50±1.98	94.4%	>0.0001	3.7±1.9	87.2%	0.0001	2.1±0.8	93.8%	0.001
pustule	21.89±14.54	52.5%	>0.0001	2.83±2.0	93.86%	>0.0001	2±0.9	94%	0.0001	0.8±0.6	97.6%	0.0001
scarring	66.66% (excellent)	16.6% (marked)	16.6% (moderate)	same	same	same	60% (excellent)	20% (marked)	20% (moderate)	same	same	same
Post inflammatory (tightening and whitening)	good			excellent			good			good		

**Table III. Difference between results of peeling by TCA and LA.**

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