

Treatment of Melasma With 88% Lactic Acid versus 30% Salicylic Acid Peels, a Split Face Study

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ABSTRACT:

BACKGROUND:

Melasma is a common pigmentation disorder where there is increase in melanin stores in the epidermis, dermis or both. There are many topical therapies for these disorders, salicylic acid and lactic acid had been used for treatment of melasma as peeling agents.

OBJECTIVE:

To evaluate the efficacy and safety of 30% salicylic acid in comparison with 88% lactic acid in treatment of melasma in a split face study.

PATIENTS AND METHODS:

Twenty six patients with melasma participated. 24 (93.3%) were women, and 2 (7.7%) were men. All patients had therapy-resistant melasma for 1 year. Full clinical examination including Wood's light examination was done to all patients. The severity of melasma was assessed by MASI (Melasma Area Severity Index). 88% lactic acid was used on the left half of the face while 30% salicylic acid was applied to the right half. The peeling sessions were done every 2 weeks for 3 months. Follow-up was carried out for 3 months after the last session.

RESULTS:

Eighteen patients completed the study, their ages ranged from 24 to 47 years with a mean \pm SD of 38.22 \pm 5.36 years. According to Fitzpatrick's classification 14 (77.7%) patients had skin type IV; 3 (16.6%) patients had skin type III and one (5.5%) patients had skin type V. After 3 months, the percent reduction to lactic acid and salicylic acid were 50% and 44.7% respectively with statically significant value (P value = 0.0001). Mild stinging sensation and transient erythema were reported. Most patients maintained improvement 3 months after cessation of therapy. However, there were no statically significant differences (P value = 0.4106) between the two modalities.

CONCLUSION:

Both peeling agents were effective in treating melasma with no important side effects.

KEYWORDS: Melasma, 30% salicylic acid peel, 88% lactic acid peel

INTRODUCTION:

Melasma is a common, acquired, circumscribed hypermelanosis of sun-exposed skin. It presents as symmetric, hyperpigmented macules or patches having irregular, serrated, and geographic borders. The most common areas involved are the cheeks, upper lips, the chin, and the forehead, but other sun-exposed areas may also occasionally be involved.[1] In Iraq, melasma is considered as the most common pigmentary problem and is seen in 26.6 % -28% of Iraqi females.[2]

Exacerbating factors include pregnancy, use of oral contraceptives and sun exposure. Due to its frequent facial involvement, the disease has an impact on the quality of life of patients.[3]

Regarding the treatment, there is no universally effective agent for melasma. There are, however, various therapeutic modalities that can offer significant results. These include; sun protection, topical depigmenting agents, chemical peels, laser therapy and dermabrasion.[4]

Chemical peeling is controlled destruction of the epidermis, partly or entirely with or without the dermis by application of chemical agents to the skin. It is effective in treating melasma through removal of the unwanted melanin pigments by causing a controlled chemical burn to the skin.

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Peels have proved to be useful agents for melasma both as a sole treatment as well as an adjunct to other topical therapies to achieve synergistic effects.[5]

Lactic acid is found naturally in sour milk. After penetrating the skin, lactic acid is converted automatically and reversibly into pyruvic acid, the alpha-keto acid derivative of lactic acid [6].

The first pilot study on lactic acid was done by Sharquie et al. who found it to be effective and safe peeling agent for melasma in dark skin [7]. Further, well-established peeling agents, Jessner's solution was compared with lactic acid in a split-face design, and similar improvement was seen on both sides with no relapse at a follow-up after six months [8].

Ethanol solutions of salicylic acid 20%-30% are excellent peeling agents for numerous conditions in dark-skinned individuals including acne, melasma and postinflammatory hyperpigmentation [9]. Salicylic acid is an anti-inflammatory agent, so it also serves to decrease the postinflammatory hyperpigmentation which may follow the use of peeling agents on the skin. In addition, salicylic acid has a diffuse whitening effect on the skin as shown in a study by Ahn and Kim [9]. In a pilot study by Grimes et al. on dark-skinned individuals, 20-30% salicylic acid peel was used to treat melasma, postinflammatory hyperpigmentation and acne, and it was observed that almost two-thirds of the patients with melasma showed a moderate improvement [10].

PATIENTS AND METHODS:

This is an interventional comparative outpatient study. It was carried out at The Center of Dermatology and Venereology Baghdad Teaching Hospital during the period from April 2017 to September 2018.

A verbal consent was taken from each patient participating in this study before starting the therapy, after full explanation about the nature, course and prognosis of the disease, the method of treatment, possible adverse effects of this treatment and the need for pre and post treatment photographs. Also, an ethical approval was given by the Scientific Council of Dermatology & Venereology/ Iraqi Board

for Medical Specializations.

2.1. Inclusion Criteria:

- All patients complaining clinically from melasma were included.
- Patients using therapy must stop any treatment for at least 2 months before the study.

2.2. Exclusion Criteria:

- Pregnant and lactating women.
- Patients with history of recurrent herpes simplex.
- Patients with any endocrine disease that interfere with skin pigmentation.
- Patients receiving drugs that could interfere with skin pigmentation especially female on hormonal therapy including oral contraceptive pills.
- History of keloid tendency.
- History of chemical peeling or any other surgical procedures on the face during last six months.
- Patients with psychological problems which may lead to non-compliance.
- Patients with unrealistic expectations and uncooperative patients.

A detailed history was taken from each patient, with emphasis on the time of onset, history of pregnancy, contraceptive pills, sun exposure, drug history, and other precipitating or aggravating factors. The diagnosis was based on clinical bases and Wood's light examination.

A careful examination of melasma was done at base line and at follow up visits including the following: site, pattern, color, homogeneity, and the surface area involved. Wood's light examination (365 nm) was performed for each patient to assess the depth of pigmentation and response of therapy. Color photographs for all patients were performed by using Galaxy camera J7 Prime (13) Megapixels at a fixed place and illumination.

Evaluation

Severity of melasma was evaluated with the melasma area and severity index (MASI) according to Pandya et al [11].

Patient's subjective evaluation of improvement according to patient satisfaction after treatment is graded into mild, less than 25%; moderate, 26% to 50%; good, 51% to 75%; excellent, more than 75% [12].

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The chemicals used in this study were lactic acid 88% manufactured by Solvochem (UK) and salicylic acid which manufactured by Interchimiques SA (France). 30% salicylic acid was prepared by dissolving 30gm of salicylic acid powder in 100 ml of 96% ethyl alcohol.

Treatment:

Split skin peeling was performed on all patients (salicylic acid 30% peels on the right half of the face and Lactic acid 88% peels on the left half of the face) every 2 weeks for 3 months. Before starting the peeling the face must be cleaned with soap and water for removing debris and make-up, then cleansing and degreasing were done by using a cotton ball soaked with 70% ethyl alcohol.

Lactic acid solution (88%) was applied on the left half of the face for each patient using the standard cotton tipped applicators. We Started from the forehead to the temples then cheeks, followed by the nose, lips, and chin. The treatment was applied strictly and carefully to the areas of melasma. An erythematous response usually starts to appear within 2 to 3 minutes; if not, then a second layer of application was necessary to obtain the desired response . Subjects suffered from stinging and burning sensation which last from few minutes to few hours. Lactic acid solution was left for 10 minutes on the skin, after that it was washed off with water.

Salicylic acid solution (30%) was applied to the right half of the face in the same manner as lactic acid. Two to three coats were applied until a pseudofrost appeared which was considered the clinical end point. Subjects suffered from stinging and burning sensation which increasing over the next 2 minutes, reaching a maximum at 3 minutes and then rapidly decreased to baseline over the next minute. Then the patient was instructed to wash the face with water after 5 minutes from application.

Post-treatment Instructions:

All patients were advised to avoid sun exposure as much as possible for the next 2 weeks and were encouraged to use 10% zinc oxide ointment as a moisturizer and a sunscreen agent. Patients who complained from discomfort or redness and exfoliation of the skin

were given 1% hydrocortisone skin cream to be applied at night.

Follow-Up:

The patients were seen regularly every 2 weeks for the first 3 months to do peeling session and to assess the response of treatment, to record the side effects, and to calculate MASI score for each patient. Patients were then followed up on a monthly basis to assess the sustained of improvement for each patient.

Statistical Analysis:

Data was analyzed using SPSS software package version 24. Descriptive statistics were done in the form of mean and SD. A paired t-test was used to compare the mean of MASI change resulting from treatment. Values were considered significant when P values were less than or equal to 0.05.

RESULTS:

Twenty six patients with melasma were included in this study. Eight patients defaulted from the study after the first and second session for unknown reasons.

Eighteen patients completed the study, their ages ranged from 24 to 47 years, with a mean \pm SD of 38.22 ± 5.36 years. Seventeen (94.4%) were female and one (5.6%) was male. Fourteen (82.3%) females were married and three (17.7%) were unmarried. Nine (64.2%) patients had a history of melasma during previous pregnancies. Family history of melasma was positive in seven (38.8%) patients.

The duration of melasma ranged from 1 to 11 years, with a mean \pm SD of 4.94 ± 3.34 years. According to Fitzpatrick's classification 14 (77.7%) had skin type IV; 3 (16.6) patients had skin type III and one (5.5%) had skin type V. Wood's light examination showed mixed type in 13 (72.2%) patients and epidermal in 5 (27.8%) patients.

Morphologic forms of melasma were as follows: butter-fly-like in 9 (50 %), mask-like in 5 (27.2%), and localized in 4 (22.2) patients.

Clinical results

The mean MASI score for the half face treated with lactic acid chemical peels before treatment was 3.52 ± 1.34 , while after 6 weeks of treatment MASI score changed into 2.54 ± 1.65 ; therefore, the reduction of MASI score

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was 27.8% decrease and was statistically significant (P value = 0.0018; Table 1). The MASI score after 12 weeks changed into 1.76 ± 1.11 ; so, the reduction rate was 50 % and was highly statistically significant (P value = 0.0001; Table 2; Fig 1) .

The mean MASI score for the half face treated with 30% salicylic acid chemical peels before treatment was 3.48 ± 1.38 , while after 6 weeks MASI score changed into 2.75 ± 1.69 . This represented an 20.9 % decrease and was statistically significant (P value = 0.0004; Table 1). The MASI score after 12 weeks changed into 1.92 ± 1.06 ; so, the reduction rate was 44.8 % and was statically significant (P value = 0.0001;Tale 2; Fig 2). Comparing the mean decrease in MASI score achieved with 30% salicylic acid and 88% lactic acid peel, there was no statistically significant difference between both group (P value = 0.4106; Table 1,2).

At the end of the 12th week of the study period, a subjective improvement was seen on both halves of the face (Fig 3). On the lactic acid-treated side, 3 patients graded their improvement as excellent (more than 75% lightening), 7 as good (51%–75% lightening) and 8 as moderate (26%–50% lightening). Whereas on the 30% salicylic acid-treated side, 11 graded

the improvement as good, 6 as moderate, and one as mild (less than 25%). (Table 3)

Follow-Up after Treatment:

At the end of last peeling session, patients were seen monthly for 3 months, the improvement was sustained in 16 (89%) patients without any obvious relapse depending on clinical basis and MASI scores. Two (11%) patients relapsed within the third month after completion of therapy. At follow-up, the patients with Wood's light confirmed the therapeutic efficacy of the treatment. All patients were advised to continue using sunscreen during this period of follow up.

Side effects

During the treatment course, all patients treated by both modalities complained of temporary burning and stinging sensation just at the time of application which was severe at beginning and decreased in intensity with continuous the course of treatment.

Few patients had persistent stinging sensation for 2-3 days mainly with lactic acid. Transient erythema developed in most patients especially with lactic acid peel which lasted 1-2 days after peeling then exfoliation started and was more prominent with lactic acid, exfoliation persisted 2-3 days then shedded was complete.



A B
Figure (1): A thirty nine years old female.

A. Before treatment MASI score was 3.6.

B. After twelve weeks of treatment MASI score became 1.2 .



A B
Figure (2): A thirty two years old female.
A. Before treatment MASI score was 3.05.
B. After twelve weeks of treatment MASI score became 1.65.



A B
Figure (3): A forty two years old female.
A. Before treatment MASI score was 12.55.
B. After twelve weeks of treatment MASI score became 7.8 .

Table (1). MASI Score before peeling and at the 6th week of peeling

MASI Score	Right (SA)	Left (LA)
Pretreatment	3.48 ± 1.38	3.52 ± 1.34
At 6 th week	2.75 ± 1.69	2.54 ± 1.65
Percent of reduction	20.9 %	27.8 %
P value	0.0004	0.0018

Table (2). MASI Score before peeling and at the 12th week of peeling

MASI Score	Right (SA)	Left (LA)
Pretreatment	3.48 ± 1.38	3.52 ± 1.34
At 12 th week	1.92 ± 1.06	1.76 ± 1.11
Percent of reduction	44.8 %	50 %
P value	0.0001	0.0001

Table (3). Patient satisfaction after salicylic acid and lactic acid peel according grade of patient satisfaction

Level of satisfaction	Right (SA)		Left (LA)	
	No.	%	No.	%
Excellent	0	0	3	16.6
Good	11	61.1	7	38.8
Moderate	6	33.3	8	44.4
Mild	1	5.5	0	0

DISCUSSION:

Melasma is a chronic distressing disease which is commonly seen in clinical practice that affects women of reproductive age group, during pregnancy in particular. Regarding management, there are various therapeutic modalities include photoprotection, topical hypopigmenting agents, chemical peels and lasers. Although there is light recovery, the cure is very difficult, so a combination of two or three agents is often tried to achieve optimum results. In spite of this, the treatment of melasma remains a challenge, and a mild to moderate improvement is all that is achieved in a majority of patients [13].

In comparison to the result of this study, the study done by Sharquie et al. with 92% LA demonstrated a mean decrease of 7.76 in MASI representing 79.34% improvement [8].

The difference in the results may be due to the fact that most patients in Sharquie et al study were with epidermal type of melasma while in this study, most of them were with mixed and

epidermal types; furthermore, the difference in concentration strength of LA (88% versus 92%) may have a role.

Another study which was done by the same author again demonstrated a mean decrease of 7.97 in MASI representing 56.72% improvement [7], which is approximately similar to rate of improvement in this study, despite the difference in concentration between the two studies.

In comparison, another study from India which assessed the effect of 82% lactic acid in the treatment of melasma showed a reduction in post-treatment MASI score when compared with baseline. Mean MASI score after 12 weeks of 50 treatment was 1.865 while that at baseline was 2.885 representing a decrease of 1.02 and a percentage of improvement were 35.36% at 12 weeks [14] (Table: 4) .

Table (4) : Comparison with other studies using Lactic Acid in treatment of Melasma

The study	Present study	Sharquei et al	Sharquei et al	Singh et al
Lactic acid conc.	88% split face	92% split face	92% alone	83%
Sessions NO.	6	2-5	2-6	6
Patients NO.	18	24	12	20
MASI score before	3.52 ± 1.34	9.78 ± 3.16	14.05 ± 5.76	2.885
MASI score after	1.76 ± 1.11	2.02 ± 1.53	6.083 ± 2.6	1.865
Reduction rate	50%	79.3%	56.72%	35.36%
P value	< 0.05	< 0.05	< 0.05	< 0.05

CONCLUSION:

Salicylic acid and lactic acid peel are efficient, well tolerated and reasonably safe modalities that can be used as treatment modality in melasma. However, the improvement was more favorable with lactic acid.

DISCLOSURE:

This study was an independent study and not funded by any drug companies.

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