LETTER TO EDITOR
Year: 2017 I Volume: 1 I Issue: 1 I Page: 26-29

COMPARATIVE STUDY OF EFFICACY AND SAFETY OF LACTIC ACID VERSUS GLYCOLIC ACID CHEMICAL PEELS IN THE TREATMENT OF MELASMA

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Sir,

Melasma is a common, acquired, symmetric hyperpigmentation commonly involving the cheeks, forehead, upper lip, nose, and chin.[1] It predominantly affects women (90%) and is common in individuals with Fitzpatrick skin type IV-VI. Different modalities like keratolytics (tretinoin, resorcin, glycolic, and trichloroacetic acids, etc.) and depigmenting agents (hydroquinone, kojic and azelaic acids) are being used but chemical peeling provides more rapid response than topical therapy.[2] Chemical peels create injury at a specific skin depth and causes exfoliation that stimulates new epidermal growth and collagen with more even distribution of melanin.[3] Most commonly used peels include phenol, trichloroacetic acid (TCA), alpha hydroxyacids (AHAs), and beta hydroxyacids.

Sixty patients with moderate to severe melasma of epidermal variety only (differentiated by Wood's lamp examination, according to darkness (D) of pigmentation) were included in the study after getting due ethical clearance from our institute ethics committee. Treatment groups for lactic acid peel and glycolic acid peel were selected randomly and divided into two groups of 30 each. Written informed consent was taken from all the patients included in the study. Cases of dermal melasma were not included in this study because both are superficial to medium depth peels and are not effective for dermal melasma. Patients with a history of herpes, taking oral contraceptive pills or isotretinoin, pregnancy, lactation, history of keloids or hypertrophic scars, concomitant systemic or skin disease and those with unrealistic expectations were excluded from the study.

Melasma Area and Severity Index (MASI) score of the right and left cheeks were calculated for each patient at baseline, at the beginning of each peeling session, and at the end of follow up, along with photography.

The response in each patient was graded as: no response (no change in MASI score at the end of three peels); mild response (less than 25% change); moderate response (25 to <50% decrease in MASI); good response (50 to <75% decrease); very good response (more than 75% decrease). In pre-peel session patients were advised to apply kojic acid 2% or tretinoin 0.025% at night and topical sunscreen daily [SPF-15].

The first group was treated with 35% Glycolic acid after a test peel and second group with 92% Lactic acid. In Glycolic acid group after 3-5 min of application of peeling agent, washing with neutralizer (sodium bicarbonate) was done. In Lactic acid group an erythematous response was awaited within 2 to 3 minutes; if not, then a second layer of application was applied to obtain the desired response and left for 10 minutes after that, it was washed off with water. Peels were performed every 2 weeks for six sessions and participants were instructed to apply sun block cream and emollients. No topical Hypo pigmenting agent was applied.

The primary objective of this study was to assess the degree of improvement in pigmentation objectively using MASI at baseline, 2, 4, 6, 8, 10 and 12 weeks. Color photographs were taken of all patients at baseline and 1 month after the last peel.

Paired t-test was used to statistically analyze the change in the mean MASI scoring resulting from treatment in the two groups and to analyze comparative decrease in MASI scoring between the two groups. All the patients in the two groups were examined for any side effects like allergic reactions, hypo or hyperpigmentation, burning, persistent erythema, acneiform eruptions and scarring.

60 patients were included in the study with 54 females and only 6 males, male: female ratio, 1:9. Maximum number of patients was in age group 31-40 year (45%). Mean age of patients in GA group was 32.77±6.88 and in LA group was 30.73±6.03 with p-value of 0.24702 making the two groups statistically comparable. The duration of the disease, in both the groups, in our study ranged from 2 months to 12 years with the mean duration of disease being 3.04±1.927 years in group 1 (Glycolic acid group) and 2.79±2.69years in group 2 (Lactic acid group). The difference between the mean duration of disease in the two groups was statistically not significant (p=0.6687), thus both the groups were comparable in terms of duration of disease. Most common pattern observed was Centro facial (58.3%) followed by malar 35% [Figure 1]. Only 15% patients gave family history of melasma. Pregnancy had no significant association with melasma and only 11(18.3%) patients gave a history of occurrence of melasma during pregnancy.

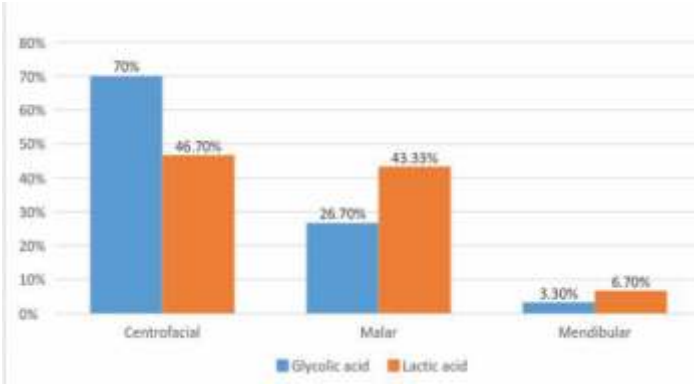

Figure 1: Clinical pattern of melasma in both Glycolic acid and Lactic acid group.

Objective response to treatment was measured by a decrease in MASI scoring after each peel session. Up to 2 week (1 peel) there was no significant response in both the groups (p>.05). After 12 weeks reduction in MASI was 54% (from 22.29 to 10.12) in GA group (Figure 2a, 2b and 3a, 3b) and 68% (from 22.15 to 6.91) in LA group (Figure 4a, 4band 5a, 5b) which was highly significant (p<.001). The MASI scores at baseline, 2 4, 6 8, 10 12 weeks were as shown in [Figure 6].

Thus lactic acid 92% showed better efficacy compared to Glycolic acid 35%. When we assessed the adverse effects, the frequency of serious adverse effects was very low in both the groups [Figure7]. Common adverse effects were mild burning (36.67% of patients in LA group and 50% in Glycolic acid group) only at the time of application of peel but resolved after ice cooling, calamine application and use of sunscreens. Erythema (6.67% in LA and 20% in GA) which resolved after applying 1% hydrocortisone cream for 3-4 days and hyperpigmentation was seen in 3.33% in GA but none of the patient in LA group.

Recurrence at 3 months follow up was seen in 25 patients in GA group in form of increase in MASI score which was significant (p<.05). No relapse was seen in LA group.

Melasma is a symmetric progressive hyperpigmentation of the facial skin that occurs in all races but observed more frequently in darker skin phenotypes. There are three clinical patterns -

Figure 2a, 2b: Melasma in 35 year old female before and after treatment with GA peel.

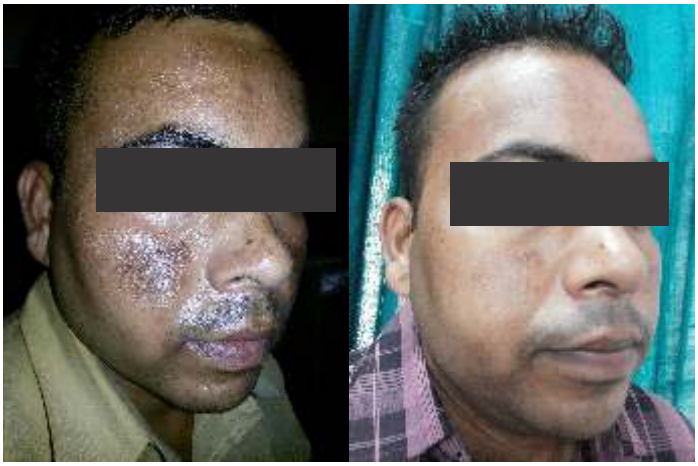

Figure 3a, 3b: Melasma in 30 year old male before and after treatment with GA peel.

centrofacial, malar, and mandibular - depending upon the area of localization.[1] By Wood's light examination, melasma can be classified into epidermal, dermal or mixed type. Different modalities as depigmenting agents, laser, and chemical peeling have been used alone and in combination for the treatment of melasma.[4] Chemical peels are often used as an adjunct to medical treatment because they produce complementary rapid therapeutic effects and improves skin appearance and texture.[5] Peels allow topical agents to penetrate more efficiently into the skin and may improve post inflammatory hyperpigmentation.[6]

Chemical peels create controlled chemical burn of the skin and produces partial thickness wound that heals by secondary intention. The end results are thinning of stratum corneum, epidermolysis, dispersion of basal layer melanin, regulation of epidermal thickness and laying down of new collagen and ground substance in dermis.[7] Depending upon the depth of peeling achieved, the chemical peeling agents are classified into very superficial, superficial, medium and deep peels.[8] Chemical peels useful in treating melasma are trichloroacetic acid, Jessner's

Figure 4a, 4b: Melasma in 28 year old female before and after treatment with LA peel.

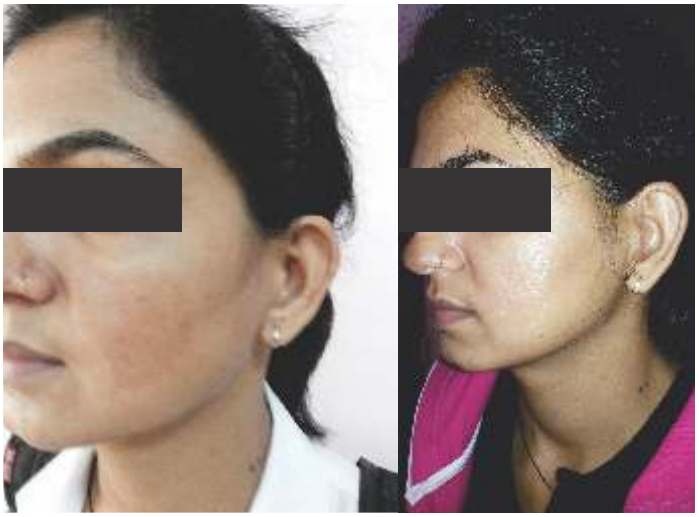

Figure 5a,5b: Melasma in 25 year old female before and after treatment with LA peel.

solution, alpha-hydroxy acid preparations, and salicylic acid, alone or in various combinations. Alpha-hydroxy-acids (AHAs) have been the most commonly used agents for superficial peelings. Both the agents used in this study, LA 92% and GA 35%, are superficial peels.

Glycolic acid (GA) is obtained from sugarcane and is the simplest and most-used alpha-hydroxy acid peel.[9] GA is a popular peel agent because it has the smallest molecular weight amongst all the alpha-hydroxy acids and penetrates skin easily.[6] Fabbrocini, in 2009, classified glycolic peels as: very superficial (30%–50% GA, applied for 1–2 minutes); superficial (50%–70% GA, applied for 2–5 minutes); and medium depth (70% GA, applied for 3–15 minutes).[10] GA peels have anti-inflammatory, keratolytic, and antioxidant effects. GA targets the corneosome by enhancing breakdown and decreasing cohesiveness, causing desquamation.[11] GA peels need to be properly neutralized to stop acidification of the skin. In a study by Sarkar et al, modified Kligman's formula (2% hydroquinone, 0.025% tretinoin, and 1% mometasone), was compared with GA peels (30% GA for the first three sittings; 40% GA for the next three sittings), combined with the modified Kligman's formula and GA peel group showed more rapid and greater improvement ($P < 0.001$).[2]

Alpha hydroxy acids have been used as effective peeling agents in a variety of conditions including melasma, but the clinical

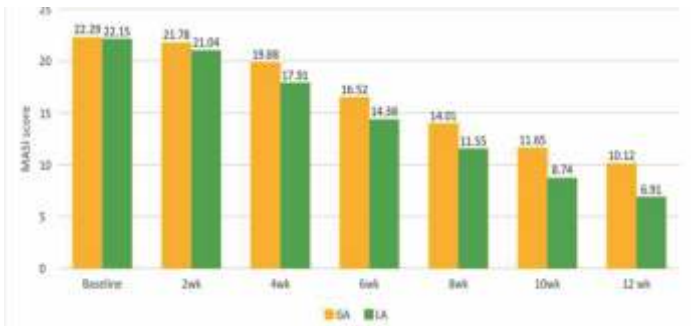

Figure 6: Comparison between change in Mean MASI score of Glycolic acid and Lactic acid with treatment duration.

experience is limited to glycolic acid only,[12] which is expensive and may not be available in every center.[13] Lactic acid, also an alphahydroxy acid having activities similar to GA, it is a non-costly and readily available agent but has not been used extensively as a peeling agent in the treatment of melasma. Further, because of its large molecular size, there is less penetration with an additional advantage of being more hydrating and less irritating.[14] The first study in melasma was done by Sharquie et al[15] and found it to be a safe and effective peeling agent for melasma in dark skin. In their study of 20 patients, 92% pure lactic acid was applied for a maximum of six sessions, and a significant fall in MASI (56%) was observed in all the 12 patients who completed the study. Further, LA was compared with Jessner's solution in melasma, and and it was as effective as Jessner's solution.[16]

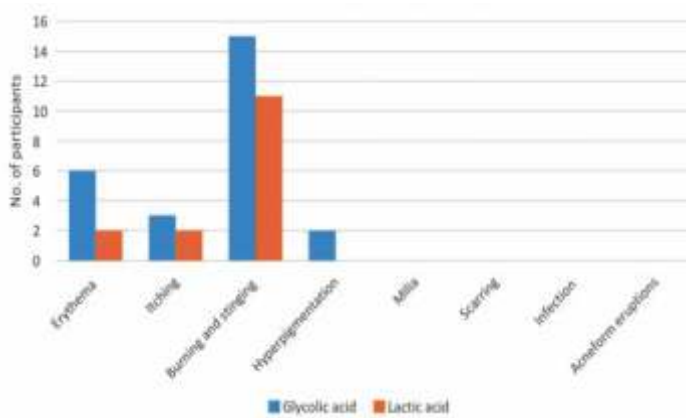

Figure 6: Comparison of adverse effects of peel in both the groups.

However, the clinical experience of LA peeling in melasma is very limited and to the best of our knowledge, there is no study available in the literature comparing the efficacy and safety of Lactic acid peeling with Glycolic acid peeling in melasma. This prompted us to undertake a clinical trial comparing the efficacy and safety of Lactic acid peeling with Glycolic acid peeling in the treatment of melasma.

Limitation of our study was short follow up period of 3 months only so we were not able to detect late recurrences that may also occur in LA peel.

Both the Glycolic acid 35% and Lactic acid 92% are effective peeling agents in epidermal melasma. Both significantly reduces MASI scores ($p<.001$). At the end of treatment LA peel showed better efficacy with rapid rate of clinical improvement. Side effects were seen with both peeling agents but less commonly with LA. Side effects were mild and not significant. More studies need to be conducted with different concentrations of GA and Lactic acid on larger samples and in other pigmentary disorders.

How to cite this article:
Dangi S, Kothiwala R, Meherda A. Comparative study of efficacy and safety of Lactic acid versus Glycolic acid chemical peels in the treatment of melasma. Indian Journal of Clinical Dermatology. 2017;1:26-29.

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