

Comparative Efficacy of 35% Glycolic Acid and 20% Trichloroacetic Acid peels in the treatment of recalcitrant melasma

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ABSTRACT

Background: Melasma is a common acquired pigmentary disorder, the treatment of which has been an uphill task ever since, owing to its nature of incomplete resolution and tendency of being recalcitrant. Chemical peels have emerged as a promising treatment option, however the precise efficacy is still under exploration in view of variation of results with varying concentration and nature of peels.

Objective: To compare the efficacy of 35% Glycolic acid and 20% Trichloroacetic acid peels in the treatment of recalcitrant melasma.

Materials and Methods: Fifty patients of recalcitrant epidermal melasma attending the out patient department of dermatology were recruited in the study. The patients were termed as recalcitrant melasma bearers, after they failed to respond to 3 months or more of treatment with medical modalities. The patients were alternatively divided into two groups of 25 each. Group A patients were treated with 35% glycolic acid and Group B patients were treated with 20% trichloroacetic acid peels. Pre-peel priming was carried out with retinoic acid (0.025%), which was to be applied at bedtime for 2 weeks prior to the commencement of peels. Three peels at three weekly intervals were done in each group. MASI Scoring and photographic documentation was done before each peel and 30 days after the last peel i.e. at the end of follow-up period.

Results: Both the groups showed a statistically significant reduction in the mean MASI score after each peel in the respective group, however the difference in MASI score reduction in both the groups was not statistically significant on completion of treatment. On comparing the percentage reduction in the MASI score after the first peel in both the groups, a statistically significant difference was found, with 12.16% reduction noted in Group A versus 20.17% reduction noted in Group B. After the third peel the percentage reduction in MASI score of Group A and B were 33.47% and 34.74 % respectively, the difference being statistically insignificant. The local reactions were more in Group B (with TCA peel) but statistically significant difference was noted only in post peel cracking.

Conclusion: Both 35% glycolic acid and 20% trichloroacetic acid peels are equally effective in the treatment of recalcitrant melasma. Though, the initial response (i.e. after first peel) was more rapid with trichloroacetic acid peels than with glycolic acid peels, the final results were similar. In view of local adverse effects, glycolic acid peels were better tolerated than trichloroacetic acid peels.

INTRODUCTION

Melasma is an acquired, progressive, macular hypermelanosis of sun-exposed areas of the skin, characterized by light to dark brown macules and patches with well defined margins.^{1,2} The disease

affects all races, with particular predominance among those with darker skin types (i.e. type IV to VI).³ It is primarily seen in women of reproductive age group, though approximately 10% men are also affected.^{4,5} Though asymptomatic, it is often

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cosmetically disfiguring with consequential noxious psychological impact.

The exact pathophysiology of melasma remains elusive, however, multiple factors are implicated in its etiopathogenesis. Solar and ultraviolet exposures are the pre-eminent etiological factors. Melasma is first observed in and also worsens in summers, and tends to improve during winters. Physiological conditions such as pregnancy, certain endocrine disorders and hormonal treatments especially oral contraceptive pills are well-known causative and exacerbating factors. Apart from the aforementioned causes; genetic predisposition, use of cosmetics, steroids, photosensitizing drugs are known instigating factors.^{6,7}

According to the area of distribution, three clinical pattern of melasma are recognized, namely centrofacial, malar and mandibular pattern; with centrofacial being the most common.^{8,9}

Based on Wood's Lamp examination of the skin, melasma can be classified into four major clinical types and patterns, with good histological correlations (in accordance with depth of melanin pigment), namely, epidermal, dermal, mixed and intermediate. Epidermal type shows enhancement under the Wood's lamp.^{1,10}

Treatment of melasma has always been a challenge for physicians, and is all the more difficult in dark skinned individuals. Numerous treatment options are available, each delivering varying results. Though betterment is often seen with various treatment modalities, a total permanent cure can be difficult to achieve. First line treatment usually relies on topical therapy, which includes the use of a bleaching cream with hydroquinone. Efficacy of treatment can be enhanced by the use of retinoids such as tretinoin and low dose steroids. Other medications employed in the treatment include

azelaic acid, kojic acid, alpha hydroxy acids, licorice extract and an array of chemical peels.¹¹⁻¹²

Chemical peeling also known as chemexfoliation, chemosurgery and recently as chemical surfacing, has emerged as a promising treatment modality. It aims at induction of controlled chemical ablation of defined layers of skin i.e. a part of or whole of epidermis, with or without dermis, leading to exfoliation, so as to induce an even and tight skin, which is more even in color and texture, as a result of the regeneration process.¹³

METHODS

Fifty patients of recalcitrant epidermal melasma attending the Outpatient Department of Dermatology of Dayanand Medical College and Hospital, Ludhiana, were enrolled in the study. The patients were regarded as recalcitrant melasma bearers, after they failed to respond to 3 months or more of treatment with medical options. All the patients were subjected to Wood's Lamp examination, and only the ones with epidermal type were enrolled in the study. However, the patients with active bacterial/viral infection, those with history of keloids and recent surgery over the face and pregnant females were excluded from the study.

The selected patients were then alternatively divided into two groups; Group A patients were treated with 35% glycolic acid and Group B patients with 20% trichloroacetic acid peels. Three peels at three weekly intervals were done in each group. Detailed history with special regards to onset of disease, duration, initial sites involved, exposure to sunlight and drug intake was taken and recorded in a performa. Informed written consent of each patient was taken prior to the commencement of treatment. In each group,

colored photographs were taken before each peel and the severity of the disease was assessed by MASI scoring.

Pre-peel priming was carried with retinoic acid (0.025%), applied at bedtime for 2 weeks prior to the first peel. After degreasing the face, peel was applied with smooth strokes on the face with the help of a cotton swab, in a sequential manner i.e. forehead, right cheek, chin, left cheek, glabella, nose, perioral and at last the periorbital area. Feathering strokes were applied at the edges to blend with the surrounding skin and prevent demarcation lines.

Group A patients were treated with 35% glycolic acid peel that was applied for a duration of 5 minutes following which it was neutralized with distilled water in reverse sequence of application. Group B patients received 20% trichloroacetic acid peel, which was applied till uniform frosting appeared on the skin after that it was neutralized in a similar fashion.

The degree of tolerability to the facial peels and adverse effects if any were recorded in a special performa. To assess the degree of improvement, colored photographs were taken and MASI score was calculated before each peel and after thirty days of last peel i.e at the end of follow up period. With the aid of these, the final response was graded as mentioned in Table 1.

Table 1 Layout for evaluating grade of improvement

Grades of Improvement	% Reduction in MASI score at the end of three peels
Mild	<25%
Moderate	25-50%
Good	50-75%
Very Good	>75%

All the patients were advised to apply broad spectrum sunscreen regularly, to achieve optimal response and to continue its use post peel to maintain the improvement achieved.

RESULTS

The age ranged from 20 to 48 years in both the groups. The mean age in Group A was 30.12 years and in Group B was 30.88 years with a standard deviation of 6.66 and 6.67 respectively. Female predominance was seen, with 72% females and 28% males, comprising a male to female ratio of 1:3.8. There were 68% females in Group A and 76% in Group B, whereas 32% and 24% patients were males in Group A and B respectively. Both the groups were similar with regards to age and sex distributions. The duration of disease varied from 6 months to 9 years. The mean duration was 3.02 ± 2.35 years in Group A and 3.60 ± 2.23 years in Group B

Sunlight (74%) was found to be the major precipitating factor followed by pregnancy (42%) and cosmetic use (28%). The details of precipitating factors are outlined in Table 2.

On analyzing the affected sites, cheeks were the most common site in both the groups, 96%

Table 2 Distribution of subjects according to precipitating factors

Factors	Group A (Glycolic acid) N=25		Group B (Trichloroacetic acid) N=25		p value
	No.	%age	No.	%age	
Sunlight	19	76.00	18	72.00	0.747
Family history	4	16.00	5	20.00	0.713
Cosmetics	8	32.00	6	24.00	0.529
Pregnancy	10	40.00	11	44.00	0.774
p value \geq 0.05 NS					

Table 3 Trends in MASI score in Group A and Group B

Period	Group A (Glycolic Acid)		Group B (Trichloroacetic Acid)	
	Mean \pm SD	p value	Mean \pm SD	p value
Pre-peel	19.91 \pm 10.60		18.56 \pm 10.11	
After 1 st peel	17.43 \pm 9.37	0.00000031	14.66 \pm 7.67	0.00000020
After 2 nd peel	15.05 \pm 7.69	0.00000059	13.39 \pm 6.82	0.00000042
After 3 rd peel	12.78 \pm 6.25	0.00000065	11.76 \pm 5.58	0.00000078
p value \geq 0.05 NS				

involvement was seen in Group A and 100% in Group B. Forehead was the second most common site affecting 60% and 72% in Group A and B respectively. Chin was the least affected site.

The pre peel mean MASI score was 19.91 \pm 10.60 in Group A and 18.56 \pm 10.11 in Group B. The difference was statistically insignificant. After each peel a significant decline in MASI score was noted. This was true for both the groups (Table 3). On evaluating the percentage reduction in the MASI score of the two groups, the decline in MASI score was significantly higher in Group B (reduction of 20.17%) than Group A (12.16%) after the first peel. However, the difference in the final reduction between the two groups, at the end of the peels, was not statistically significant (Table 4).

Table 4 Comparison of Percentage reduction in Group A and B

Period	Group A (Glycolic acid) Percentage reduction in MASI score	Group B (Trichloro- acetic acid) Percentage reduction in MASI score	p-value A/B Change
After 1 st peel	12.16	20.17	0.00000044
After 2 nd peel	23.04	26.82	0.074
After 3 rd peel	33.47	34.74	0.597
p value \geq 0.05 NS			

After completion of treatment, the response was graded as per the format charted, based on percentage reduction on MASI. Majority of the patients showed a moderate response (84% in

Table 5 Grade of improvement in Group A and B

Grades of Improvement	Group A (Glycolic acid)		Group B (Trichloro- acetic acid)		p-value
	No.	%age	No.	%age	
Mild (<25%)	4	16.00	5	18.00	0.546
Moderate (25-50%)	21	84.00	19	80.00	
Good(50-75%)	0	0.00	1	2.00	
Very Good(>75%)	0	0.00	0	0.00	
p value \geq 0.05 NS					

Table 6 Distribution of subjects according to reactions of peeling

Reactions	Group A (Glycolic acid)		Group B (Trichloroacetic acid)		p-value
	No.	%age	No.	%age	
Burning Sensation	9	36.00	15	60.00	0.089
Erythema	7	28.00	10	40.00	0.370
Itching	6	24.00	8	32.00	0.529
Cracking	0	0.00	4	16.00	0.037
Recurrence	0	0.00	1	4.00	0.312

Group A and 80% in Group B), however good response was noted only in 1 patient of Group B (Table 5).

The adverse effects noted were mild in nature and without any long-term effect. These were more frequent in Group B than Group A, though the difference was not statistically significant, except post peel cracking which was exclusively experienced by patients of Group B. Recurrence of melasma was noted in one patient of Group B (Table 6).

DISCUSSION

Melasma though being a common condition, can have concerning psychological and emotional impact on the life of an individual. Those who suffer are likely to experience low self-esteem and diminished confidence in social situations. Treating the underlying cosmetic condition can help to annihilate these negative feelings.

Chemical peels have emerged as a promising treatment modality for melasma. These are classified into superficial, medium and deep peels in congruence with the depth of injury caused by the peel. Superficial peels are those, which cause injury to the epidermis and dermal-epidermal interface. Medium depth peels penetrate through the papillary dermis and deep peels are those that cause destruction to the reticular dermis. Deeper the histological changes exerted by the peel, more profound is the clinical response.¹⁴ Wide selections of chemical peels are available, delivering varying results. Therefore, there is no universally effective treatment option. Thus, there is an earnest need to accomplish a treatment, which promises to offer enduring beneficial effects.

In the present study, we compared the efficacy of 35% glycolic acid and 20% trichloroacetic acid

peels in fifty patients of recalcitrant melasma. Both the agents used in our study belong to the category of very superficial peels, as described in Bordy's Classification.¹⁵

In our study, the mean age duration was 30.12 ± 6.66 and 30.88 ± 6.67 years in Group A and B respectively and the most common age group affected was 20-30 years. Our results were in congruence with the study by other authors. Kalla et al reported 87% patients in the age group of 20-40 years and 54% in 20-30 years age group.¹⁶ Sharquie et al, also documented the mean age of 33.53 ± 6.96 years with majority of patients in age group of 18 to 50 years.¹⁷ However, Kimbrough-Green et al in their study on black patients reported a relatively higher age (44 years). We noted a female preponderance with male to female ratio of 1:3.8, which was similar to that, noted by Goyal et al and Achar et al.^{18,19}

The disease duration was 1-3 years in 42% and <1 year in 14% patients. Kalla et al found that 40% patients had duration of <1 year, whereas 32% had duration of >3 years.¹⁶ The lower percentage with disease duration <1 year in our study, can be possibly be due to the enrollment of only recalcitrant melasma patients (not responding to conventional treatment for 3 months). Sunlight was the major precipitating factor, followed by pregnancy, and the same was reported in other series.^{16,20} We came across the use of cosmetics as an important precipitating factor (after pregnancy), which may be attributed to the increasing and excessive use of cosmetics these days. Previous studies on melasma have demonstrated the predominance of malar pattern over the centrofacial^{21,22} and so were the results of this study, with malar pattern seen in (98%) patients. Contrary to this, Javaheri et al found centrofacial pattern of melasma (91%) to be

much more common than the malar (9%).²⁰

The reduction in the mean MASI score after the first peel was evidently higher in Group B in comparison to Group A, demonstrating a better initial clinical response in those treated with TCA peel. At the end of three peels the final response noted in the two groups was comparable; the difference was not statistically significant. Kalla et al also found that the initial response was higher with TCA peel.¹⁶ Likewise Kumari et al who used GA and TCA peel to treat melasma, also reported a better response after initial peels with TCA and comparable response with both peeling agents (GA and TCA), at the end of peeling sessions.²³ On grading the final response in those treated with GA peel, 16% patients had mild and 84% had moderate improvement; whereas in those treated with TCA 20% had mild and 76% had moderate response. In addition, only one subject who received TCA peel exhibited a good (50-75%) response. Kumari et al, demonstrated good/very good subjective response in 75% subjects treated with GA peel and 65% in those treated with TCA peel.²³ The response noted in their subjects was better than ours, the conceivable reason for which is more number of peels (average of 7.3) used by Kumari et al in contrast to our study where only 3 peels were undertaken.

The peels were well tolerated by majority of the patients, though a few experienced mild reactions. The reactions noted were burning sensation, erythema, itching and post peel cracking in decreasing order of their frequency. All these aforementioned local reactions were more in those treated with TCA peel as compared to GA peel. The difference however was not statistically significant except the post peel cracking (4%) which was seen only those patients who received

TCA peel. Kumari et al also noticed post peel cracking exclusively in subjects treated with TCA peel.²³ Thus, suggesting GA peel to be a viable option, as those treated with it can carry on with their office work and other outdoor activities unhindered. Kalla et al also reported local irritant side effects such as burning, tingling sensation and post peel cracking to be more in the ones receiving TCA peel.¹⁶

Post-inflammatory hyper-pigmentation has been documented as one of the most common adverse effect with the use of GA peel,²⁴ which was not so in our subjects, possibly because of the advised regular use of sunscreen, post peel.

We came across one case of recurrence of melasma, who was given TCA peel. The possible reason of the recurrence could be inadequate sun protection by the patient. Therefore, reinforcing the role of sunlight as a precipitating factor of melasma and the role of sun-protection in preventing its occurrence and recurrence.

Thus, we conclude that both the peeling agents are equally efficacious in the management of melasma though the initial response is better with TCA than with GA. Initial treatment with TCA peel followed by GA peel can be considered as viable treatment option, wherein a initial quicker response can help enhance patient's adherence to the treatment. Since GA peels have lesser post peel cracking, these are more feasible in professionals as they can continue with their daily work routine conveniently. The role of sun-protection must be stressed upon, as this one of the leading causes and it should form the basis of any treatment modality chosen.

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