

Original Article

Comparative efficacy of 20% trichloroacetic acid and 50% glycolic acid peels in treatment of recalcitrant melasma

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Abstract *Background* Melasma, one of the common aesthetically displeasing entities, continues to be a difficult problem to treat. Chemical peeling is one new weapon in the therapeutic armamentarium of melasma. Glycolic acid and trichloroacetic acid chemical peels have been used alone and also in combination to treat melasma.

Objective To compare the efficacy of 50% glycolic acid and 20% trichloroacetic acid in the treatment of recalcitrant melasma.

Patients and methods 50 patients of recalcitrant epidermal melasma were recruited in the study. Recalcitrant melasma included the patients who failed to respond to 3 months or more of medical treatment. Patients were randomly allocated into two groups: group A (glycolic acid 50%) and group B (TCA 20%) with 25 patients in each group. Patients carried out a pre-peel programme of daily application of sunscreens (day time) and 5% hydroquinone and 0.025% retinoic acid at bed time for two weeks. 3 peels were carried out at 3 weekly intervals. MASI scoring and coloured photographs of each patient were taken before each peel and at end of the follow-up period i.e. 30 days after the last peel. Side effects if any were also recorded.

Results In both the groups there was constant decrease in MASI scores after each peel as compared to pre-peel scores. However, the comparison of mean MASI scores i.e. both pre-peel and after each peel, between the two groups showed no statistically significant difference ($p>0.05$). The mean score of response calculated for both the groups revealed better overall clinical response in TCA group (2.00 ± 0.50) than in GA group (1.76 ± 0.66). But the difference was statistically insignificant ($p>0.05$). Whereas the local reactions, such as burning sensation and erythema during the peel were significantly more with TCA as compared to GA.

Conclusions Both 50% glycolic acid and 20% trichloroacetic acid were found to be equally effective agents in the treatment of melasma. But as regards the local irritant effects, tolerability to glycolic acid peels was better than trichloroacetic acid. Follow-up period in the study was short to make conclusions regarding relapse rates in both the groups.

Key words

Melasma, chemical peeling, glycolic acid (GA), trichloroacetic acid (TCA).

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Introduction

Melasma is a characteristic pattern of marginated facial hyperpigmentation, occurring primarily on the forehead, cheeks

and chin in a mask like distribution.¹ The condition is seen most commonly on the face of women with Fitzpatrick skin types IV to VI, especially among those living in areas of intense UV radiation.² The pathogenesis of melasma is not fully understood, but pregnancy, estrogen ingestion, UV light exposure, and family history are well recognized associations. Although melasma is seen in both sexes and all races, women are most commonly affected and it appears to be more prevalent in darkly pigmented races.¹

Melasma is often distributed in one of the three clinical patterns i.e. centrofacial, malar and mandibular.³ Clinical examination of melasma under wood's light (wavelength, 365 nm) helps to determine the location of melanin in the skin as the epidermal form is enhanced under wood's light whereas the dermal form shows no enhancement.^{4,5}

Therapy for melasma has generally been difficult, particularly in black patients.¹ Therapies have included the routine use of broad spectrum sunscreen and various concentration of hydroquinone with or without the addition of corticosteroids, retinoids (tretinoin), salicylic acid or glycolic acid.⁶ Despite these measures treatment of this recalcitrant disorder is often difficult and frustrating both for the patient and the clinician. In general, melasma of recent onset responds better than the long standing cases, and the melasma of epidermal type, as determined by wood's light responds faster than the mixed epidermo-dermal type.⁷

Chemical peeling with glycolic acid and trichloroacetic acid has become an

increasingly popular method to treat a myriad of benign skin disorders. The basic procedure aims at the production of controlled chemical burns of epidermis and/dermis resulting in exfoliation and subsequent resurfacing of the epidermis and remodelling of collagen and elastic fibres with deposition of glycosaminoglycans in dermis.⁸ Chemical peels have been referred to as chemexfoliation, chemosurgery, and most recently, chemical resurfacing.⁹

Patients and methods

50 patients of recalcitrant melasma attending Skin and V.D. outpatient department of Dayanand Medical College and Hospital, Ludhiana were recruited in the study. Only the patients with epidermal melasma as confirmed by Wood's lamp examination were included in the study. Complete history of the patient with regard to onset of the disease, its total duration, aggravating factors, site, reactions during the peel and any complications thereafter, were documented.

Patients selected were randomly allocated into two groups: group A (glycolic acid 50%) and group B (trichloroacetic acid 20%). In each group coloured photographs were taken before each peel and severity of the disease was assessed by melasma area scoring index (MASI) scoring.¹ Pre-peel priming was carried out by each patient with sunscreens (day time) and 5% hydroquinone and 0.025% retinoic acid at bed time for two weeks. Three peels were carried out at three weekly intervals. Group A patients underwent peeling with glycolic acid. 50% glycolic acid was applied for a period of 20-30 seconds and was left for a period of 3

minutes (1st peel), 3½ minutes (2nd peel) and 4 minutes (3rd peel). Group B patients were given trichloroacetic acid peels. 20% trichloroacetic acid was applied till there was appearance of uniform white coat of frosting.

The degree of tolerability to the facial peels and side effects if any were recorded. MASI scoring and coloured photographs of each patient were taken before each peel and at the end of the follow up period i.e. 30 days after the last peel. At the completion of the study the response in each patient was graded as: -

Grades of improvement	Reduction of MASI at end of 3 peels
No response	No change in MASI
Mild	< 25%
Moderate	25 – 50%
Good	50-75%
Very Good	> 75%

At the end of 30 days after the last peel, MASI score was compared with the pre-treatment values in each group.

Results

- The age range in group-A was 22-46 years and that in group-B was 22-40 years. The mean age in group-A was 33.84 ± 7.28 years and in group-B was 30.32 ± 5.76 years. In both the groups maximum number of patients was in the age-group 21-40 years.
- Amongst the 50 cases included in the study, 45 (90%) were females and 5 (10%) were males, with a male to female ratio of 1:9.
- The mean duration of disease was found to be 5.1 years.
- The main precipitating factor in both the groups was sunlight (74%) followed by

pregnancy (44%), cosmetics (22%), oral contraceptive pills (14%) and family history (6%).

- As regards the site of disease, malar pattern predominated in both the group with 96% cases in group A and in 100% cases in group B. Malar pattern (98%) was followed by forehead (70%) and chin (28%) i.e. centropacial pattern.
- The mean MASI scores in both the groups were compared. There was a constant decrease in MASI scores after each peel as compared to the pre-peel values. Although the values had a constant decline after each peel in both the groups, the comparison of mean MASI scores i.e. both pre-peel and after each peel, between the two groups showed no statistically significant difference $p>0.05$ (Table 1).
- On comparing the percentage reduction in MASI scores between the two groups it was found that the percentage reduction was more in group-B after the 1st & 2nd peel. This was found to be statistically significant ($p<0.05$). Though after the 3rd peel also the percentage reduction in MASI was more in group B but was found to be statistically insignificant $p>0.05$ (Table 2).
- Table 3 shows comparison of overall therapeutic response with regards to percentage reduction in MASI & grades of improvement in both the groups. In group A, 36% cases showed mild response as compared to 12% cases in group-B. This difference was found to be statistically significant ($p<0.05$). Whereas the moderate response was more in group B (76% cases) as compared to in group A (52% cases).

Table 1 Comparison of mean MASI scores in group A & group B

Period	Glycolic acid	Trichloroacetic acid	T value	p value*
Pre-peel	13.20±3.45	12.88±3.43	0.24	>.05
At the end of 1 st peel	11.46±3.31	10.49±3.38	0.86	>0.05
At the end of 2 nd peel	10.30±3.29	9.01±3.00	1.30	>0.05
At the end of 3 rd peel	9.16±3.45	8.18±3.00	0.97	>0.05

* p value not significant

Table 2 Trends in percentage reduction in MASI score in the two groups.

Period	Percent reduction in MASI score		t value	p value
	Glycolic acid	Trichloroacetic acid		
At the end of 1 st peel	13.18±8.97	18.56±8.66	2.16	<0.05*
At the end of 2 nd peel	21.97±13.35	30.05±10.30	2.40	<0.05*
At the end of 3 rd peel	30.61±15.65	36.49±10.64	1.55	>0.05**

*p value significant, ** p value not significant

Table 3 Overall clinical response (grades of improvement) in group-A & group-B at the end of three peels.

Response	Glycolic acid	Trichloroacetic acid	z value	p value
Mild (<25%)	9 (36%)	3 (12%)	1.99	<.05*
Moderate (25-50%)	13 (52%)	19 (76%)	1.77	<.10*
Good (50-75%)	3 (12%)	3 (12%)	0	>.05**
Very Good (>75%)	0 (0)	0 (0)	--	--
Mean ±SD	1.76±0.66	2.00±0.50		

t-value = 1.45, * p value significant, ** p value not significant

Table 4 Reactions during peeling in Group-A and Group-B

Reactions	Glycolic acid	Trichloroacetic acid	z value	p value
Burning sensation	6 (24%)	16 (64%)	2.85	<0.01*
Erythema	6 (24%)	14 (56%)	2.31	<0.05*
Frosting	0 (0)	25 (100%)	7.07	<0.001*
Itching	10 (40%)	16 (64%)	1.70	>0.05**

* p value significant, ** p value not significant

- This difference was also found to be statistically significant ($p < 0.05$). The good response was at par in both the groups (12% in each group). None of the cases showed a very good response. The overall mean score of response in group A was 1.76 ± 0.66 and in group B was 2.00 ± 0.50 . Thus the overall clinical response was better in group B but difference was statistically insignificant.
- The tolerability profile and reactions during peeling in both the groups were compared. In group A, burning sensation and erythema were seen in each of 25% cases. In group B, burning sensation and erythema were seen in 64% and 56% cases respectively. The

difference in both of these reactions in the two groups was found to be statistically significant. Itching as a reaction was seen in 40% cases in group-A as compared to 64% in group-B. The difference being statistically insignificant (**Table 4**).

Discussion

In the present study the mean age of patients in group A was 33.84 ± 7.28 years and in group B was 30.32 ± 5.76 years. The cases included in the study varied in age from 22-46 years. Out of the total 50 cases, 46 (92%) were in the age group of 20-40 years. The findings regarding the age incidence in the



Figure 1 Glycolic acid group – pre-peel.



Figure 2 Glycolic acid group – after three peels.



Figure 3 Trichloroacetic acid group – pre-peel.



Figure 3 Trichloroacetic acid group – after three peels.

present study are in concordance with studies of Kalla *et al.*¹⁰ and Javaheri *et al.*¹¹ 45 cases (90%) were females and 5 (10%) males, with a male to female ratio of 1:9. In group A, 23 (92%) cases were females and only 2 (8%) were males. Similarly in group B, 22 (88%) cases were females and only 3 (12%) males. Thus in both the groups there was a female preponderance. In study by Sarkar *et al.*¹² out of 40 melasma patients, 22 were females and 18 males, showing female predominance.

In our study, mean duration of disease in group A was 3.92 ± 2.55 years whereas in group B it was 4.00 ± 2.57 years. The duration of disease varied from 6 months-10 years with mean of 5.1 years. This was well consistent with study carried by Javaheri *et al.*¹¹ where mean duration of melasma was

found to be 5.05 years and duration of disease varied from 4 months 7 years. The main precipitating factors in our study were sunlight (74%) followed by pregnancy (44%), cosmetics (22%), oral contraceptive pills (14%) and family history (6%). Kalla *et al.*¹⁰ in their study observed melasma to be more common due to three factors such as sun exposure (28%), followed by pregnancy (19%) and drugs (8%). Hurley *et al.* found following aggravating factors in melasma – pregnancy (44%), sun exposure (39%), hormonal therapy (22%) and cosmetics (6%). The history of melasma in first degree relative was found in 44% cases.²

Melasma in the present study showed predominantly a malar pattern in both the groups. Malar pattern (98%) was followed by forehead (70%) and chin (28%) involvement (centrofacial pattern). This is

consistent with the study carried out by Grover *et al.* in which malar pattern (53.3%) predominated over the centrofacial (46.6%) pattern.¹³

The reduction in MASI scores after each peel was compared with the pre-peel scores. In both the groups there was a constant decrease in MASI scores after each peel as compared to the pre-peel scores.

Sarkar *et al.* in their study evaluated the results following serial glycolic acid peels in 20 melasma patients.¹² For clinical evaluation, MASI score at baseline, 12 and 21 weeks was calculated. The mean MASI score for peel group significantly decreased from 19.12 ± 6.71 at baseline to 10.17 at 12 weeks and 3.93 at 21 weeks. This represented percentage change of 45.89% at week 12 and 79.99% at week 21, which was found to be highly significant ($p < 0.001$). The results being well in accordance with the present study.

On comparing the two groups the percentage reduction in MASI was found to more in group B till the 2nd peel. This difference found to be statistically significant showed that the response in group B was rapid as compared to group A initially. But after three peels, the difference in the percentage reduction of MASI in the two groups was found to be statistically insignificant.

The overall therapeutic response with regards to percentage reduction in MASI and grades of improvement, were compared in both the groups and the overall clinical response was found to be better in group B but difference was statistically insignificant. Chun *et al.*¹⁴ reported a good clinical

response in 55% patients with TCA as compared to 12% in the present study. With GA peels, a good to fair response was reported by Grover *et al.* in more than 90% of the patients.¹³ Similarly in the present study mild to moderate response was seen in 88% cases in GA group. Also Gupta *et al.* reported maximum beneficial effects with 52% glycolic acid for 3 minutes in melasma.¹⁵ The results being well consistent with that of the present study.

In group A, burning sensation and erythema were seen in each of 24% cases whereas in group B, burning sensation and erythema were seen in 64% and 56% cases, respectively. The difference in both of these reactions in the two groups was found to be statistically significant.

Gupta *et al.*¹⁵ reported minimum side effects with 52% GA in the form of erythema, or burning sensation in their study, which is consistent with the present study. In a study conducted by Kalla *et al.* TCA patients experienced more local irritant effects like tingling, burning sensation and post peel cracking as compared to GA.¹⁰

Thus from the present study it can be concluded that both 50% glycolic acid and 20% trichloroacetic acid are equally effective peeling agents in the treatment of melasma. However, the response with trichloroacetic acid was rapid initially. But as regards the local irritant effects, tolerability to glycolic acid peels was better than trichloroacetic acid.

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