



A Comparative Study of Topical 3% Tranexamic Acid and 35% Glycolic Acid in Melasma and Review of Literature

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: To compare the efficacy and safety of topical 3% tranexamic acid gel vs 35% glycolic acid peel in the treatment of melasma over face.

Materials and Methods: This is an open labelled, Randomised Controlled Trial(RCT) conducted on 60 patients. Patients were randomly divided equally into 2 groups – Group A and Group B. Patients of Group A used topical 3% tranexamic acid gel twice a day and Group B patients were treated with 35% glycolic acid peel with a contact period of 5 minutes once in every 2 weeks. Patients were assessed every month for a period of 3 months and recurrence was assessed for the next consecutive 3 months following the treatment. Patients were asked to use a broad spectrum sunscreen before sun exposure during the entire study. Assessment of reduction in pigmentation was made by MASI score, subjective and objective valuation (blind observer) and photographic comparison. Safety profile was assessed by the side effects.

Results: The mean value of Melasma Area and Severity Index(MASI) score for glycolic acid group at baseline was 14.41 which reduced to 7.05 at end of 3rd month. In tranexamic acid group, the mean value of MASI score at baseline was 14.58 which reduced to 5.96 at the end of 3rd month. The mean percentage of improvement in MASI score in glycolic acid group 52% whereas in tranexamic acid group it is 61%. The side effects were minimal in this study. Side effects were

more in glycolic acid group than tranexamic acid group. A total of 8 patients had recurrence during follow up. In glycolic acid group, 5 patients had recurrence whereas in tranexamic acid group, only 3 patients had recurrence. The percentage of recurrence in glycolic acid group is 16.7 % whereas in glycolic acid group it is 10.7%.

Conclusion: Tranexamic acid is a novel emerging therapy for melasma. In this study it has been found that topical 3% tranexamic acid is equally efficacious as 35% glycolic acid peel with minimal side effects in the treatment of melasma.

Keywords: Melasma; tranexamic acid; glycolic acid.

1. INTRODUCTION

Melasma is an acquired facial melanosis commonly seen in females of reproductive age group of 20-40 years of age. It is around 7 to 9 times more common in women than men [1]. It commonly affects the face that indirectly has a negative impact on the patient affecting the self-esteem and Dermatology life and quality index(DLQI) [2].

Melasma has been known since ages – it still remains one of the most difficult conditions to treat in dermatology. Management of melasma is challenging because it takes a long time to respond and recurrences are also common. It includes many treatment options like the topical depigmenting agents, sunscreens, lasers, anti-oxidants, chemical peels, dermabrasion, microdermabrasion and camouflage etc. Topical depigmenting agents remain the first line options for melasma. Multiple studies have been done to discern the efficacy and safety of various treatment options of melasma.

Tranexamic acid is a haemostat with anti-inflammatory and hypopigmentary effects that targets the vascular pathology of melasma thereby targeting the UV induced melanogenesis. It can be used topically, intradermally or orally providing significant reduction in the MASI score with minimal side effects [3,4].

This study was done to assess the therapeutic efficacy and safety of topical tranexamic acid in melasma in comparison with glycolic acid.

2. MATERIALS AND METHODS

This was an Open labelled, Randomized controlled trial (RCT) conducted at a tertiary care hospital for a period of 1 year. A total of 60 patients were included in our study. Following the approval from the institutional ethical committee

[Proposal No.229/ IHEC/10-17] the study was started.

Patients were randomly divided equally into 2 groups - Group A(Tranexamic acid) and Group B(Glycolic acid). Patients of Group A patients were asked to use topical 3% tranexamic acid gel twice a day and Group B patients were treated with glycolic acid peel for a contact period of 5 mins (35%) once in every 2 weeks under supervision. Patients were assessed every month for a period of 3 months and recurrence was assessed for the next consecutive 3 months following the treatment. Patients were asked to use a broad spectrum sunscreen before sun exposure during the entire study.

Assessment of reduction in pigmentation was made by:

- Melasma Area and Severity Index (MASI) score
- Subjective valuation :
 - No response: no improvement
 - Mild response: <25% improvement
 - Moderate response: 25%–<50% improvement
 - Good response, 50%–<75% improvement
 - Excellent response, >75% improvement
- Physician's valuation (blind observer):
 - No response: no improvement
 - Mild response: <25% improvement
 - Moderate response: 25%–<50% improvement
 - Good response, 50%–<75% improvement
 - Excellent response, >75% improvement
- Photographic comparison and evaluation by 2 blinded dermatologists.

- Safety profile was assessed by the side effects.

2.1 Inclusion Criteria

Female patients with epidermal melasma(confirmed by Wood’s lamp) over the face , age group: between 25 -50 years, only new cases of melasma who have not been treated previously were included in the study, patients having regular menstrual cycles, patients who are willing to participate and give written and well informed consent.

2.2 Exclusion Criteria

Extra facial melasma, hypersensitivity, photosensitivity, pregnancy/planning for pregnancy, nursing, taking drugs like oral contraceptive pills, Phenytoin, anticoagulants, bleeding disorders, irregular menstrual cycles, keloidal tendency, active infection over face, facial dermatitis, history of herpes, patients refusing to give consent.

3. RESULTS

In this study, the total study population was 60 out of which 4 patients dropped out of the study, 2 from glycolic acid group and 2 from tranexamic acid group and 56 patients completed the study.

The most common age group that was affected was 25-30 years i.e. 31% of the patients. The

mean age for glycolic acid group was 34.77 years and in tranexamic acid was 37.33 years. The majority of the patients in this study had duration of < 6 months i.e. 41.7%.The mean duration of the disease in Group A is 25.17 months and in Group B is 21.57 months.

In this study, the most common type of melasma that was seen was of malar type constituting about 62.7 % followed by centrofacial melasma which constituted 37.3% of the patients. There was no mandibular type of melasma seen.

In this study, the mean value of Melasma Area and Severity Index(MASI) value at baseline in glycolic acid group was 14.41 which reduced to 12.03 at the end of 1 month then to 9.55 during the end of second month then to 7.05 at the end of 3rd month. So here, the reduction in the MASI score from baseline to 3rd visit was 14.41 to 7.05 as shown in Fig. 1. The mean percentage of improvement in MASI score in glycolic acid group was 52%.

In tranexamic acid group, the mean value of Melasma Area and Severity Index(MASI) score at the baseline was 14.58 which reduced to 11.70 at the end of 1 month then to 8.25 at the end of second month then to 5.96 at the end of 3rd month. So here, the reduction in the MASI score from baseline to 3rd visit is 14.58 to 5.96. The p-value in both the groups is 0.00 which is highly significant. The mean percentage of improvement in MASI score in tranexamic acid group was 61%.

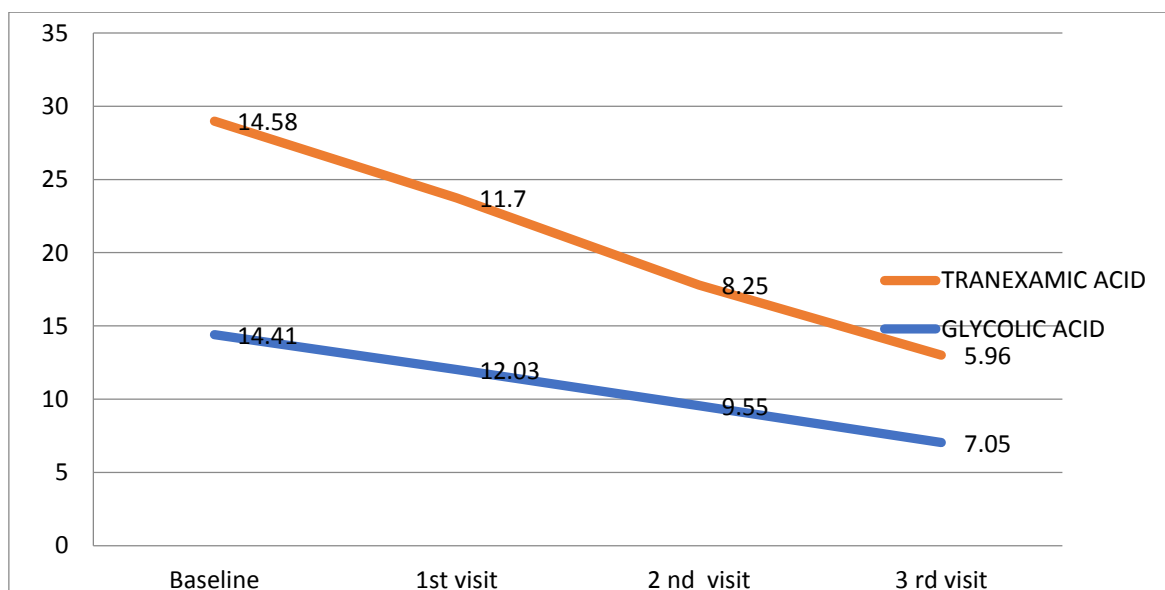


Fig. 1. The reduction in the Melasma Area and Severity Index(MASI) score from baseline

Table 1. Comparison of subjective and objective improvement in both groups

S.no	Range	Improvement	Objective improvement		Subjective improvement	
			Glycolic acid	Tranexamic acid	Glycolic Acid	Tranexamic Acid
1	0	No	0	0	0	0
2	<25%	Poor	3	4	4	4
3	25-50%	Fair	9	6	7	9
4	50-75%	Good	10	13	13	13
5	75-100%	Excellent	6	5	4	5
Total			28	28	28	28

In glycolic acid group, 4 patients had >75 % subjective improvement and 13 patients had 50-75% subjective improvement whereas in tranexamic acid Group 5 patients had >75% subjective improvement

In glycolic acid group, 6 patients had >75 % objective improvement and 10 patients had 50-75% objective improvement whereas in tranexamic acid group 5 patients had >75% improvement and 5 patients had 50-75. The subjective and objective improvement in both the groups is shown in Table 1.

In this study, side effects were minimal. A total of 7 patients had side effects. Side effects were more in glycolic acid group when compared to tranexamic acid group. In Glycolic acid group 10.8% developed side effects like erythema, 3.3% developed hyperpigmentation, 6.7% of the patients developed xerosis whereas in tranexamic acid group only 1 patient developed side effect i.e 1.7% developed edema as a side effect.

In this study, the most common skin phototype seen was phototype IV (45%) followed by

phototype III (30%) followed by phototype V (25%). The phototypes of all the patients in the study is given in table no. 2 .

Recurrence was seen in a total of 8 patients during follow up. In glycolic acid group 5 patients had recurrence i.e. 16.7% of the patients whereas in tranexamic acid group, only 3 patients had recurrence i.e. 10.7 patients as shown in Fig. 2 p-value of comparison of recurrence in both groups is 0.511.

Table 2. Showing fitzpatrick skin type of the patients in this study

Phototype	Number of patients	Percentage
I	0	0
II	0	0
III	18	30%
IV	27	45%
V	15	25%
VI	0	0
	60	100

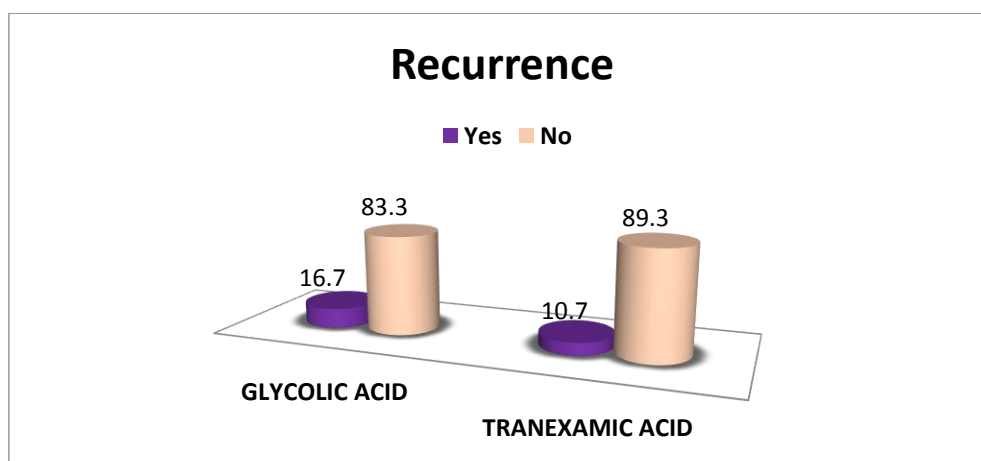


Fig. 2. Recurrence in both groups

Photographic comparison in glycolic acid group :



Image 1. Baseline (glycolic acid)



Image 2. 3RD Follow up



Image 3. Baseline (Glycolic acid)



Image 4. 3RD Follow up(Glycolic acid)



Image 5. Baseline(Tranexamic acid)



Image 6. 3RD Follow up(Tranexamic acid):



Image 7. Baseline(Tranexamic acid)



Image 8. 3RD Follow up (Tranexamic acid)

4. DISCUSSION

Melasma is a common facial melanosis which requires long term treatment and maintenance and recurrences are common. In spite of availability of numerous modalities of treatment, it still remains one of the notorious conditions to treat by dermatologists and dermatocosmetologists.

Tranexamic acid targets the UV induced melanogenesis. It has shown promising effects in all the routes administered like topical [5,6], oral [4] or intradermal [7] with minimal side effects.

In Glycolic acid group, the mean MASI score at the baseline was 14.41 which

reduced to 7.05 at the end of 3rd follow up (p-value 0).

In a comparative study done by Valkova et al comparing 35% glycolic acid and 15% trichloroacetic acid for melasma, there was significant reduction in MASI scores in both groups. In glycolic acid group, it reduced from 13.8±9.4 to 5 ±1.2 [8].

In a study conducted by Kumari et al, the mean MASI score significantly reduced from 26.6 to 5.6 in patients treated with glycolic acid [9].

In a study done by Puri et al, patients treated with 35% glycolic acid had significant reduction in MASI score from 23.64±1.24 to 4.25±0.862 [10].

Similar effects were seen by Grover et al where good to fair response was seen in 90% of the patients [11].

In tranexamic acid group, the mean Melasma Area and Severity Index(MASI) score at the baseline was 14.58 ± 1.68 which reduced to 5.96 ± 1.68 (p value 0.00).

In a double blinded, split face, Randomized Control Trial(RCT) with 5% topical tranexamic acid done by Kanechorn et al 18 out of 23 patients had significant reduction in MASI score [12].

In a double blinded Randomized Control Trial (RCT) done by Atefi et al in 60 women with melasma in Tehran comparing 5% Tranexamic acid vs 2% hydroquinone, Melasma Area and Severity Index(MASI) score from baseline to the end of 12 weeks reduced from 72.43 ± 20.64 to 26.60 ± 13.43 [5].

In a 12 week double blinded study done by Ebrahimi et al in 50 Iranian women who applied 3% Tranexamic Acid solution on one side of the face and topical solution of 3% Hydroquinone with 0.01% dexamethasone on the other side two times a day. The Melasma Area and Severity Index(MASI) score reduced from 31.68 ± 10.32 to 10.76 ± 9.43 at the end of 12 weeks [6].

In a study by Kim et al. 2% topical Tranexamic Acid was applied in 23 melasma patients for 12 weeks. Significant improvement in modified Melasma Area and Severity Index(mMASI) score was observed in 22 of 23 participants [13].

From the above findings it has been found that the efficacy of 35% glycolic acid peel and the tranexamic acid gel in the treatment of melasma is comparable. Though not statistically significant, when compared, tranexamic acid showed more reduction in Melasma Area and Severity Index(MASI) score when compared to glycolic acid

Side effects were minimal in this study and were comparable with the side effects of previous studies with Glycolic acid [8-11] and tranexamic acid [5,6] which showed either minimal or no side effects. This was contradicted by Kanechorn et al showing significant erythema in tranexamic acid treated group when compared to vehicle [12].

5. CONCLUSION

On evaluating the therapeutic efficacy of both the drugs in their respective groups, both of them showed a significant reduction in Melasma Area and Severity Index(MASI) score. Side effects were minimal and mild in both the groups, though statistically insignificant, slightly more incidence of adverse reactions and recurrence rate was seen in glycolic acid group. Tranexamic acid targets the vascular effects of melasma offering protection from adverse reactions of Ultra Violet rays whereas glycolic acid peels requires a compliant patient who strictly follows the pre and the post peel care routine properly in order to prevent adverse effects like photosensitivity, post inflammatory hyperpigmentation, erythema, irritation and xerosis . Glycolic acid peels are done on Out Patient Department basis whereas topical tranexamic acid can be self applied.

As we all know that India has a heritage of varied skin colour and ethnicity, different people respond to the same modality of treatment differently i.e some might respond and some might not. Tranexamic acid is a cost effective, easily available drug with minimal side effects and aids in the management of melasma in all routes. In this study, it has been found that the efficacy of 3% tranexamic acid gel is comparable with 35% glycolic acid peel in melasma.

In this study, the sample size was small and cannot be extrapolated to the general population. Hence further studies in larger population, different concentrations, vehicles and combinations are necessary to ascertain the exact efficacy of tranexamic acid in melasma.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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