ORIGINAL RESEARCH

A comparative study of the effect of oral versus intralesional tranexamic acid in melasma

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ABSTRACT

Background: Melasma is a persistent acquired hypermelanosis of the skin, described by muddy brown coloured macules evenly disseminated on sunexposed region of the body, especially on the face. The present study was conducted to assess the oral versus intradermal Tranexamic acid infusion for the treatment of melasma.

Materials & Methods:100 patients of melasma of age group 20 to 45 years were assigned to 2 groups – Oral (Group A) and intralesional (Group B). Patients in the oral therapy group were given tablet tranexamic acid (250 mg) twice daily for 3 months. In the intralesional group, patients were administered intradermal injections of tranexamic acid. Clinical assessment of patient was performed using modified MASI score.

Results: Pattern was Centrofacial in 23 and 20, mandibular in 17and 18 and dermal in 10 and 12 patients in group I and II respectively. Type was dermal in 8 and 8, and epidermal in 17 and 16 patients and mixed in 25 and 26patients. Fitzpatrick skin type II was seen in 5 and 6, III in 25 and 22, and IV in 20 and 22 patients in group I and II respectively. The difference was non- significant (P> 0.05). In group I and group II, the mean MASI score at 1st sitting was 4.478 and 4.468, at 2nd sitting was 3.402 and 3.476 ± 2.2806, at 3rd sitting was 2.712 ± 1.7784 and 2.736 ± 1.847, at 4th sitting was 2.04 ± 1.3334 and 2.076 ± 1.4353, at 5th sitting was 1.784 ± 1.2079 and 1.84 ± 1.2886 and at 6th sitting was 2.07 ± 1.8486 and 2.052 ± 1.8655respectively. The difference was significant (P< 0.05).

Conclusion: Tranexamic acid is safe and well tolerated drug for the treatment of melasma. Both intradermal and oral modes of administration are effective for melasma. We observed a significant decrease in the mean MASI scores from 1st sitting to 5th sitting in both Group 1 and Group 2, showing an improvement in their melasma severity over time. However, when comparing the two groups, there were no significant differences in the extent of this improvement, as the MASI scores remained similar between the groups across all sittings.

Keywords: MASI, melasma, tranexamic acid

INTRODUCTION

Melasma is a persistent acquired hypermelanosis of the skin, described by muddy brown coloured macules evenly disseminated on sunexposed region of the body, especially on the face.[1] The lesions have serrated edges, quite often restricted to the face including the cheeks, extends to dorsum of nose, temple (particularly the region over the eyebrows), and the upper lip, saving the region under the nose. Its prevalence in pregnancy is around 50%-70%.The prevalence of melasma in Indian men is about 20.55% to 25.83%.[2] The specific prevalence of melasma is obscure in the vast majority of the countries. The disease influences all races and ethic gatherings. Most cases happen in females, however few men can be affected.1Common clinical patterns identified are centro-facial, malar and mandibular. Based on Wood's lamp examination, the types of melasma described are epidermal, dermal, mixed and indeterminate.[3]

Multiple pathways have been implicated in the induction of hyperpigmentation. Etiologic factors include a genetic predisposition, UV light exposure, and hormonal influences. The exact pathogenesis remains obscure but it is related to changes in melanin pigment. Increased melanogenesis, extracellular matrix changes, inflammation and angiogenesis have role in the development of melasma. Due to its multifactorial nature it tends to recur again and again.[4]

Therapeutic modalities including hydroquinone, retinoic acid, kojicacid, azelaicacid, rucinol, chemical strips, laser treatment, dermabrasion, L-ascorbic acid, zinc and so on have been attempted in the treatment of melasmabut success rates are variableand recurrence rates high.[5] Recently tranexamic acid has been approved for treatment of melasma but consistent results are variable.Tranexamic acid, as a lysine analogue, prevents binding of plasminogen to the lysine-binding site by interfering with the structure of the plasminogen molecules.[6]The present study was conducted to assess the oral versus intradermal Tranexamic acid infusion for the treatment of melasma.

MATERIALS & METHODS

The present study was conducted on 100 patients of melasma of age group 20 to45years in department of Dermatology and venerology, Rama Medical college and hospital, Hapurof both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. All patients were assigned to 2 groups – Oral (Group A) and intralesional (Group B). Patients in the oral therapy group were given tablet tranexamic acid (250 mg) twice daily for 3 months. In the intralesional group, patients were administered intradermal injections of tranexamic acid. 2 U of tranexamic acid was drawn in a 40U/ml30-gauge insulin syringe and diluted with normal saline up to 1 ml (remaining 38 U out of total 40 U) to get a concentration of approximately 2.5mg/unit (5mg/ml) of tranexamic acid. Intradermal injections were given at the site of melasma, after application of topical anesthetic, with a distance of around 1 cm from each injection, with a maximum of 8 mg in a single sitting. 3 such sessions at intervals of a month were carried out. Various measures for strict photoprotection were prescribed for next 6 months.Clinical assessment of patient was performed using modified MASI score. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table: I Assessment of parameters

Parameters	Variables	Group I (50)	Group II (50)	P value
Pattern	Centrofacial	23	20	0.75
	Mandibular	17	18	
	Dermal	10	12	
Depth	Dermal	8	8	0.83
	Epidermal	17	16	
	Mixed	25	26	
Fitzpatrick skin type	II	5	6	0.64
	III	25	22	
	IV	20	22	

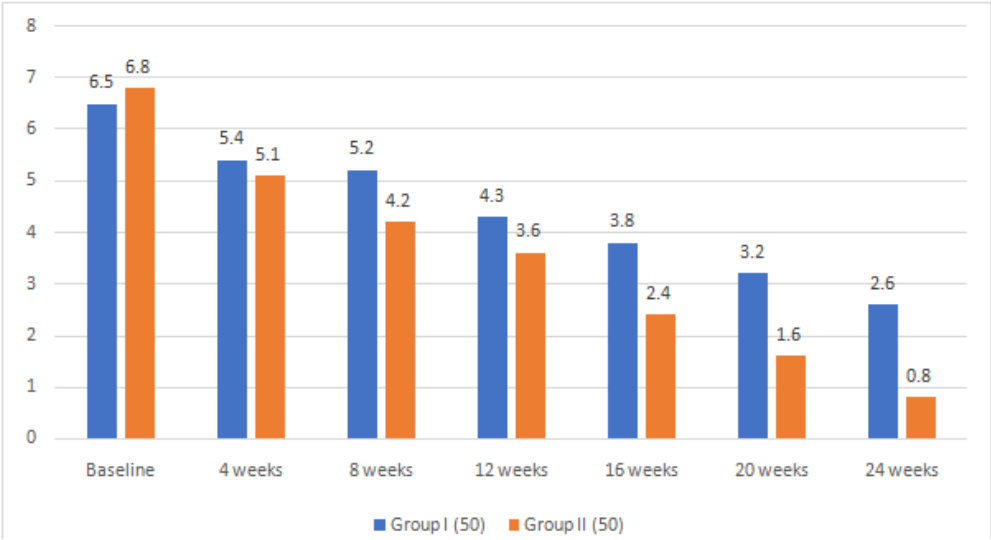
Table I shows that pattern was Centrofacial in 23 and 20, mandibular in 17 and 18 and dermal in 10 and 12 patients in group I and II respectively. Type was dermal in 8 and 8, and epidermal in 17 and 16 patients and mixed in 25 and 26patients.Fitzpatrick skin typeII was seen in 5 and 6, III in 25 and 22, and IV in 20 and 22 patients in group I and II respectively.The difference was non- significant (P> 0.05).

Table: II Effectiveness of treatments on the Melasma Area and Severity Index (MASI) score

Duration	Group I (50)	Group II (50)	P value
At 1st sitting	4.478 ± 2.0134	4.468 ± 2.2887	0.04
At 2nd sitting	3.402 ± 2.1408	3.476 ± 2.2806	
At 3rd sitting	2.712 ± 1.7784	2.736 ± 1.847	
At 4th sitting	2.04 ± 1.3334	2.076 ± 1.4353	
At 5th sitting	1.784 ± 1.2079	1.84 ± 1.2886	
At 6th sitting	2.07 ± 1.8486	2.052 ± 1.8655	

Table II shows that in group I and group II, the mean MASI score at 1st sitting was 4.478 and 4.468, at 2nd sitting was 3.402 and 3.476 ± 2.2806, at 3rd sitting was 2.712 ± 1.7784 and 2.736 ± 1.847, at 4th sitting was 2.04 ± 1.3334 and 2.076 ± 1.4353, at 5th sitting was 1.784 ± 1.2079 and 1.84 ± 1.2886 and at 6th sitting was 2.07 ± 1.8486 and 2.052 ± 1.8655respectively. The difference was significant (P< 0.05).

Graph: I Effectiveness of treatments on the Melasma Area and Severity Index (MASI) score



DISCUSSION

Melasma is a symmetric hyperpigmentation disease that is acquired over time. Melasma lesions are amorphous brown patches that mostly affect the mandibular, malar, and centrofacial facial patterns. Based on multiple investigations, the overall prevalence of melasma in the general population was estimated to be between 1 and 50 percent.[7] The two main risk factors for developing melasma are exposure to ultraviolet radiation and female hormone activity. Another risk factor that has been found in 55–64 percent of instances is a positive family history.[8]There are several ways to treat melasma, such as oral medications, topical treatments, microinjections, mesotherapy, laser ablation, and combination therapies. The gold standard treatment for melasma lesions with a high recurrence rate is topical hydroquinone (HQ).[9] However, the only medication that can stop melanocytes from being activated by hormones and sunshine is tranexamic acid (TA), which has just been made available as a novel therapy for melasma. TA is frequently utilized in solutions for oral, topical, and intradermal application at various concentrations.[10]The present study was conducted to assess the oral versus intradermal Tranexamic acid infusion for the treatment of melasma.

We found thatpattern was Centrofacial in 23 and 20, mandibular in 17and 18 and dermal in 10 and 12 patients in group I and II respectively. Type was dermal in 8 and 8, and epidermal in 17 and 16 patients and mixed in 25 and 26patients. Fitzpatrick skin type II was seen in 5 and 6, III in 25 and 22, and IV in 20 and 22 patients in group I and II respectively. Lueangarun et al[11]evaluated the 48-week efficacy of a 4mg/mL intradermal TA injection for the treatment of melasma. Five female patients with melasma participated in the 48-week follow-up after receiving 4-mg/mL intradermal TA injections on the face every two weeks for seven sessions and a sunscreen prescription. Assessments were performed at baseline and weeks 4, 8, 12, 16, and 48 using the modified Melasma Area Severity Index (mMASI) score, melanin index, and patient satisfaction score. Safety and adverse effects were also evaluated. The mean (standard deviation) age of patients was 53.6 (8.14) years and Fitzpatrick Skin Type IV (60%) and Fitzpatrick Skin Type V (40%) were observed. The mean (standard deviation) duration of melasma was 7.6 (2.51) years and 60 percent of participants reported a family history of melasma. There was a significant decrease in mMASI score and melanin index at 16 weeks, without a statistically significant improvement of mMASI score at 48 weeks. Melasma recurrence was observed in 60 percent of the participants, with higher mMASI scores recorded, but the severity remained less than at baseline. The patient satisfaction score was lower from Week 16 to Week 48. Interestingly, a statistically significant decrease in the melanin index was observed up to Week 48, with no serious adverse effects.

We observed that in group I and group II, the mean MASI score at 1st sitting was 4.478 and 4.468, at 2nd sitting was 3.402 and 3.476 ± 2.2806, at 3rd sitting was 2.712 ± 1.7784 and 2.736 ± 1.847, at 4th sitting was 2.04 ± 1.3334 and 2.076 ± 1.4353, at 5th sitting was 1.784 ± 1.2079 and 1.84 ± 1.2886 and at 6th sitting was 2.07 ± 1.8486 and 2.052 ± 1.8655respectively. Pazyar et al[12]compared the efficacy of 100mg/mL intradermal TA with 4% topical HQ on female patients presenting with melasma lesions.48 women with melasma were allocated into two groups, treated with either 100mg/mL intradermal TA or topical 4% HQ. The MASI (Melasma Area and Severity Index) score was assessed. The Dynamic Physician General Assessment (PGA) was also performed by taking photographs with a digital camera.The average MASI score for the HQ and TA groups was 7.7 and 5.9, respectively. In both groups, the MASI decreased

significantly after three months of treatment; however, the decrease was not significant between the two groups (P=0.1). All participants developed mild degrees of burning pain in the injection site without serious adverse effects.
The shortcoming of the study is small sample size.

CONCLUSION

Tranexamic acid is safe and well tolerated drug for the treatment of melasma. Both intradermal and oral modes of administration are effective for melasma. We observed a significant decrease in the mean MASI scores from 1st sitting to 5th sitting in both Group 1 and Group 2, showing an improvement in their melasma severity over time. However, when comparing the two groups, there were no significant differences in the extent of this improvement, as the MASI scores remained similar between the groups across all sittings.

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