

Comparative Study of Efficacy of Glycolic Acid Peel and Intense Pulsed Light in the Treatment of 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. Intense Pulsed Light (IPL) is a noncoherent, broad-spectrum light, ranging from 500 to 1200 nm. Intense Pulsed Light (IPL) treatment is a good option for patients with melasma. **Aims and Objective:** To compare the efficacy of glycolic acid peel and intense pulsed light in the treatment of melasma. **Setting:** Outpatient department of Dermatology, Venerology Leprology of a tertiary health care centre with an attached medical college. **Material and Methods:** 60 patients of melasma were recruited in the study. Patients were randomly allocated into two groups: one group (glycolic acid 50%) and another group (IPL) with 30 patients in each group. All the participants were subjected to undergo pre-peel programme of daily application of sunscreens (day time) and 0.025% retinoic acid at bed time for two weeks in GA peel group. Four peels were carried out at 2 weekly intervals. Four sessions of IPL were done at 3 weeks interval. MASI scoring and coloured photographs (without revealing identity) of each patient were taken before each peel and at the end of the follow-up period i.e. 2 weeks after 4th sitting in GA peel group and 3 weeks after 4th sitting in IPL group. Side effects, if any, were also recorded. **Statistical Analysis Used:** SYSTAT version-12. **Results:** In both the groups there was constant decrease in MASI scores after each sitting 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 statistically significant difference ($p < 0.05$). Local reactions, such as burning sensation and erythema during the peel were not significant with both the groups. **Conclusions:** Glycolic Acid (GA) peel (50%) is more efficacious & safe treatment modality in melasma compared to IPL.

Keywords: Glycolic Peel, Intense Pulse Light, Melasma

1. Introduction

Melasma is an acquired, circumscribed, pigmentary disorder characterized by more or less symmetrically

distributed, medium to dark brown macules with defined geographic borders affecting the sun exposed areas, particularly the forehead, cheeks, temples and upper lip¹.

Melasma is a common skin condition among

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darker individuals including Indians and relatively more frequently encountered in females¹. Multiple etiologic factors like high oestrogen states (pregnancy, oral contraceptives), genetic factors, cosmetics and autoimmune thyroid disease have been implicated in the etiopathogenesis of melasma. Sunlight exposure appears to be essential for the development of melasma².

Many modalities of treatment are available, but none is satisfactory³.

Conventional therapy for melasma consists of keratolytic (tretinoin, resorcinol and glycolic acid in low concentrations, etc.) and depigmenting agents (hydroquinone, kojic and azelaic acids, etc). Modern modalities include chemical peels such as salicylic acid, trichloroacetic acid, glycolic acid, pyruvic acid, lactic acid, phenol, etc. potentiate the effect of the depigmenting agents and reduce significantly the Melasma Area and Severity Index (MASI) score².

Chemical peels have become a popular method for treating melasma³. Superficial and medium depth chemical peels, especially glycolic acid, have been found to be effective in melasma².

Intense Pulsed Light (IPL) is a non-coherent, broad-spectrum light, ranging from 500 to 1200 nm. Intense Pulsed Light (IPL) treatment is a good option for patients with melasma. Adverse actions of IPL are minimal and acceptable^{4,5}.

Since there are very few studies done on melasma in this area and considering the high prevalence of melasma among people with Indian skin type there is a need to study treatment modalities of melasma. So, we decided to study and compare the efficacy of glycolic acid peel and intense pulsed light in the treatment of melasma.

2. Aims and Objectives

1. To study the efficacy of Glycolic acid peel in treatment of melasma.
2. To study the efficacy of intense pulse light in treatment of melasma.
3. To compare the efficacy of Glycolic acid peel and intense pulse light in treatment of melasma.

3. Setting

The study was undertaken in the outpatient department of Dermatology Venerology and Leprology of a tertiary health care centre with an attached medical college after approval from the institutional ethics committee.

4. Materials and Methods

The present prospective comparative interventional study was carried out in department of dermatology of a tertiary health care institute. A total of 71 patients of melasma of either sex were included in the study during the period from August 2011 to Dec 2013. Among them, 11 patients didn't complete the study (5 patients in GA peel and 6 patients in IPL group). They were excluded from the study. Approval of institutional ethical committee was taken. A written informed consent of each patient was taken.

4.1 Patient Selection

4.1.1 Inclusion Criteria

1. Patients with clinical diagnosis of melasma who have not taken any treatment for the same for last one month
2. Patients in age group between 18-64 years
3. Patients willing to participate in the study and ready to sign the informed consent form

4.1.2 Exclusion Criteria

1. Pregnant and lactating women
2. Women on hormonal contraceptives or on hormone replacement therapy
3. Females of child bearing age who are not ready to use prescribed non hormonal contraception during treatment
4. Patients receiving other modalities of treatment of melasma in topical form
5. Patients with tendency to develop keloids and post-inflammatory hyperpigmentation
6. Patients who have hypersensitivity to peeling agent
7. Patients receiving photosensitizing drugs
8. Patients having active bacterial, fungal or viral infections
9. Patients having history of recurrent herpes simplex infection on the face

4.2 Treatment Modalities

1. 50% glycolic acid peel was used in one group of 30 patients of present study
2. Intense Pulse Light equipped with pigment filter which emits light between 560nm-1200nm was used in another group of 30 patients of the present study

4.3 Method

Eligible patients with melasma were allotted to the two study groups alternatively.

50% glycolic acid peel was used in one group of 30 patients. An Intense Pulsed Light device (Dermaindia) equipped with pigment filter which emits light between 560nm-1200nm was used in another group of 30 patients.

Intervention

Group 1

Glycolic acid peeling was done as per procedure described below:

Pre-treatment priming with 0.025% tretinoin cream was started and test peel was done behind the ear on day 1. Priming was done for 2 weeks. Patient was examined after 7 days to see the tolerance of the test peel. He/she was enrolled in the study unless patient had any untoward effect either to test peel or priming agent. Peeling procedure initiated after 2 weeks of priming. Peeling procedure was as follows:

Patient was asked to wash the face with plain water. Using 2" x 2" gauze pieces, skin was cleaned with alcohol and then degreased with acetone. Sensitive areas like inner canthus of eye, nasolabial folds. Angles of mouth were protected with Vaseline. Eye padding was done with wet gauze pieces. The timer was started and peeling agent, glycolic acid 50% was applied with cotton tipped applicator on the face. The peeling agent was kept till erythema appeared. The peel was neutralized with sodium bicarbonate solution. Skin was gently dried with gauze and patient was asked to wash face with cold water. The patient was asked to apply sunscreen. After 20 mins, patient was allowed to go home. Such 4 sittings of glycolic acid peeling were done at 2 weeks interval. Results were assessed at the end of the each sitting with MASI (melasma area and severity index) score and subjective improvement and objective improvement before and at the completion of study. The final result was compiled 2 weeks after 4th sitting.

Group 2

Intense pulsed light was given as per procedure described below: Patients were given test shot behind the ear on day 1. Patient was called after 7 days to see the tolerance of test shot. He/she was enrolled in the study unless there was any untoward effect of test shot.

Patients were treated with a light emission apparatus of intense pulsed light family (Dermaindia) during 4 sessions at 3 weeks interval. 560nm-1200nm filter was used for the study. Using colourless gel, intense pulsed light shots were given. Fluence was modulated in relation to anatomic area: energy levels of 12-14 J/cm² were used

to treat cheek & zygoma, 10-12 J/cm² for the forehead, and lower levels 7-8 J/cm² were reserved for the perioral region and neck.

5. Evaluation

Patient was assessed at the end of the each sitting with MASI Score. The MASI is calculated based on the Area (A) of involvement, the Darkness (D) of melasma, and the Homogeneity (H) of the hyperpigmentation. The right forehead (rf), right malar region (rm), and right chin (rc) correspond to 15%, 30%, and 5% of the total face, respectively. The same regions were measured on the left side, giving a total facial surface area of 100%. The area of involvement in each of these 6 areas is given a numerical value of 0 to 6 (0 indicates no involvement; 1, 0%-9%; 2, 10%-29%; 3, 30%-49%; 4, 50%-69%; 5, 70%-89%; and 6, 90%-100%). The severity of melasma is also determined by measuring 2 additional variables: Darkness (D) and Homogeneity (H), rated on a scale from 1 to 4 (0 indicates absent; 1, slight; 2, mild; 3, marked; and 4, maximum). The MASI score was calculated by adding the sum of the severity ratings for darkness and homogeneity, multiplied by the value of the area of involvement, for each of the 6 facial areas. The values for each side are then totaled; for example, MASI right = 0.15 [D(rf)+H(rf)] A(rf)+0.3 [D(rm)+H(rm)] A(rm)+0.05 [D(rc) +H(rc)] A(rc). The score for each side is 0 to 24. Subjective improvement as reported by patients were evaluated as mild, moderate, good and very good. Objective improvement as reported by dermatologists were evaluated as mild, moderate, good and very good.

Statistical Analysis:

Statistical analysis was done using SYSTAT version 12

6. Results

Table 1. Age wise distribution in treatment of melasma in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Age in years	GA Peel No. (%)	IPL No. (%)	TOTAL No. (%)
<25	14	8	22
25-29	8	16	24
30-35	5	2	7
>35	3	4	7
TOTAL	30	30	60

Table 2. Sex wise distribution in treatment of melasma in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Gender	GA Peel No. (%)	IPL No. (%)	TOTAL No. (%)
Male	3	7	10
Female	27	23	50
Total	30	30	

Mean ±SD in GA peel group was 28.77±6.47, 28.48±5.89 in IPL group

Table 3. Duration of Melasma in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Duration of melasma (in months)	Glycolic Acid peel (GA) (n=30)	Intense Pulsed Light (IPL) (n=30)
	No. (%)	No. (%)
0-12 months	9(30%)	8(26.66%)
12-24 months	0	4(13.33%)
24-36 months	0	10(33.33%)
36-48 months	3(10%)	1(3.33%)
48-60 months	6(20%)	2(6.66%)
>60 months	12(40%)	5(16.66%)
Total	30	30
Mean ± SD (months)	58.73 ± 42.23	45.50 ± 38.53

Table 4. Comparison of various etiological factors associated with Melasma in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Factors	Glycolic Acid peel (GA) (n=30)	Intense Pulsed Light (IPL) (n=30)	Total
	No. Patient (%)	No. Patient (%)	No. Patient (%)
	Family history of melasma	26(86.66%)	27(90%)
Aggravation of lesions sun exposure	23(76.66%)	29(96.66%)	52 (86.67%)

Table 5. Comparison of various clinical types of Melasma in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Type	Glycolic Acid peel (GA)(n=30)	Intense Pulsed Light (IPL) (n=30)	TOTAL
	No. of patient (%)	No. of patient (%)	No. of patient (%)
Malar type	19(63.33%)	17(56.66%)	36 (60%)
Mandibular type	3(10%)	2(6.66%)	5(8.33%)
Centro facial type	9(30%)	11(36.66%)	20 (33.33%)

Table 6. Comparison of various types of Melasma on Wood's lamp examination in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Type	Glycolic Acid peel (GA)(n=30)	Intense Pulsed Light (IPL) (n=30)	TOTAL
	No. of patient (%)	No. of patient (%)	No. of patient (%)
Epidermal melasma	11(36.66%)	11(36.66%)	22 (36.67%)
Dermal melasma	10(33.33%)	12(40%)	22 (36.67%)
Mixed melasma	9(30%)	7(23.33%)	16 (26.67%)

Table 7. Comparison of mean values of MASI at before treatment, after each sitting and after treatment in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

MASI Score	Glycolic Acid peel (GA)(n=30)	Intense Pulsed Light (IPL) (n=30)	Unpaired 't' test value	'p' value and significance
	Mean ± SD	Mean ± SD		
Before treatment	9.90±5.53	12.07±3.67	1.79	p>0.05, not significant
After 1st sitting	8.22±4.91	11.21±3.16	2.81	p<0.01, highly significant

	Glycolic Acid peel (GA)		Intense Pulsed Light (IPL)		Total	
	No. of females	Percentage (%)	No. of females	Percentage (%)	No. of females	Percentage (%)
OC pills	4	14.82%	7	30.43%	11	22%
Pregnancy association	6	22.22%	7	30.43%	13	26%

After 2nd sitting	7.30±4.45	10.47±3.08	3.21	p<0.01, highly significant
After 3rd sitting	6.25±3.95	10.14±3.61	3.98	p<0.01, highly significant
After treatment	5.95±4.32	9.58±3.28	3.67	p<0.01, highly significant

At baseline no there was no significant difference in severity of melasma according to MASI SCORE. At every consequent follow up however there was significant difference in MASI score, mean values of MASI were greater in IPL group.

Table 8. Comparison of mean values of MASI at before treatment, after treatment in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

MASI Score	Before t/t	After t/t	paired t test value	P value
GA Peel	9.90±5.53	5.95±4.32	4.39	p<0.01, highly significant
IPL	12.07±3.67	9.58±3.28,	3.92	p<0.01, highly significant

Table 9. Comparison of mean values of MASI at after treatment in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

GA Peel After t/t MASI value	IPL After t/t MASI value	Unpaired t test value	P value
5.95±4.32	9.58±3.28,	3.67	0.0015, highly significant

Table 10. Subjective response to treatment in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Subjective Response	Glycolic Acid peel (GA)	Intense Pulsed Light (IPL)
	No. (%)	No. (%)
Very good (>75%)	4(13.33%)	2(6.66%)
Good (51-75%)	10(33.33%)	5(16.66%)

Moderate (26-50%)	7(23.33%)	13(43.33%)
Mild (<25%)	9(30%)	10(33.33%)
Total	30	30

Value of $\chi^2 = 12.33$ d.f. =3, significant, p<0.05

Table 11. Comparison of various side effects associated with Melasma in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Subjective Response	Glycolic Acid peel (GA) (n=30)	Intense Pulsed Light (IPL) (n=30)
	No. (%)	No. (%)
Burning	2(6.66%)	1(3.33%)
Dryness	2(6.66%)	1(3.33%)
Erythema (persistent)	1(3.33%)	2(6.66%)
No side effects	23(76.67%)	26(85.66%)
Post-Inflammatory Hyperpigmentation (PIH)	2(6.66%)	0

Value of $\chi^2 = 3.184$, d.f. =4, not significant, p>0.05

Side effects like burning, dryness and Post-Inflammatory Hyperpigmentation (PIH) were observed in 2 patients each in GA peel group and erythema observed in one patient from GA peel group and 2 patients of IPL. In IPL group, burning and dryness is noted in 1 patient each. By applying Chi-square test there is no significant association between side effects of melasma in GA peel and IPL (i.e. p>0.05) (Table 8). So, side effects were well tolerated in both the treatment groups.

Table 12. Objective improvement in Glycolic Acid peel (GA) and Intense Pulsed Light (IPL)

Objective improvement	Glycolic Acid peel (GA)	Intense Pulsed Light (IPL)
	No. (%)	No. (%)
Very good (>75%)	6(20%)	4(13.33%)
Good (51-75%)	13(43.33%)	6(20%)
Moderate (26-50%)	5(16.66%)	9(30%)
Mild (<25%)	6(20%)	11(36.66%)
Total	30	30

Value of $\chi^2 = 5.60$ d.f. =3, significant, p<0.05.

There were 19 patients on GA peel who responded as more than 50% of clearance of lesion, when objective

assessment was carried out. In IPL group, 20 patients responded less than or up to or 50% of clearance. By applying Chi-square test there is a significant association between objective improvement of melasma in GA and IPL (i.e. $p < 0.05$). After applying Z test of difference between two proportions, the proportion of very good response is significantly higher in Glycolic Acid peel (GA) than in Intense Pulsed Light (IPL) (i.e. $p < 0.01$).

7. Discussion

Melasma is an acquired increased pigmentation of the skin. The clinical features are according to the region of involvement. The clinical types of melasma are centrofacial, malar & mandibular. Facial appearance plays a large role in self-perception and interaction with others and severe facial blemishes like melasma leave a significant impact on person's quality of life⁶. The disease is associated with higher incidence of depression, social deprivation and low self esteem. Melasma is a disease that mainly affects females of reproductive age group (Table 1,2).

Melasma poses a great challenge as its treatment is unsatisfactory and recurrence is high. Conventional treatment for melasma includes elimination of any possible causative factors coupled with use of a sunscreen and hypopigmenting agent, often in combination with other therapies, such as tretinoin, topical corticosteroids, or superficial peeling agents like glycolic acid peel⁷⁻¹². Various treatment modalities are available with varied benefits and side effects. Therapy can be difficult due to melanin depth. Treatment is easier if melanin is epidermal and much more difficult if it is located in the dermis. We know that dermal pigment originates from the epidermis. Therefore, if we inhibit epidermal melanogenesis for a sufficiently long period of time, dermal melanin cannot be replaced and melasma may slowly evolve toward healing¹³. Glycolic acid peel in different strengths has been tried as an effective treatment for melasma. Among various light based therapies, IPL therapy is proven to be effective, but there are very less studies mentioning its comparison with glycolic acid peel. In present study we compared the efficacy of IPL with efficacy of glycolic acid peel in patients of melasma. We used both treatment modalities in newly diagnosed patients of melasma.

Age of Patients in this study ranged from 20-46 with mean age 29 years which was less as compared to 33.45, which, Arun Achar et al.¹⁴ reported in his study. One study from Singapore reported mean age 42.3 years¹⁵. Late marriage can be a factor for different values of the present study from the above studies.

Female to male ratio was found to be 5:1 which is higher compared to 4:1 reported in Arun Achar et al.¹⁴ study of clinico-epidemiology. In present study 16 % of participants were men as compared to 10% in Katasambas et al.¹⁶ study. Arun Achar et al.¹⁴ found 19% involvement of men in his study.

Female predominance was noted in the disease. There may be role of hormones supporting this finding¹⁷. Clinical evidence suggests that oestrogen can trigger melasma. Melasma is more common in women, and its occurrence has been reported in association with pregnancy and the use of oral contraceptives^{18,19}. In addition, one study previously showed an increased expression of Estrogen Receptors (ER) in female melasma-affected skin¹⁹. These findings suggested that sex hormones such as oestrogen and progesterone are associated with the origin and pathogenesis of melasma. Estrogens mediate their activity by interaction and activation of specific intracellular receptor proteins, the ERs²⁰. To date, two distinct intracellular ERs (ER-a and ER-b) have been identified that belong to the super family of nuclear hormone receptors²¹. Among them, ER-b is the predominant ER type in melanocytic lesions²². These findings suggest that oestrogen and oestrogen-like ligands interacting with ER-b receptors may play an important role in melanocytes physiology and pathophysiology^{23,24}. But, in our study, we didn't find higher percentage of pregnancy or Oral Contraceptive Pills (OCP) association. So, this disparity might be because of the fact that females have more cosmetic concern so more cases visited to Outpatient Department (OPD) than males. This may be one of the reasons leading to outnumbering of females. Passeron et al.²⁵ review revealed that OC pills appear to have weak impact on the evolution of melasma. Moreover, the impact of the hormonal treatment is even weaker in case of family history of melasma. The results of Passeron et al.²⁵ are in concordance with our study. Approximately 10% of Caucasian patients with melasma, 26% of Indian patients with melasma, 4% of Korean patients with melasma, and 14.5% of Latino patients with melasma were men in the literature²⁶⁻²⁸.

Sun exposure was the strong aggravating factor in both the groups of patient (86.67% of total patients). Pathak's report also suggested sun exposure as trigger factor in 100% of patients²⁹. On the contrary, Arun Achar et al. found it only in 55.12% of patients¹⁴. Ultraviolet radiation induced pigmentation may be the additive factor in exacerbation of lesions. Ultraviolet radiation is playing major role in etiology of melasma in Indian patients.

Family history of melasma was present in 88.33% of patients (Table 3,4). Hereditary factor may play a role

in the causation of melasma. Positive family history of melasma is reported in several studies^{26,30-33}. Although genetic influence is suggested by a twin study, it is not generally accepted^{34,35}. Upregulation of many melanin biosynthesis related genes as well as melanocytes markers such as TYR, MITE, SILV and TYRP1 were found to be upregulated in melasma skin²⁵.

There were 70% of patients who were married in both the study groups in this study. Hassan Adalatkah et al.²⁸ found that 77% of melasma patients were married in their study. Married females have more chances of hormonal imbalances due to use of various hormonal contraceptives at some point of their lives. So, there is increased risk of development of melasma in married population especially in females.

We found a constant & significant decrease in the MASI scores at each visit compared to the baseline in both the groups of patients. At the completion of study there was significant difference in MASI reduction in glycolic acid peel group & Intense Pulsed Light (IPL). MASI reduction was significantly higher with GA peel group (from 9.9 ± 5.53 to 5.95 ± 4.32 ; $t: 4.39$; $p < 0.01$). GA peel treatment is more effective than IPL (since in GA peel MASI score is decreased by 66.38% and in IPL it is 25.99%).

So, GA peel is much more effective than IPL.

The side effects such as erythema, postinflammatory hyperpigmentation, burning sensation and dryness which have been seen in 11 (18%) patients in the present study has also been noted in the literature³⁶. Side effects were not significantly associated with t/t in both the study groups ($p > 0.05$).

After treatment, patients were asked to evaluate the discomfort from the two different procedures & asked to grade response to treatment. Response graded by patient at the completion of treatment as very good, good, moderate and mild. There was very good and good response (>50% improvement) observed in 23.33 % of patients in GA peel group. Good response was observed in only 12% of cases in Alka Dogra et al. study of comparing GA peel with TCA peel³⁷.

According to patients, compared to GA peel, the IPL treatment caused more discomfort, erythema and burning sensation during therapy. However, all patients tolerated the discomfort well throughout the full course of treatment in both the study groups. No scarring or hypo pigmentation occurred during and after the treatment. All patients could return to work and resume normal daily activity without downtime immediately after each sitting with both the groups.

Dermatologist not involved in the study examined

the patients and gave their judgments of the overall improvements of melasma based on the lesion colour, size, telangiectasia, and skin texture. Mild to very good was the grading of treatment response, given by the dermatologist. Dermatologist global evaluation results showed that 19 (63.33%) patients had >50% improvement in the GA group and 20 (66.67%) patients were thought to have <50% improvement in the IPL compared with baseline photographs. The objective assessment also concluded that GA peel is more efficacious treatment.

7.1 Group I: Glycolic Acid Peel (GA)

Average Duration of melasma in GA peel group was 4.8 years. Hurley et al.³⁸ found average duration of melasma of 11 years (range, 2-26 years) in his study. Arun Achar et al.⁹ noted mean age of onset of melasma as 29.99 years with youngest and oldest being 11 and 49 years in 312 patients. In the same study they observed that patient mostly seek treatment for the disease after 3.5 years of its onset. In our study, 40% patients were having its onset for more than 5 years with highest being 12 years of disease. Average duration of melasma was significantly more in GA peel group compared to IPL group in the present study. So, long duration of melasma can be better treated with GA peel.

Malar type of melasma was found to be the most common (63.33%) followed by centro-facial (30%) and mandibular type which was the least common (10%) in this group. Hurley et al.³⁸ study showed malar type contributing to 72% followed by centropacial (28%) and no case of Mandibular type. In Hurley et al.³⁸ study, epidermal melasma was observed in 89% of cases and mixed in 11% of cases. In our study, mixed melasma was found in 30% cases while dermal in 33.33% of cases. Almost equal distribution of patients we obtained in each type of melasma on Wood's lamp examination in our study.

MASI reduction was significant with GA peel group (from 9.9 to 5.95) compared to the IPL group.

Comparison of our study group of GA peel with various other studies of chemical peeling using glycolic acid peel:

In the present study

Total 4 peels of glycolic acid 50%, in 2 weeks interval for 30 cases, there was > 50% in 63.33 % patients with reduction of 66.38% in MASI score (Table 5,6,7,8,9).

In study done by Javaheri et al.³⁹ total 3 peels, glycolic acid 50% in 3 weeks interval for 23 cases, there was > 50%

in 60% patients with reduction of 47% in MASI score.

In study done by Kalla et al.⁴⁰ total 7 peels, glycolic acid 55-70% in 2 weeks interval for 68 cases, there was > 50% in 54% patients.

In study done by Grover et al.⁴¹ total 8 peels, glycolic acid 10-3-% in 2 weeks interval for 15 cases, there was > 50% in 90% patients.

In study done by Sarkar et al.⁴² total 6 peels, glycolic acid 30-40% in 3 weeks interval for 20 cases there was > 80% in 60% patients with reduction of 46% in MASI score.

Present study results of objective assessment were in concordance with Javaheri et al. study³⁹.

The use of alpha hydroxy acids, particularly glycolic acid, has expanded dramatically during the past decade for the treatment of skin disorders, including hyperpigmentation. Because of their relative safety profile compared with stronger agents such as trichloroacetic acid, glycolic acid peels are often used by dermatologists, plastic surgeons, aestheticians, and other skin care specialists. Indeed, because most of the world's population is brown or dark skinned, a great deal of effort and expense for the performance of peels is being dedicated to the treatment of disorders of hyperpigmentation, particularly melasma. In this study also same glycolic acid peel (50%) was found to be more effective.

Subjective assessment in this group showed that 70% patients were satisfied with the treatment.

7.2 Group II: Intense Pulsed Light (IPL)

Mean duration of melasma in IPL group was 45.5 months (3.8 years). The duration of melasma ranged from 6 months to 30 years (mean, 9.4 years), which is very high compared to this study, in Yuan-Hong Li et al. study conducted on Chinese patients⁴.

Malar type of melasma found to be the most common (56.66%) clinical type in IPL group. Zoccali et al.⁴³ also found same type to be most common in their study. This type was having significant association with t/t in the present study. Dermal melasma was found in 40% of patients in this group.

MASI score reduced from 12.07 to 9.58 in this group. Our study and Zoccali et al.⁴³ study concluded that IPL is an effective t/t in melasma (Table 10-12). By delivering an evenly distributed pulsed light with lower fluency levels, this modality provides a safer and an effective treatment of melasma in Asian populations.

Comparison of our study group with other studies with IPL in melasma:

Present study IPL filter 560-1200 nm was used on 30

patients with 4 sitting at an interval of 21 days with 6-14J/cm² fluence, 5-10 ms pulse, delay 10-20 ms results was on objective basis with excellent response in 75%, good in 50-75%, moderate in 25-50% poor in <25% with no side effects.

Study done by Zoccali et al.⁴³ IPL filter 550 nm was used on 38 patients with 5 sitting at an interval of 40-45 days with 6-14J/cm² fluence, 5-10 ms pulse, delay 10-20 ms results was on objective basis with excellent response in 80-100%, good in 60-79%, Fair in 40-59% poor in 39% with no side effects.

Study done by Wang et al.⁵, IPL + 4% HQ First session: 570nm

Rest: 590-615nm was used on 17 patients with 4 sitting at an interval of 30 days with 26-33J/cm² fluence, 5-10 ms pulse, delay 30-35 ms results was on objective basis with excellent responses in 76-100%, good in 51-75%, Fair in 26-50%, poor in 0-30% with no erythema and PIH in 2 patients.

Present study results of objective assessment were in concordance with Wang et al. study⁵. Subjective assessment by patient showed that maximum number of patients, 23(77%), rated treatment was effective with ≤50% improvement.

Many IPL devices are available in the market. The settings of each device are different. So, while assessing the results, this important point is to be considered. Most of the studies, which evaluated the efficacy of IPL, are carried out in different parts of the world. So, racial difference is another factor while comparing results of this therapy. More Indian studies are invited to know the efficacy of IPL in future.

Nonetheless, the findings of this study group are significant. However, before IPL or other flat-beam profile lasers can be considered as the standard of care for the treatment of melasma, further studies are necessary. In the present study GA peel was more effective treatment as compared to IPL therapy.

8. Recommendations

There are no sufficient studies comparing role of IPL as a therapy with standard treatments of melasma. Hence more studies are invited to prove the effectiveness of IPL on long term in Asian skin.

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