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Original Research Article

Comparative study of efficacy of glycolic acid (50%) peel and lactic acid (92%) peel in the treatment of melasma

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ABSTRACT

Background: Melasma is difficult to treat in Fitzpatrick skin type IV-VI and recurrence is a big problem.It causes emotional distress to the patient. There is paucity of controlled trials comparing efficacy of two chemical peels Glycolic acid (50%) Vs Lactic acid (92%) with Hydroquinone 2% cream in melasma treatment.Our goal was to determine efficacy and safety of these peels in melasma.
Methods: A total 50 newly diagnosed patients of melasma were included in the study, over a duration of 1 year in department of Skin and V.D, M.P. Shah Medical college, Guru Gobindsingh Government Hospital, Jamnagar. All patients were advised daily application of Hydroquinone (2%) cream at night for priming. Patients were divided into two groups.Group1 had 2 weekly lactic acid (LA) peel, while Group 2 had 2weekly Glycolic acid (GA) peel with standard application method. Overall severity was assessed via the pre and post treatment melasma area and severity index (MASI) score. Evaluation for clinical improvement was done by graded score.
Results: It was seen in study that at the end of 6 sittings, grade 4 improvement, that is reduction in MASI score by >60% was seen in 27.27% patients in GA peel while 22.72% in LA peel. Amongst the complication noted, in GA peel burning was most common (72.72%) followed by erythema (45.45%). In LA peel only 18.18% showed erythema.
Conclusions: Lactic acid peel has almost equal efficacy to Glycolic acid peel, but LA peel has much lesser side effects, leads to increasing the patient compliance, hence making it new peeling agent of choice for treatment of melasma.

Keywords: Melasma, Glycolic acid, Lactic acid, Chemical peels, MASI

INTRODUCTION

Melasma is a common pigmentary disorder that predominantly affects women of childbearing age, especially those of Asians and Hispanic origin.[1,2] It is characterized by symmetrical and confluent grey-brown patches mostly on areas of face exposed to sun, such as cheeks, forehead, nose and chin.[3] It accounts for 0.25 to 4% of the patients seen in Dermatology Clinics in South East Asia, and is the most common pigment disorder among Indians.[4,5] It is more commonly seen with darker skin type, particularly Fitzpatrick skin types III-VI.[6] Melasma results from hyperactivity of epidermal melanocytes. The reported risk factors include genetic predisposition, exposure to ultraviolet light, pregnancy, exogenous hormones, consumption of certain food items, ovarian tumors, intestinal parasitoses, use of cosmetics and photosensitizing drugs, procedures and inflammatory processes of the skin, and stressful events.[7-9] It also causes great psychological concern.[10,11] Recent studies have highlighted the role of chemical peeling as a new weapon in the therapeutic armamentarium.[12] Chemical

peeling is application of one or more exfoliating agents to the skin, resulting in controlled destruction of portion of epidermis and or dermis with subsequent regeneration of new epidermal and dermal tissue.[13] There is paucity of controlled trials showing effectiveness and safety of two different chemical peels in melasma which has prompted us to conduct this study to compare efficacy and to determine safety of glycolic acid (50%) vs lactic acid (92%) peels in melasma.

Objectives of our study were to study various epidemiological factors in etiopathogenesis of melasma and to study various clinical pattern of melasma, to evaluate efficacy, safety and adverse effects of glycolic acid (50%) and lactic acid (92%) peel in melsma.

METHODS

Study design

A randomized, open label, single blind, single centre, comparative study was done in 50 patients with facial melasma, for a period of 12 weeks. The recruitment period was August 2010 to July 2011 and the study was conducted at M.P. Shah Medical college, Guru Gobindsingh Government hospital, department of Dermatology, Jamnagar, Gujarat, India. Institutional Ethical committee approval was taken and written informed consent and consent for taking photograph was taken before beginning therapy for every patient.

Patient recruitment and study groups

Subjects with age more than 12 years with facial epidermal melasma and who had not taken prior topical treatment in last 6 months were enrolled in the study. Patients with dermal or mixed variety of melasma or with history of photosensitive dermatosis or who were on photosensitive medication, history of recurrent herpes labialis,pregnant and lactating mothers were excluded from study. At the first visit, the patients were divided randomly into two groups comprising 25 patients in each. Out of 25 patients 6 were lost to follow up. Detailed baseline history was taken with special emphasis on occupation, history of OC pills and any drug intake. Wood's lamp examination was done in every patient to determine depth of melanin pigmentation: contrast in epidermal pigmentation was increased while contrast in dermal pigmentation was decreased under wood's lamp illumination. Clinical pattern of melasma (centrofacial, malar, mandibular or mixed) was noted and baseline severity was assessed by calculating melasma area and severity index (MASI). The study groups were as follows-

- Group A: 25 patients: Glycolic acid 50% peel two weekly upto 12 weeks.
- Group B: 25 patients: Lactic acid 92% peel two weekly upto 12 weeks

All the patients in both groups were prescribed to apply topical Hydroquinone 2% cream two weeks prior to therapy for priming. Patients were asked to stop applying cream two weeks prior to 3 days after peeling. Test peel was carried out in all patients, a small 1-1/2 inch circular area in post auricular region and was evaluated after 48-72 hrs for redness or pruritus. Before each peel, face was cleansed with mild cleanser and degreased with pure acetone. Peel was applied with cotton swab to affected area and neutralized with 10-15% sodium bicarbonate in glycolic acid peel and with cold water in lactic acid peel. Duration of glycolic acid peel was started with 1 min with gradual increase of 30 seconds in each session upto maximum 5 minutes, while 30 minutes in lactic acid peel. Figure 3 has shown material we used while doing peeling procedure. Strict avoidance of UV light exposure was adviced and all patients were prescribed broad spectrum of sunscreen.

All patients were applied chemical peels two weekly upto 12 weeks and at every visit clinical photograph was taken and MASI score was calculated.

Qualitative assessment

Percentage of improvement= 100-(100*MASI at last sitting /MASI at first sitting).

Evaluation of patients were done using following grading score

- Grade 1 : 0-20% improvement
- Grade 2 : 21-40% improvement
- Grade 3 : 41-60% improvement
- Grade 4 : 61 and more % improvement

Statistical analysis was done by applying Yates' chi square test.

RESULTS

Out of total 50 patients 6 were lost to follow up, 3 patients from each group.

Out of total 50 patients, 48 were females and 2 were male.

Table 1: Age wise distribution.

Age in years	Total no of patients	Percentage (%)
12-20	4	9.10
21-30	12	27.27
31-40	22	50
41-50	6	13.63
Total	44	100

Most common age group affected was 21-30 years (27.27%). The youngest patient was of 16 year old and oldest was of 46 year of age.

Table 2: Marital status.

Marital status	No. of patients	Percentage (%)
Married	39	88.64
Unmarried	5	11.36
Total	44	100

Majority of our patients with melasma were married (88.64%).

Table 3: Various clinical pattern of Melasma.

Pattern	No. of patients	Percentage (%)
Malar	26	59.09
Centrofacial	15	34.10
Mandibular	3	6.81
Total	44	100

Malar was most common pattern (59.09%) observed in our study followed by centrofacial (34.10%). Least common type of melasma was of mandibular type (6.81).

Table 4: Aggravating factors.

Cause	No. of patients	Percentage (%)
Pregnancy	16	36.36
Sunlight	15	34.09
O.C pills	10	22.72

Pregnancy and OC pills were common aggravating factors in melasma indicates high estrogen and progesterone level have been implicated in causing melasma.

Table 5: MASI score in group A (after glycolic acid peel) (n=22).

Group	MASI score	Pre-treatment no of patients	Post-treatment no of patients
1	0-5	0	14
2	6-10	6	7
3	11-15	11	1
4	16-20	5	0
5	21-25	0	0

More than 50% patients were belonged to pre-treatment group 3 and 4 of glycolic acid peel while after treatment they improved to group 1 with reduction in MASI.

Most of the pre-treatment patients were in group 2 and 3 came into group 1 after Lactic acid peel with significant reduction in MASI.

MASI score was calculated at 1st and 6th session. Mean and SD of MASI were obtained. Difference in pre and post treatment MASI score was found to be statistically significant.

Table 6: MASI score in Group B (after lactic acid peel) .

Group	MASI score	Pre-treatment no of patients	Post-treatment no of patients
1	0-5	0	12
2	6-10	9	10
3	11-15	8	0
4	16-20	3	0
5	21-25	2	0

Table 7: Comparision of pre-treatment and post-treatment MASI in both groups.

	Pre-treatment MASI Mean±SD	Post-treatment MASI	Paired T test
Glycolic acid peel	12.56±4.87	5.94±2.2	T value = (-11.84) P≤0.0001
Lactic acid peel	12.15±4.42	5.11±2.08	T value = (-8.39) P≤0.0001

Table 8: Improvement at the end of 12 weeks (6th sitting).

Grade of improvement	Peeling Agent	
	Glycolic acid (Group A) (n=22)	Lactic acid (Group B) (n=22)
	N ()	N ()
1	0	3 (13.63)
2	3 (13.63)	3 (13.63)
3	13 (59.09)	11 (50)
4	6 (27.27)	5 (22.72)

Yates'Chi squared value 1.542

Table 9: Comparison of various side effects associated with melasma in group A (GA peel) and group B (LA peel).

Side effects	No. of patients in Group A (Glycolic acid peel)	No. of patients in Group B (Lactic acid peel)
	N (%)	N (%)
Burning	16 (72.72)	3 (13.63)
Erythema	10 (45.45)	4 (18.18)
Crusting	3 (13.63)	0
Milia	2 (9.09)	0
Post inflammatory hyperpigmentation	2 (9.09)	0
Herpes labialis	13(4.54)	0

Degree of freedom =3, p>0.05, showed that improvement in both groups was not significant statistically.

Yates' Chi squared value for burning was 13.339, p value <0.005 which was highly significant statistically, while Yates' Chi square for erythema was 2.619 with p value >0.05 which was not statistically significant.

Figure 1: Glycolic acid peel results.

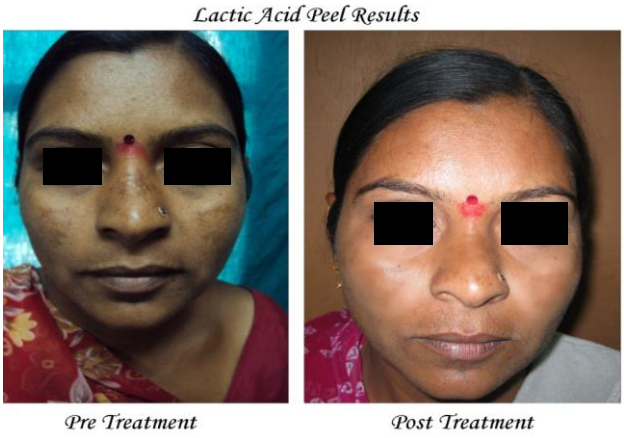

Figure 2: Lactic acid peel results.

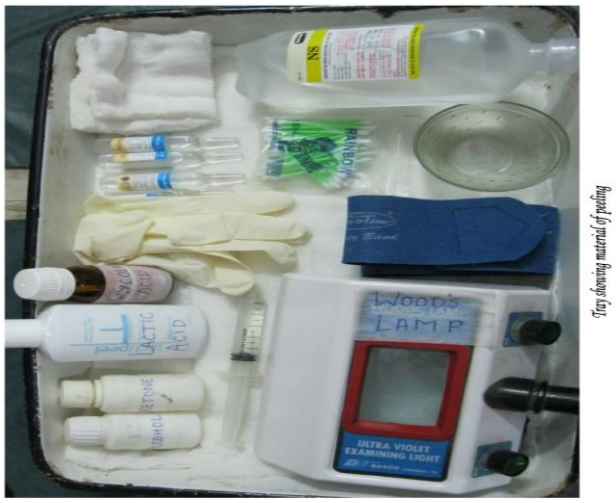

Figure 3: Tray showing material of peeling.

DISCUSSION

Out of total 44 patients 50% (22 patients) were seen in 31-40 years age group. Youngest patient was of 16 year old and oldest was of 45 years old. Female preponderance was noticed in our study (96%), this sex incidence was comparable with Sharquie et al observation of female preponderance.[14] Female predominance was noted in the disease. There is role of hormones supporting this finding.[15]

In our study 88.64% patients were married and 11.36% were unmarried as married women had more risk factors like pregnancy and use of O.C pills specially estrogen containing or combine pills. Clinical evidence suggests that oestrogen can trigger melasma. one study previously showed an increased expression of Estrogen Receptors (ER) in female melasma-affected skin.[16] 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 ERs.[17] To date, two distinct intracellular ERs (ER-a and ER-b) have been identified that belong to the super family of nuclear hormone receptors.[18] Among them, ER-b is the predominant ER type in melanocytic lesions.[19] These findings suggest that oestrogen and oestrogen-like ligands interacting with ER-b receptors may play an important role in melanocytes physiology and pathophysiology.[20,21] History of O.C pills intake was positive in 22.72% of patients in our study, while in Katsambas et al, 6.3% had prior history of O.C pills intake.[22] In our study 36.36% patients developed melasma after pregnancy while in Katsambas et al showed 27% melasma developed after pregnancy.[22]

Sun exposure was the strong aggravating factor in both the groups of patient (34.09% of total patients). Pathak's report also suggested sun exposure as trigger factor in 100% of patients.[23]

Commonest pattern of melasma was of malar type and least common was of mandibular type 6.81%. These findings matches with Rashmi et al.[24] According to Katambas et al centrofacial variety was most common followed by malar.[22]

Hereditary factor may play a role in the causation of melasma. Positive family history of melasma is reported in several studies.[25-27] Upregulation of many melanin biosynthesis related genes as well as melanocytes markers such as TYR, MITF, SILV and TYRP1 were found to be upregulated in melasma skin.[28] Positive Family history of melasma was present in only 4.54% of patients in our study.

We found constant and 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 and Lactic acid peel group. Table 5 showed that more than 50% patients belonged to pre-treatment group 3 and 4 of glycolic acid peel while after treatment these patients improved to group 1. More than 60% of patients showed reduction of MASI score upto 5 or less that reflects very good effectiveness of treatment. Table 6 showed that most of the pre-treatment patients of lactic acid peel were belonged to group 2 and 3, while after 6 sittings of lactic acid peel, maximum number of patients came under group 1.

Table 8 shows that, at the end of 12 weeks, maximum number of patients 59.09% of group A (Glycolic acid peel) showed grade 3 improvement and 27.27% patients showed grade 4 improvement, while in group B(lactic acid peel) 50% patients showed grade 3 improvement and 22.72% showed grade 4 improvement. After statistical analysis p value was more than 0.05 which was statistically not significant, Thus lactic acid was almost equally efficacious to glycolic acid peel. Figure 1 and 2 shows pre and post peel improvement in group A(Glycolic acid peel) and in group B (Lactic acid peel) respectively.

Side effects such as burning and erythema was seen in both treatment groups, while crusting, milia, post inflammatory hyperpigmentation and herpes labialis was found only in group A (glycolic acid peel). Burning was more commonly seen with group A (glycolic acid peel) in 72.72% of patients than in patients of group B with 13.63% of patients with p value of less than 0.05% which showed statistically significant value. The findings of minimal side effects of lactic acid matches with study done by Sharquie et at.[14]

CONCLUSION

Lactic acid peel has almost equal efficacy to Glycolic acid peel, but Lactic Acid peel has much lesser side effects, leads to increasing the patient compliance, hence making it new peeling agent of choice for treatment of melasma.

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