Original Article

Superficial chemical peeling with glycolic acid in melasma

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Abstract

Background Melasma is an acquired hyperpigmentation of exposed parts of face and neck, for which various treatment options are available. Chemical peeling is an established treatment modality for melasma.

Objective The aim of this study was to assess the safety and efficacy of glycolic acid peel in our patients with melasma where the predominant Fitzpatrick skin type is IV and V.

Patients & methods A prospective therapeutic trial was carried out in the Department of Dermatology, Mayo Hospital Lahore Pakistan from May 1999 to February 2000.Twenty adult females (age range 18-38 years) with melasma (epidermal n=15, mixed n=3, dermal n=2) were enrolled. Trial was conducted as a series of six fortnightly hospital-based peeling sessions with increasing concentration of glycolic acid (20%-50%), and nightly application of tretinoin, 5% glycolic acid and 2% hydroquinone. Patients were followed up for a period of two months after completion of treatment.

Results The mean pre-peel and post-peel melasma area and severity index (MASI) scores were 16.56 and 3.8 respectively, showing a significant reduction of about 75% ($p< 0.05$). Among the two clinical patterns seen in our patients, malar distribution responded better as compared to the centrofacial. Mild and reversible complications noted were erythema (90%), peeling (70%), crusting (55%), post-inflammatory hyperpigmentation (20%) and moist maceration (10%).

Conclusion Superficial chemical peeling with glycolic acid is safe and effective treatment modality for melasma in our population.

Key Words
Chemical peeling, melasma, glycolic acid.

Introduction

Melasma is a common, acquired hyperpigmentation of the sun-exposed areas of the face and neck, characterized by light brown to grey-brown macules and patches. Multiple factors implicated in its pathogenesis includes genetic influences, exposure to ultraviolet radiation, pregnancy, thyroid dysfunction, cosmetics and drugs, which include oral contraceptives, phototoxic and anti-seizure medicines. Melasma affects all racial groups, predominantly females, but is the most prevalent in dark-complexioned individuals (skin types IV-VI), especially who live in areas of intense UV radiation.[1] Exact incidence of melasma in Pakistan is not known. However, in 1999, 2.5% of 71,000

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new patients seen at our outdoor presented with this problem.

Melasma does not cause physical limitation or severe morbidity but it has a significant psychological impact on the patient and has been likened to "mask of stress". It leads to loss of confidence, adds to stress and economic burden, sometimes comparable to other major illnesses requiring hospitalization.

Treatment of melasma has always been a challenge for the physician. Current therapeutic modalities, although effective for most of the patients, remain ineffective for the others. The task of the physician is to choose the most appropriate therapy, keeping in mind the risk benefit ratio of each treatment modality.

Chemical peeling has become an established technique for the treatment of melasma. All levels of peels have been tried in melasma and practically every known chemical-peeling agent has been used. Most commonly used agents include, buffered and unbuffered phenols, trichloroacetic acid, resorcinol paste and alpha-hydroxy acids (AHA).[2-5] The most popular agent among the AHAs is glycolic acid (GA), the smallest AHA occurring naturally in sugar cane.

This study was designed to assess the safety and efficacy of chemical peeling in melasma in our patients. Glycolic acid was used for this purpose, as it is safe even in deeply pigmented skin.

Patients and methods

Twenty adult patients with melasma (epidermal, dermal or mixed), of either sex, and any age group, who presented to Dermatology Department, Mayo Hospital, Lahore, were enrolled in the study. Patients who were pregnant, nursing or on hormonal replacement therapy, oral contraceptives or retinoids were excluded from the study. So, were the patients who had history of recurrent herpes simplex. After taking informed consent, patient's bio-data, brief history and relevant examination findings were recorded on a printed pro forma. On the basis of clinical pattern each patient was classified into centrofacial, mandibular or malar type. Depth of the lesions was gauged by Wood's light examination' and each patient assigned to epidermal, dermal or mixed type. Severity of melasma was assessed by MASI score, a scoring system, similar to that used for psoriasis, devised to quantify its severity.

Test peel was performed with 20% GA on a small area retroauricularly. GA was applied with a gauze piece and left for 5 minutes after which it was neutralized with saline soaked gauze. Skin reaction was noted immediately and again after two weeks. After the test peel, for the next two weeks the patient was advised topical nightly application of tretinoin and sunscreen during the day as a prepeel preparation.

On the day of peel, the patient was asked to wash his/her face with soap and water. Face was dried and then thoroughly degreased with acetone. GA was applied with a small sterile gauze piece. First application was on the whole of the face and a second

application was done on the hyperpigmented areas. Acid was left on the face of the patient for 5 minutes. However, if the patient felt any undue irritation, burning or pain, it was removed earlier. A fan directed towards the face alleviated mild stinging and irritation. After 5 minutes, GA was neutralized with normal saline. Topical antibiotic and mild potency steroid preparation in an ointment base was applied to the face. Patient was advised to apply the ointment for at least two days or until erythema and crusting had settled. After this, patient resumed nightly application of tretinoin, this time combined with 5% GA and 2% hydroquinone cream, and sunscreen during the day. For at least two days immediately after the peel, the patient was advised to totally avoid sun exposure. Skin response during peeling, 2-3 days after peeling and then after two weeks, before the next peel, was observed and noted on the pro forma.

Peels were repeated fortnightly. Series of six peels were performed. Concentration of GA was gradually increased. First, second and third sittings were with 20%, 30% and 40% respectively. The last three peels were performed with 50% GA. The pH of GA ranged from 2.85 to 1.56. MASI score was reassessed at the end of six peels. Photographs were taken before and after treatment. Patients were followed up for a period of two months after completion of six peels. Paired student t test and Fisher's exact test were used to compare the pre- and postpeel MASI score and to compare response in different subtypes of melasma. A *p* value of less than 5% was considered significant.

Results

Twenty female patients completed the six fortnightly peeling sessions. The age range of the patients included in the study was 18-38 years. Average age at onset of melasma was 20.9 years and the mean duration of melasma was 4.2 years. All patients were Asians with skin types IV and V (n=11 and 9, respectively). Eight patients (40%) had history of melasma in at least one close family member. Six patients in the group were married and out of them 4 patients correlated melasma with pregnancy. None of the patients had used oral contraceptives or any other hormonal replacement therapy. No patient correlated the occurrence of melasma with the use of cosmetics.

Before entry into the study, 5 patients had used hydroquinone, 8 patients had tried different cosmetic remedies, while 7 patients had had no treatment for their melasma. All patients had history of minimum to moderate exposure to sunlight, only one patient had used topical sunscreen regularly before entering into the study. Clinically patients had either centrofacial (n=13, 65%) or malar (n=7, 35%) distribution of melasma. On Wood's light examination, 15 patients (75%) had epidermal, 3 patients (15%) had dermal and 2 patients (10%) had mixed variety of melasma.

At baseline, the MASI score ranged from 5.6 to 27.6 (mean 16.56). After completion of series of 6 superficial chemical peels with increasing concentration of GA, it was seen that there was moderate to marked improvement in majority of the patients. The mean MASI score after treatment was 3.8, this represents a 75% decrease in the

Table 1 Comparison of MASI score values in different types of melasma

No.	*Type of melasma*	*Clinical pattern*	*Fitzpatrick skin type*	*Pre-peel MASI score*	*Post-peel MASI score*	*Follow-up score*
1	Epidermal	Malar	V	12	2.4	2.6
2	"	Centrofacial	IV	15.5	4.2	4.2
3	"	Malar	IV	13.5	4.3	4.8
4	"	Centrofacial	IV	20.3	5.8	6
5	"	"	IV	5.6	1.2	1.2
6	"	"	V	20.1	6	5.8
7	"	Malar	V	21.4	3.6	4.2
8	"	Centrofacial	IV	7.6	3.8	3.8
9	"	"	V	9.9	1.9	2.4
10	"	"	1V	10.1	1.6	1.8
11	"	Malar	IV	18.4	2.4	2.2
12	"	"	1V	13.8	1.8	1.2
13	"	"	IV	18.9	2.4	1.8
14	"	Centrofacial	V	20.1	2.9	2.8
1 5	"	Malar	IV	17.7	2.1	2.4
16	Dermal	Centrofacial	IV	17	6	7.4
17	"	"	V	19	5.6	6
18	"	"	V	26.8	7.2	8.6
19	Mixed	"	V	27.6	7.6	8.6
20	"	"	V	15.9	4.3	7.2

Table 2 Postpeel complications (n=20)

Complications	*n (%)*
Erythema	18 (90)
Crusting	11 (55)
Peeling	14 (70)
Moist maceration	02 (10)
Hyperpigmentation	04 (20)

average MASI score (p<0.01). Statistical analysis using student t test for paired means of change in the MASI score had a significant p value (<0.01).

The mean MASI score difference in pre- and postpeel values of epidermal, dermal and mixed types of melasma showed improvement of 79%, 69% and 72%, respectively. Comparison of different types of melasma revealed that malar distribution of melasma showed better improvement as compared to the centrofacial pattern (83% vs. 73%, p>0.05) (**Table 1**). However, difference in improvement in epidermal as compared to the other types of melasma was not significant (p>0.05).

All the patients tolerated the GA peels well. The subjective feeling was that of stinging, rather than pain and although the concentration of GA was increased serially, the tolerance of patients improved. The majority of the patients noted erythema, ranging from very mild to marked. It settled within a few hours and maximally persisted up to 3 days (**Table 2**). Erythema, peeling and crusting resolved with topical application of steroid plus antibiotic ointment.

All patients were followed up for a period of 2 months. The mean MASI score at follow-up was 4.25, which is close to the mean MASI score value of 3.86 at the end of 6 peels. Although the dermal and mixed variety of melasma showed a tendency

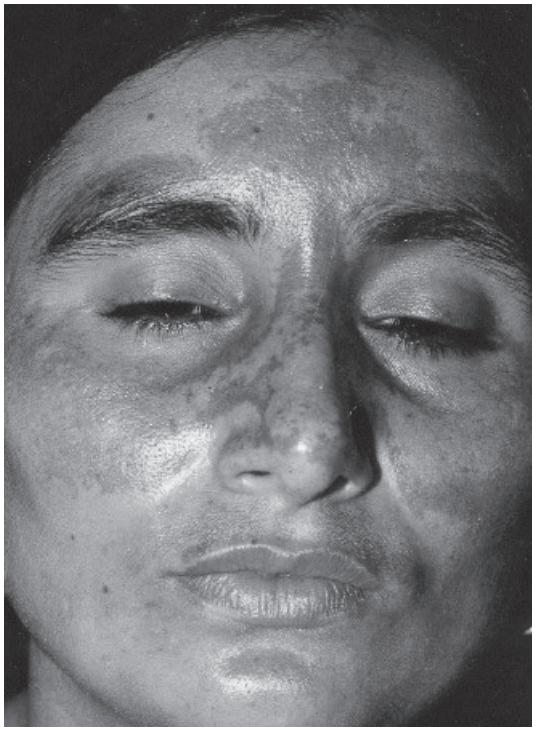

Figure 1 Predominantly epidermal type of melasma before peel

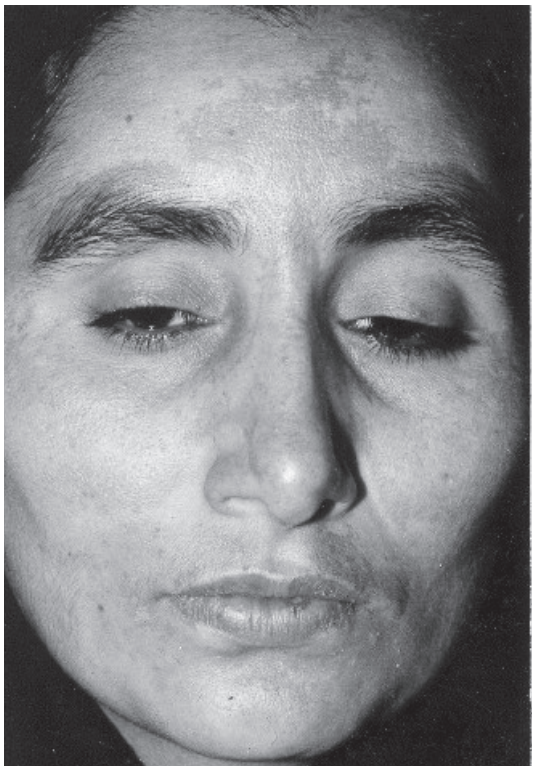

Figure 2 Substantial improvement after 6 peels.

towards relapse (**Table 1**), all patients maintained improvement better than the baseline (**Figures 1** and **2**).

Discussion

Although melasma is a common problem in our population because of intense ultraviolet radiation and predominant Fitzpatrick skin type IV/V, it is a poorly studied group.

The average age at onset of melasma in our study group was 20 years, with an age range of 18 to 38 years. This is more close to a recent study of melasma in whites[1] in which average age at onset was 30 years while in blacks the average age at onset was 44 years. Our demographic data demonstrated that the prevalent pattern of melasma is centrofacial (65%), followed in frequency by the malar pattern. This is consistent with the pattern of melasma in white population.' In the black population, the most common pattern is malar in distribution. Study by Griffith *et al*.[7] showed a high prevalence i.e. 94% of Wood's light detectable epidermal pigment, whereas study by Sanchez[1] revealed dermal pigment of melasma to be more common in blacks and Puerto Ricans. We showed higher prevalence (75%) of epidermal pigment in melasma, somewhat similar to that in white population. In one study genetic predisposition was seen in 47% of patients with melasma. Our results were similar showing genetic predisposition in 40%. The use of cosmetics, as suggested by history, had no deleterious effect in melasma in our patients, an effect opposite to that reported, particularly in Japanese.

Our study showed a substantial reduction in MASI score in our patients, as compared to

that seen with topical tretinoin alone where no clinical improvement was seen until 24 weeks. In a study[9] using GA for the treatment of melasma, the average MASI decreased by 8.61, representing a 63% decrease. This is comparable with our results in which the average MASI decreased by 12.5, showing almost a 75% decrease.

Perricone *et al*.[9] reported extensive epidermolysis (9%), erythema (63%), crusting (36%) and post-inflammatory hyperpigmentation (9%) after GA peeling. Our study showed high incidence of erythema (90%), crusting (55%) and hyperpigmentation (20%), while none of the patients developed epidermolysis.

Conclusion

Glycolic acid is a safe and effective adjuvant therapy for the treatment of melasma in our skin type (Fitzpatrick IV and V).

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