

Effect of Trichloroacetic acid and glycolic acid peel on melasma via split-face technique

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Abstract

Background: Melasma is prevalent worldwide. This typical disease mostly affects women of reproductive age from all racial groups. But has a predilection for darker skin type. Melasma is more common in women than in men. Men have been reported to represent 10% of cases and demonstrate the same clinical and histological characteristics as women. It is associated with sun exposure and pregnancy hormonal disorder.

Objective: To study the effect of Trichloroacetic acid and glycolic acid peel on melasma via split-face technique.

Materials and Methods: Sixty patients of both the sex attending the outpatient clinic of Dermatology Department, with clinically evident bilaterally symmetrical melasma and in good health with normal finding in medical history and physical examination, were included in the study. Pregnant females and one-year postdelivery or lactating females and females on oral contraceptive pills or patients with preexisting inflammatory dermatoses such as psoriasis, atopic dermatitis, or with history of infection or with keloidal tendency were excluded from the study.

Result: There was an improvement of melasma via trichloroacetic acid as well as glycolic acid peel on both sides of the face.

Conclusion: On comparing the two peels in terms of side effects, more adverse events were seen with 15% trichloroacetic acid. Glycolic acid on the other hand showed mild side effects in very few patients.


KEY WORDS: Melasma, trichloroacetic acid, glycolic acid

Introduction

Melasma (also known as chloasma or mask of pregnancy) is an acquired, chronic, symmetrical hypermelanosis, characterized by brown patches of variable darkness on sun-exposed areas of the body.^[1] This typical disease mostly affects women of reproductive age from all racial groups. But has a predilection for darker skin type.

Melasma is more common in women than in men. Men have been reported to represent 10% of cases and demonstrated the same clinical and histological characteristics as women.^[2] It is also more common in Latino black and Asian

than in white population and in individuals with Fitzpatrick skin types 4–5 than in those in fairer skin. An estimated 50%–70% of pregnant women in the USA develop melasma.^[3] Factors involved in the pathogenesis of the condition include genetic influence, exposure to UV radiations, pregnancy, and hormonal therapy (oral contraceptives and thyroid hormones). Other factors implicated are phototoxic drugs, anticonvulsants, and use of certain cosmetics. It presents as single lesion to multiple patches located usually symmetrical over face and occasionally over V-neck area. It has been classified into different types, clinically, histologically, on the basis of Wood lamp, and according to the natural history of lesions. Melasma is recognizable in three typical patterns as follows: centro-facial (63% forehead, nose, chin, and upper lips), malar (21% nose and cheeks), and mandibular (16% ramus of mandible). Light microscopic findings of melasma include increased deposits of melanin in the epidermis and dermis, or both when compared with adjacent normal skin and a mild perivascular lymphohistiocytic infiltrate.^[4] Evaluation of the outcome of clinical trials in melasma can be divided into subjective and objective evaluation techniques. Although subjective evaluation techniques

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are inferior to objective techniques, the most commonly scoring system is the Melasma Area and Severity Index (MASI) score.^[5] Melasma severity scale is also another subjective score used to analyze treatment outcomes in melasma.

The treatment of melasma is challenging. There are many modalities of treatment, but the relapse rate is usually high after therapy.^[6] Aims for the treatment of melasma are to slow the proliferation of melanocytes and inhibit formation of melanosomes and promote their degradation. These objectives can be achieved by inhibiting melanocytes activity and synthesis, removing melanin, and disrupting melanin granules contained within melanosomes.

Chemical peeling consists of the application on the skin of one or more exfoliating agents to obtain first destruction then regeneration of part of the epidermis and/or dermis.^[7] Chemical peels, alone or in combination therapy, have become increasingly popular in the treatment of melasma. They tend to hasten the end result of topical therapy and their use alone is an area of growing interest. Indications for chemical peeling include pigmentary disorders, superficial acne scar, aging skin changes, and benign epidermal tissues. Different types of peels depending on the depth of wound created by peeling agent are classified as very superficial, superficial, medium, and deep according to Mark Rubin's classification.^[8] Superficial and medium depth peels are safer for Indian patients.^[9]

Alpha-hydroxy acid are the most commonly used in current practice but the clinical experience is limited to glycolic acid, which is expensive and may not be available in every centers. Lactic acid, an alpha-hydroxy acid, is an old but innovative agent for peeling as it has only recently experimented for the treatment of melasma. It has similar activities to glycolic acid, but it has not been used as a common peeling agent for melasma.^[10]

Materials and Methods

The present comparative interventional study was conducted in the Department of Dermatology, Venereology and Leprology, Rohilkhand Medical College, Bareilly, India, from January 1 to December 31, 2013. Research work was approved by the ethical committee. During research, Sapna Goyal was an associate professor and Gunjan Aggrawal was a postgraduate student.

Sixty patients of both the sex attending the outpatient clinic of Dermatology Department, with clinically evident bilaterally symmetrical melasma and in good health with normal finding in medical history and physical examination were included in the study. Pregnant females and one-year postdelivery or lactating females and females on oral contraceptive pills or patients with preexisting inflammatory dermatoses such as psoriasis and atopic dermatitis, or with history infection or with keloidal tendency were excluded from the study. Realistic outcome of treatment was discussed with each patients and an informed written consent was taken before inclusion into the study.

Materials

Fifteen percent trichloroacetic acid (TCA), 35% glycolic acid, sable brush, spirit Petroleum jelly, cotton gauze, graduated dispensing cup, surgical caps, acetone, timer gloves, and fan for cooling

Methods

A complete clinical examination including general physical and dermatological examination was carried out. Detailed examination of the face under good illumination was conducted to assess total number of lesions, size of largest lesions, clinical type, homogeneity, and color of lesion. All patients in the study were classified according to their Fitzpatrick skin type as follows:

- Type I: Always burn, never tans; very white and freckled,
- Type II; Always burn, minimally tans: white,
- Type III: Moderately burns, uniformly tans: moderately brown,
- Type IV: Minimally burns, always tans: moderately brown,
- Type V: Rarely burns, profusely tans: dark brown,
- Type VI: Never burns, deeply pigmented: black skin.

Result

The mean MASI score for the left half before treatment was 2.6 ± 1.57 , while after TCA treatment at 12 weeks MASI score was 1.68 ± 1.28 . Maximum and minimum MASI at 0 weeks was 0.9 and 7.20, respectively. With treatment, minimum MASI changed from 0.9 to 0.6; however, maximum remained the same (i.e., 7.2).

In the beginning, no improvement in MASI score after TCA application was seen at 4 weeks. But at 8 weeks, a decrease of 0.70 was noted from pretreatment MASI and was statistically significant ($p < 0.05$). At 12 weeks also mean MASI was showing a decrease of 0.92 (i.e., 34.8%), which was a statistically significant difference ($p < 0.05$).

The MASI score for the right side of the face before and after glycolic acid peel for all the 52 treated patients were the mean MASI score for the right half treated before treatment was $2.6 + 1.57$, while after treatment at 12 weeks MASI score was 1.688 ± 1.28 . Maximum and minimum MASI at 0 week was 0.9 and 7.20, respectively. With treatment, minimum MASI changed from 0.9 to 0.6; however, maximum remained the same (i.e., 7.2).

In the beginning, no improvement was seen at 4 weeks. But at 8 weeks a decrease of 0.69 was noted from baseline and was statistically significant. At 12 weeks also mean MASI was showing a decrease of 0.92 (i.e., 34.8%), which was a statistically significant difference ($p < 0.5$).

In the follow-up period, MASI was well maintained till 16 weeks, although there was a slight decrease in percentage improvement at 20 and 24 weeks, difference remained statistically significant ($p < 0.05$).

Discussion

Melasma is a very common problem in people with dark skin. There are modalities of treatments especially using bleaching agents such as hydroquinone, but unfortunately, relapse rate is usually high after therapy, that may be attributed to continuous exposure to triggering agents such as sunlight, which is the main exacerbating factor.^[6]

Superficial and medium depth peels have been employed with variable success in the treatment of melasma.^[11] And this can have some potentially undesirable side effects and tolerance to this procedure may vary from person to person.^[12] In our study, all of the patients were in the range of 18–45 years and the mean age of women was 31.64 ± 7.84 and of men was 30.33 ± 4.63 years. In our study, we found positive correlation between duration of disease and total MASI at 12 weeks; if more is the duration of the disease more is the MASI at 12 weeks. This suggests that patients with long duration disease respond less to treatment, whereas those with recent onset respond well, thereby showing less MASI after treatment.

In our study, all the patients were belonged to Fitzpatrick skin type IV and V. About 55% patients ($n = 22$) belonged to the skin type V and 45% ($n = 18$) to the skin type IV. Melasma is known to occur commonly in patients with Fitzpatrick skin types IV to VI, especially among those living in areas of intense UV radiation. In a study conducted by Shariquie et al.,^[9] 87.5% of their patients had skin type IV, 8.33% had skin type V, and 4.17% had skin type III.

In our study, most of the patients (60%) had malar type of melasma while remaining had centro-facial type. Although in literature 3, centro-facial has been recognized as the most common type but Thappa et al.^[6] found malar melasma to be the most common type in South Indian population.

In the treatment history, 50% of our study subjects had used multiple topical treatments from outside with no improvement. However, our outcome measures were not affected by the previous modality used as a washout period of 4 weeks used in our study, where patients were instructed not to use any of the previously used medicines.

Superficial peeling agents were used more frequently because deep peels are associated with hypo- and hyperpigmentation, scarring, and even keloid formation in some patients.^[13]

Few studies have been carried out in the past comparing the efficacy of various chemical peeling agents of different group in split-face manner.^[4,9]

In our study, the patients treated with 15% TCA showed statistically significant reduction in posttreatment MASI ($p < 0.05$ at 8 and 12 weeks) when compared with baseline. The mean MASI after treatment was 1.688 while that at baseline was 2.608 representing a decrease of 0.92 and a percentage improvement of 34.8% at 12 weeks.

In our study, most of the side effects were noted on the left side of the face peeled with 15% TCA. Burning sensation was

the most common side effect noted followed by erythema, epidermolysis, and post-inflammatory hyperpigmentation. Epidermolysis was frequently observed with increased duration of contact period of glycolic acid especially at 4th sitting. In the follow-up period, MASI was well maintained at 12 weeks. Thereafter, slight decrease in percentage improvement was noted from 34.8% at 12 weeks. However, statistically significant results ($p < 0.05$) were still maintained in the follow-up period when compared to baseline.

In this study, 52 patients were treated with 35% glycolic acid applied on right half of the face. Statistically significant reduction in MASI was seen after treatment when compared with baseline ($p < 0.05$ at 8 and 12 weeks). At 12 weeks, mean MASI was 1.688 while that at baseline was 2.608 representing a decrease of 0.92 and a percentage improvement of 34.8%. Melasma severity scale also showed improvement. At baseline, maximum number of patients (71.4%) reported Grade 2 on melasma severity scale, which decreases with treatment to 11.4% at 12 weeks as more number of patients reported improvement to Grade 1 in which 20% patients were there at baseline that rises to 85.7% at 12 weeks. Statistically significant difference was seen with Grade 2 at 8 and 12 weeks ($p < 0.05$).

In our study, with glycolic acid no side effects were noted expect for burning sensation and erythema seen in two patients. It is well known that glycolic acid is a safe and well-tolerated superficial peeling agent in treatment of various facial dermatoses. Also in a study conducted by Bari et al.^[10] noted that use of 30% SA was well tolerated by most of the patients except for few side effects such as burning, irritation, stinging, dryness, and so on. Kodali et al.^[14] also in his study with 30% SA has observed mild side effects such as erythema and burning in most of the patients.^[15]

In the follow-up period, MASI was well maintained at 12 weeks. Thereafter, slight decrease in percentage improvement was noted from 34.8% at 12 weeks to 34.4% and 33.4% at 20 and 24 weeks, respectively, although the and the difference compared to baseline remained statistically significant ($p < 0.05$).

In our study, a statistically significant decrease in MASI score was found with both peeling agents, but when two methods were compared the difference was not statistically significant.

On comparing the two peels in terms of side effects, more adverse events were seen with 15% TCA. Glycolic acid on the other hand showed mild side effects in very few patients. So, it can be concluded by our study that 35% glycolic acid is a safer alternative in comparison to 15% TCA for the treatment of melasma in Asian skin.

Conclusion

On comparing the two peels in terms of side effects, more adverse events were seen with 15% TCA. Glycolic acid on the

other hand showed mild side effects in very few patients. So, it can be concluded by our study that 35% glycolic acid is a safer alternative in comparison to 15% TCA for the treatment of melasma in Asian skin.

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