

Original Article

# Comparative efficacy of 10-20% trichloroacetic acid and 35-70% glycolic acid peel in 60 cases of melasma, freckles, lentiginos and postinflammatory hyperpigmentation.

Silonie Sachdeva

Department of Dermatology, Venereology and Leprology, Govt. Medical College and Rajindra Hospital, Patiala, Punjab, India.

**Abstract** *Background* Melasma, freckles, lentiginos and post-inflammatory hyperpigmentation are common disorders of cutaneous hyperpigmentation, which present in Dermatology clinics. Despite the availability of a large number of skin lightening treatments, hyperpigmentation of skin remains a therapeutic challenge. Chemical peeling has been widely used for the treatment of cutaneous hyperpigmentation. The present study compares the effects of 10-20% trichloroacetic acid and 35-70% glycolic acid peel in these common disorders of skin hyperpigmentation.

*Patients and methods* The study included 60 patients of melasma, freckles, lentiginos and post-inflammatory hyperpigmentation of both sexes, in 15-45 year age group. Patients were randomly divided into two equal groups A and B. Pre-peel priming was carried out with 3% hydroquinone for two weeks. Group A was treated with trichloroacetic acid (TCA, 10-20%) peel and group B with glycolic acid (GA, 35-70%) peel. Four peels were done at serial intervals of 15 days. Full-face peel was done for melasma and regional or spot peeling for freckles, lentiginos and post inflammatory hyperpigmentation. Patients were followed every month for three months after the last peel. Clinical photographs were taken at the beginning of the therapy and then serially to assess the response.

*Results* Glycolic acid showed better response compared to trichloroacetic acid at end of four peels, but this difference was not statistically significant ( $p>0.05$ ). Chemical peeling with trichloroacetic acid produced significantly more erythema ( $p<0.05$ ) and burning sensation ( $p<0.01$ ) compared to glycolic acid. Also, trichloroacetic acid peel was associated with higher incidence of post peel hyperpigmentation ( $p<0.05$ ).

*Conclusion* Chemical peeling with both trichloroacetic acid (10-20%) and glycolic acid (35-70%) is safe and effective for the treatment of the skin pigmentary disorders. Glycolic acid is a superior peeling agent with better patient tolerance and lesser side effects.

## Key words

Chemical peeling, trichloroacetic acid, glycolic acid, cutaneous hyperpigmentation.

## Introduction

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### Address for correspondence

Dr. Silonie Sachdeva,  
1312, Urban Estate, Phase-1,  
Jalandhar-144022, Punjab, India.  
Email: siloniesachdeva@yahoo.com

Cutaneous hyperpigmentation is a therapeutic challenge to the dermatologist and a source of great distress to the patient. The commonly encountered skin pigmentary conditions include melasma, freckles,

lentiginos and post-inflammatory hyperpigmentation.

Melasma is a common acquired symmetric hypermelanosis characterized by irregular light to grey brown macules involving sun exposed areas and occurring primarily on the forehead, cheeks and chin in a mask like distribution.<sup>1</sup> The condition is seen most commonly on the face of women with Fitzpatrick skin types IV to VI, especially among those living in areas of intense UV radiation. The pathogenesis of melasma is not fully understood, but pregnancy, estrogen ingestion, UV light exposure, and family history are well recognized associations.<sup>2</sup> Melanocytic lesions result from melanocytic proliferation. The common melanocytic lesions include lentiginos and freckles.<sup>3</sup> Lentiginos arise as a result of an increased number of melanocytes at dermo-epidermal junction and appear as macular areas of brown-black pigmentation, 2-3 mm in diameter and circular or polycyclic in shape. Freckles are light brown-pigmented macules with ill-defined lateral borders <3 mm in diameter and arise due to increased production of melanin in melanocytes in response to stimulation by UV radiation.<sup>4</sup> Post inflammatory hyperpigmentation can follow acute or chronic inflammatory processes in skin in which there is disruption of the basal layers of the epidermis. Therapy for cutaneous hyperpigmentation has generally been difficult, particularly in black patients.<sup>5</sup> Different regimens include use of broad-spectrum sunscreens and various concentrations of hydroquinone with or without the addition of corticosteroids, retinoids (tretinoin), salicylic acid or glycolic acid. Chemical peeling with glycolic acid and trichloroacetic acid has

become an increasingly popular method to treat a myriad of benign skin disorders<sup>6</sup>. We compared the efficacy of trichloroacetic acid and glycolic acid in these skin pigmentary disorders.

### **Patients and methods**

Sixty patients of melasma, freckles, lentiginos and post-inflammatory hyperpigmentation in 15-45 year age group, and of both sexes attending Skin and V.D. outpatient department of Government Medical College and Rajindra Hospital, Patiala were recruited in the study. Complete history of the patient with regard to onset of the disease, total duration, aggravating factors, site, reactions during the peel and any side effects and complications thereafter, were documented. Patients with active infections (herpes labialis, bacterial), history of recent surgery over the area to be treated and history of keloid formation were excluded from the study. Patients who were finally selected were randomly allocated into two equal groups- A and B. Pre-peel priming was carried out with 3% hydroquinone for two weeks. Group A was treated with trichloroacetic acid (TCA, 10-20%) and Group B with glycolic acid (GA, 35-70%) peel. Full-face peel was done for melasma and spot or regional peeling for freckles, lentiginos and post inflammatory hyperpigmentation. Patients were advised to use sunscreen (SPF $\geq$ 15) during daytime and were asked to avoid sunlight for next few days. Patients were advised to continue with the pre-peel priming schedule at 7<sup>th</sup> day i.e. after complete desquamation of the skin. Maximum of four peels were carried out at serial intervals of two weeks each. Total

response was assessed by three main criteria: Pre-peel and post –peel photographs of the patient, subjective improvement as experienced by the patient and clinical response as assessed by the physician. At the completion of the study, the response in each patient was graded as: Mild - <30% improvement, Moderate -30-60% improvement and Good - >60% improvement in pigmentation. Patients were followed every month for a period of three months after the last peel to see any side effects and complications.

### Result

In the present study of 60 cases, 20 patients (33.3%) were of melasma, 12 (20%) of lentiginos, 8 (13.4%) of freckles and 20 (33.3%) of post inflammatory hyperpigmentation. Maximum 29 (48.4%) were in 26-35 years age group. Mean age was 27.55 years and the male-female ratio was 1: 2.5. In 20 cases of melasma, sunlight was the precipitating factor in 12 (60%) followed pregnancy in 7 (35%) and oral contraceptives in 1 (5%). Sunlight was aggravating factor in 13 (65%) cases of lentiginos and freckles while 7 (35%) had a familial association. Most common cause of postinflammatory hyperpigmentation was previous skin infection seen in 11 patients (55%). In 5 cases (25%), it was post traumatic and in 4 (20%) it had followed an irritant reaction to topical application. Maximum 41 patients (68.4%) came with the problem of pigmentation on face that is cosmetically disfiguring.

At the end of four peels in group A (10-20% TCA peel), 7 patients (23.4%) showed good response, 15 (50%) showed moderate

**Table 1** Clinical response (Grades of improvement) in Group A & Group B at the end of four peels.

Response	Group A TCA (n=30)	Group B GA (n=30)
Mild	8 (26.6%)	4 (13.3%)
Moderate	15 (50%)	17 (56.7%)
Good	7 (23.4%)	9 (30%)

**Table 2** Reactions during peeling in Group A and Group B

Reactions	Group-A (TCA)	Group-B (GA)	p- value
Burning sensation	25 (83.33%)	16 (53.3%)	< .01
Erythema	24 (80%)	15 (50%)	< .05
Frosting	30 (100%)	-	< .001

**Table 3** Side effects during follow up in Group A and Group B

Side effects	Group A (TCA)	Group B (GA)
Post inflammatory hyperpigmentation	11(36.6%)	4(13.3%)
Herpes simplex	1 (3.3%)	-
Milia	1 (3.3%)	-

response and 8 (26.6%) patients showed mild response. Comparatively, in group B (35-70% GA peel), 9 patients (30%) showed good response, 17 patients (56.7%) showed moderate response and 4 (13.3%) showed mild response. Though clinically, results with glycolic acid were better compared to trichloroacetic acid (**Table 1**), the difference in efficacy was not statistically significant ( $p>0.05$ ) as calculated by chi square test. Twenty five patients (83.3%) in group A complained of intense stinging and burning sensation during peeling compared to 16 (53.3%) in group B. Twenty four patients (80%) in group A developed erythema compared to 15 (50%) in group B.

All patients in group A showed frosting reaction, which was completely absent in group B. TCA produced significantly more erythema ( $p<0.05$ ) and burning sensation



**Figure 1.** Patient with Melasma (pre-peel).



**Figure 2.** Same patient showing good response after 4 peels with trichloroacetic acid.

( $p < 0.01$ ) compared to GA. (**Table 2**). During the 3-month follow up period, postpeel hyperpigmentation was the most common side effect seen in 15/60 patients (25%). It was higher in group A i.e. 11/30 (36.6 %) compared to 4/30 (13.3%) in group B. The difference was statistically significant ( $p < 0.05$ ). One case (3.3%) in group A developed milia, and one case (3.3%) developed herpes simplex infection (**Table 3**). No infection was seen in group B patients. No allergic reaction or scarring was observed in the either group.

## Discussion

Chemical peeling has been used since time immemorial to smoothen and improve the skin. Unna, a German dermatologist, first reported in 1882 the use of salicylic acid, resorcinol, phenol and trichloroacetic acid for chemical peeling.<sup>6</sup> The basic procedure aims at production of controlled chemical

burns of epidermis and/ or dermis resulting in exfoliation and subsequent resurfacing of the epidermis and remodeling of collagen and elastic fibers with deposition of glycosaminoglycans in dermis. Glycolic acid and trichloroacetic acid chemical peels have been used alone and in combination to treat cutaneous hyperpigmentation.<sup>7,8</sup>

The present study compared the efficacy of 10-20% trichloroacetic acid and 35-70% glycolic acid in 60 patients of melasma, freckles, lentigines and post-inflammatory hyperpigmentation. Sunlight exposure, pregnancy and oral contraceptives were the most common precipitating factors for melasma. Javaheri *et al.*<sup>9</sup> and Kalla *et al.*<sup>10</sup> observed similar findings in etiology of melasma. Sunlight exposure and familial association were predominant in the etiology of lentigines and freckles. Green *et al.*<sup>11</sup> and Gallagher *et al.*<sup>12</sup> have highlighted this previously. At the end of four peels, TCA produced good response in 23.4%, moderate response in 50% and mild response in 26.6% patients. Comparatively, with GA peel good response was seen in 30%, moderate in 56.7% and mild response in 13.3% patients. Clinical improvement was more with GA compared to TCA peel but this difference in efficacy was not statistically significant ( $p > 0.05$ ). TCA produced significantly more erythema ( $p < 0.05$ ) and burning sensation ( $p < 0.01$ ) compared to GA during peeling. Postpeel pigmentation was significantly higher in TCA group 36.6 % compared to 13.3% in GA group ( $p < 0.05$ ) in follow up period. Kalla *et al.*<sup>10</sup> found in their study that TCA patients experienced more local irritant effects like tingling, burning sensation and postpeel crackening as compared to GA. Also, relapse and hyperpigmentation were

25% with TCA as compared to 5.9% in GA group, during follow up period of 3 months. This may be due to photoprotective and anti-inflammatory effects of topical glycolic acid.<sup>13</sup> One case (3.3%) in TCA group developed milia, and one case (3.3%) developed herpes simplex infection. No such infection occurred with the GA peel. It can be concluded that both trichloroacetic acid (10-20%) and glycolic acid (35-70%) peels are equally effective in the treatment of cutaneous hyperpigmentation. Glycolic acid is a superior peeling agent with better patient tolerance and lesser side effects.

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