

# Efficacy and Side Effects of Trichloroacetic Acid (TCA) Versus Cryotherapy in the Treatment of Solar Lentigo

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Received: May 19, 2010  
Accepted: June 20, 2010

## Abstract

**Introduction:** Solar lentigo is local and benign proliferation of melanocytes which is common in old individuals and creates a major concern considering beauty. Despite several and somehow expensive treatments such as laser and cryotherapy, chemical peeling with Trichloroacetic Acid (TCA) has recently attracted attentions considering its low cost and availability. The present study was designed to compare the efficacy and side effects of Trichloroacetic Acid (TCA) 35% and cryotherapy in the treatment of solar lentigo.

**Methods:** This randomized clinical trial was performed on 35 individuals with solar lentigo on their hands. First, images were taken from both hands. Then, one side was treated with cryotherapy and the other side was treated with TCA 35%, randomly. This treatment was repeated after one month. The imaging was repeated at the end of the second month and both sides were compared with previous images regarding the degree of the improvement (lightening) of the lesions and the resultant side effects. Descriptive statistical methods and 2-chi square relation were used for analyzing data with SPSS 16.

**Results:** The results demonstrated that cryotherapy resulted in more than 50% recovery (lightening >50%) in 60% of the cases which was statistically significant ( $P < 0.05$ ). In contrast, TCA 35% yielded more than 50% recovery in 46% of the cases which was significant, too. Comparing these modes of treatments regarding 50% recovery showed no statistically significant difference ( $P = 0.219$ ). Side effects were seen in 40% and 13.3% of the individuals who used cryotherapy and TCA 35%, respectively, which was statistically significant ( $P < 0.05$ ).

**Conclusions:** According to the findings of the research, TCA 35%, compared to cryotherapy, has similar efficiency but fewer side effects in the treatment of solar lentigo. (*Iran J Dermatol* 2010;13: 47-50)

**Key words:** solar lentigo, cryotherapy, trichloroacetic acid

## Introduction

Solar lentigo is local and benign proliferation of melanocytes at dermo-epidermal junction<sup>1</sup>. These lesions are several yellow or brown oval or round macules with obvious margins created on the areas such as back of the hands, forearm and face which are exposed to sun light. These lesions are common in the Caucasian race and increase with age such that they can be observed in 90% of the individuals older than 60 and 50% of the individuals older than 45. In most cases, solar lentigo is a complete benign lesion but rarely progresses slowly toward malignant lentigo and is regarded as an independent risk factor for melanoma<sup>1,2</sup>.

Therefore, it is necessary to recognize these lesions from simple lentigo, plane seborrheic keratosis, melanocytic spots and malignant melanoma<sup>2</sup>.

Considering that solar lentigo is mostly seen in exposed parts of the body such as the face, neck, hands and forearm, negative psychological effects of these lesions on affected individuals should not be overlooked. On the other hand, these lesions can impose further mental pressure on the patient considering that they can be the first sign of aging process resulted from sun damage<sup>3,4</sup>. At the same time, the major concern regarding these lesions is related to cosmetic issues and most of the people may not look for treatment.

Treatments applied for solar lentigo are divided into two physical and medical categories: physical treatments including cryotherapy, laser, pulsed light and chemical peeling have faster effects compared to medical treatments such as Hydroquinone, Tretinoin, Adapalene, Alpha Hydroxy Acid, etc. Most patients experience improvement after one or two sessions of treatment, but side effects and recurrence after treatment should also be considered <sup>5</sup>. Chemical peeling with Trichloroacetic Acid (TCA) has recently attracted attention because its low cost and availability. This drug destructs tissues through hydrolyzing cellular proteins <sup>6</sup>. In 30-50% concentration, this drug has been used as a moderate to deep peeling agent for the treatment of solar keratosis, warts and even xantelasma <sup>7</sup>.

Few studies have been conducted on the effect of this drug and its comparison with other treatments and contradictory results have been obtained such that in studies by Lugo et al, <sup>8</sup> and Rezaiee et al <sup>9</sup>, TCA was less effective than cryotherapy but in another study, the cryotherapy efficacy has been reported to be less than Q-switched Nd:YAG laser <sup>10</sup>. But, in study of Engin Sezer, the effects of TCA and Glycolic Acid combination with cryotherapy was comparable <sup>11</sup>. Considering the high prevalence of solar lentigo, lack of proved treatment without side effects and contradictory results of current studies on the effect of TCA, we decided to conduct the present study to compare the efficacy and side effects of TCA 35% with cryotherapy in the treatment of solar lentigo.

## Patients and Method

Thirty five subjects of this research, as a random clinical experiment, were selected through simple random sampling among individuals who were referred to Sina educational and therapeutic center of Tabriz with clinical diagnosis of solar lentigo. Every patient had to have at least five lesions on each hand. Individuals with warts, recurrent herpes, sensitivity to light, raynaud phenomenon, pregnancy and lactation, sunburn within recent 2-3 days, those who have received treatments such as surgery, cryotherapy, radiotherapy and PUVA therapy within the last 6 weeks and Isotretinoin during the last 6 months were excluded from the study. Those who were qualified to participate in the study filled a demographic check list including questions regarding age, sex, occupation and skin type after

receiving required information about the study and signing a written consent letter.

Before treatment, images were taken from the lesions of the patients with a digital camera. All graphs were taken with the same camera and in the same conditions in terms of magnification, light and position. Randomly, one side was treated with cryotherapy in such a way that the tip of the spray was held at a 3-centimeter distance with the lesion and spraying was continued until the surface of the lesion became frosted as a result of spraying. Duration of spraying varied between 2 and 5 seconds based on the diameter of the lesion. The other side, after washing with water and soap, was treated with TCA 35% with a cotton applicator. The patients were recommended not to be exposed to sun and to frequently use the sunscreen with which they were provided free of charge.

Both treatments were repeated after one month. During treatment and after the 2-month period, the patients were evaluated for the side effects of the treatments including blisters, permanent and severe pain, dyspigmentation, atrophy and scar. The photographs were repeated at the end of the second month. Previous images and also images taken after treatment were observed and compared by two academic dermatologists and a dermatology resident who were blinded to the study considering the degree of lightening of the lesions.

Lesion improvement in terms of the degree of lightening was classified as follows:

1. No improvement (trivial): lightening < 25%
2. Mild improvement: 25% < lightening < 50%
3. Moderate improvement: 50% < lightening < 75%
4. Significant improvement: lightening > 75%

Data was statistically analyzed through descriptive statistical methods, 2-chi square relation and SPSS 16 statistical software. The values less than 0.05 were regarded as significant.

## Results

Out of the 35 individuals, 30 continued the study. Twenty seven (90%) of them were women and 3 (10%) were men. Mean age of the subjects was 53.5.

According to Fitzpatrick skin typing, one (3.3%) of the patients had type I, 13 (43.3%) had type II and 16 (53.4%) had type III skin.

**Table 1.** Degree of responses to treatment in each therapeutic group (cryotherapy and TCA 35%)

Treatment	Trivial improvement		Mild improvement		Moderate improvement		Significant improvement		Sum	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Cryo	5	16.6	7	23.3	11	36.6	7	23.3	30	100
TCA	9	30	7	23.3	10	33.3	4	13.3	30	100

Trivial improvement: lightening <25% mild improvement: 25%< lightening <50%  
 Moderate improvement: 50% < lightening < 75% Significant improvement: lightening >75%

**Table 2.** Frequency of the observed side effects for each therapeutic group

Treatment	Side Effects (No.)						
	Severe pain	Blister	Permanent erythema & edema	hyperpigmentation	hypopigmentation	scar	Severe itching
Cryo	1	5	2	3	4	2	1
TCA			2				2

Comparing previously taken images and ones taken after treatment with cryotherapy, it was seen that 18 cases (60%) had more than 50% improvement (more than moderate improvement) which was statistically significant ( $P<0.05$ ). At the side treated with TCA 35%, we observed more than 50% improvement in 14 cases (46.6%) which was significant, too ( $P<0.05$ ). However, comparison between cryotherapy and TCA 35% regarding more than 50% improvement [18 cases (60%) versus 14 cases (46.6%)] showed no significant difference ( $P=0.219$ ).

More than 75% improvement (significant improvement) was seen in 7 cases (23.3%) treated with cryotherapy and 4 cases (12.3%) treated with TCA. None of them were statistically significant (Table 1).

From the patients' points of view, 17 cases (56.7%) stated that cryotherapy was more effective. In the opinion of 8 cases (26.7%), TCA 35% was better and 6 individuals (20%) stated that both had the same effect.

Considering the side effects observed during treatment, at least one side effect was observed in 12 cases (40%) treated with cryotherapy. Blisters were the most common side effect observed in those treated with cryotherapy. However, side effects were seen only in 4 cases (13.3%) of those treated with TCA. Comparing side effects between the two therapeutic groups showed a statistically significant difference ( $P<0.05$ ).

Hypopigmentation and scarring, which were regarded as possible important and worrying side effects, were observed in 4 cases (13.3%) after

cryotherapy while they were not seen in cases treated with TCA 35% (Table 2).

## Discussion

In this study, TCA 35% was compared with cryotherapy in the treatment of solar lentigo of the hand. Most of our patients were women which was justifiable considering that women pay more attention to cosmetic issues.

Our study suggested that the efficiency of TCA 35% was comparable with cryotherapy in the treatment of solar lentigo (more than 50 percent improvement: 46% versus 60%). Additionally, it induced fewer side effects than cryotherapy (13.3% versus 40%). These results are in contrast to the findings of Sanchez and Raziee<sup>5,6</sup> but in accordance with a study by Sezer<sup>8</sup>. Sanchez and Raziee used TCA 30% and 33% and more than 50% improvement was seen in 36% and 12% of their patients, respectively. Concentration of the material used in peeling is one of the factors affecting depth of peeling and as a result, the destructive power against melanocytes. TCA at a concentration of 50-65% has been successfully used in the treatment of seborrheic keratosis and melasma without any significant side effects<sup>12</sup>. It is also effective in the treatment of acne scars at higher concentrations<sup>13</sup>. In this study, we used TCA 35% which was more concentrated than the ones used by Sanchez and Raziee which can be regarded as one of the factors justifying the efficacy of TCA in our study. In addition, we repeated the treatments once every month. Obviously, repeating the treatment results in more destruction of melanocytes and more improvement.

Other reasons for the difference in outcomes were different methods of evaluating response to treatment, methods used for treatments and skin type.

None of the treatments were effective considering more than 75% improvement (significant improvement) which was similar to other studies. It can be stated that cryotherapy and TCA were not effective in the cure of solar lentigo and just led to their relative improvement.

The efficiency of a drug is always assessed against its side effects. In previous studies, there was an increasing concern regarding the side effects of cryotherapy, especially scar and dyspigmentation. Our study demonstrated that side effects of cryotherapy were significantly more than TCA 35% (40% versus 13.3%). However, repeating the treatment did not increase major side effects including scar and hypopigmentation.

There are concerns regarding potential tumorigenesis of TCA in some articles<sup>11</sup> which requires more investigation. However, not using TCA for a long time and long-term follow-ups seem logical.

Briefly, our study demonstrated that TCA 35% was as effective as cryotherapy in the treatment of solar lentigo with fewer side effects. Repeating treatment did not increase their side effects. TCA 35% could be suggested for the treatment of solar lentigo in order to prevent side effects of cryotherapy.

However, the follow-up period of 2 months in this study seems not to be enough to evaluate side effects and pigmentation variations and further follow-up recommended to evaluate the safety and efficacy of lentigo treatment more definitely.

## Acknowledgement

We would like to thank and appreciate the staff and assistants of the skin ward of Sina Hospital, Tabriz, and the patients who participated in our study.

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