Section: Dermatology Venereology Leprology

Original Research Article

THERAPEUTIC RESPONSE TO CRYOTHERAPY VERSUS 50% TRICHLOROACETIC ACID APPLICATION IN IDIOPATHIC GUTTATE HYPOMELANOSIS

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ABSTRACT

Background: Idiopathic guttate hypomelanosis (IGH) was a common, acquired dermatosis characterized by multiple, round or oval, hypopigmented to depigmented macules. A variety of therapies with variable success were described, still treatment remains unsatisfactory and therapeutic challenge for dermatologists. The objectives were to find out the therapeutic response to cryotherapy versus 50% Trichloroacetic acid (TCA) in IGH and determine patient reported outcome. **Materials and Methods:** 30 patients with each group containing 15 patients and 5 macules in the pre – tibial region of each patient were selected. Short contact cryotherapy for 3-5 seconds and 50% Trichloroacetic acid were applied in the IGH macules once in a month till repigmentation for maximum of 3 applications and assessed every 2 weeks for 4 months for side effects and improvement in pigmentation. The degree of improvement in pigmentation was assessed using a grading system, G0 = no improvement, G1 = up to 25% improvement, G2 = 25–50% of improvement, G3 = 51–75% of improvement and G4 = greater than 75% improvement. **Result:** At the end of 4 months, out of 75 macules treated with cryotherapy, 38.7% (n= 29) lesions showed G4 improvement and G0 was seen in only 8% (n = 6) lesions. In 50% TCA group, G4 was seen in only 20% (n= 15), and G0 in 21.3% (n = 16) lesions (p value of 0.008). Side-effects like persistent scabbing, scarring and post – inflammatory hyperpigmentation were more common with 50% TCA application compared to cryotherapy. **Conclusion**: Short contact cryotherapy of 3-5 seconds was found to be more efficacious, safe and good patient reported outcome when compared to therapeutic wounding with 50% TCA in inducing pigmentation of IGH macules.

INTRODUCTION

Idiopathic guttate hypomelanosis (IGH) was a common, benign, irreversible disorder, with a presence of achromic or hypopigmented macules measuring 0.2–1.6 cm of unknown origin. It was first described in 1951 by Costa as “symmetric progressive leukopathy of the extremities”. Cummings and Cottel introduced the term IGH in clinical practice in 1966 & confirmed its incidence, with a prevalence of 47% among the studied population.[1,2] These lesions primarily appear on sun-exposed areas such as the forearms and shins, particularly in middle-aged and older individuals. Even though being asymptomatic and non-progressive, many patients visit medical centres due to its significant cosmetic concerns, especially among individuals with darker skin types and to confirm the natural course of idiopathic guttate hypomelanosis.[3] The exact aetiology of IGH remains unclear, but cumulative sun exposure, skin aging, and genetic predisposition have been implicated. Histologically, IGH was associated with a reduction in melanocyte activity rather than complete melanocyte loss, distinguishing it from other depigmenting disorders like vitiligo. While the condition was harmless, various therapeutic interventions had been explored to improve cosmetic appearance, reflecting a growing interest in aesthetic dermatology and patient quality of life.

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MATERIALS AND METHODS

It was a Prospective Comparative study. The study was done in dermatology Outpatient department, Government Rajaji Hospital, Madurai. Patients were enrolled for the study after obtaining the written informed consent. Detailed history and clinical examination were carried out to know the type, distribution and number of lesions.

Patients with age more than 60 years having IGH lesions distributed over the pre-tibial region were included in the study. Patients with a history of treatment with topical retinoids, topical calcineurin inhibitors, chemical peel, cryotherapy, or lasers during the previous three months were excluded. Patients with a history of hypertrophic scars or keloids, active vitiligo, or active infection were also excluded.

Study Procedure: The clinically diagnosed cases of IGH fulfilling the inclusion criteria were enrolled in the study after obtaining written informed consent for the procedure. The patients were divided into two groups A and B, with 15 patients in each group, allocating them in a randomized manner by selecting alternate patients. Detailed history was taken and thorough dermatological and systemic examination was done. The Clinical photographs of the lesions were taken and recorded at the baseline. All the parameters were recorded in a pre-structured proforma. The patients were treated as per the allotted group:

Group A: Cryotherapy using liquid nitrogen

Group B: 50% Trichloro acetic acid

Group A: Under aseptic conditions, liquid nitrogen was applied over the lesions by dip stick method using cotton tipped applicators for 5 seconds in a single freeze – thaw cycle to 5 selected macules in the pre – tibial region. Blister formation may occur and when the scab falls off, all the patients were advised to apply topical 2% mupirocin cream twice daily till lesions heal. The procedure was repeated at monthly interval up to 3 sittings till complete repigmentation was achieved. The patients were followed up once every 2 weeks for 4 months.

Group B: Under aseptic precautions, with the help of cotton buds, 50% TCA was applied over the macule and feathering of up to 1 mm of normal skin will be done at the periphery of the lesion to 5 selected macules in the pre – tibial region. Frosting was seen in lesions treated with 50% TCA. The patients were asked to wash after 30 minutes. After the scab falls off, all the patients were advised to apply topical 2% mupirocin cream twice daily till lesions heal. The procedure was repeated at monthly interval up to 3 sittings till complete repigmentation was achieved. The patients were followed up once every 2 weeks for 4 months.

Clinical assessment score: The assessment was done for all treated macules separately and noted. Serial photographs were taken of all treated patients and results of subjective clinical improvement score were graded as G0 = no improvement, G1 = up to 25% improvement, G2 = between 25–50% of improvement, G3 = between 51–75% of improvement and G4 = greater than 75% improvement. The patient satisfaction score was recorded at the end of 4th month on a four- point scale for cryotherapy and 50% TCA treated patients (1 – very unsatisfied, 2 - somewhat unsatisfied, 3 - somewhat satisfied and 4 – very satisfied).

For every two weeks, patients were assessed for any complications and to ensure follow – up and grading was done once every 4 weeks till 4 months. Those who achieve complete repigmentation in all macules before 4 months would be released from study. The side effects were assessed and managed accordingly. The grading and time taken for repigmentation in both groups were analysed and compared and results were obtained.

Statistical Analysis: The information collected regarding all the selected cases were recorded in a master chart. Data analysis was done with the help of computer by using latest SPSS software. Using this software, mean, standard deviation, frequency distribution and 'p' value are calculated through 'one way ANOVA' test for raw data and Chi square test for consolidated data. Confidence Interval 95%. P value of < 0.05 was taken as significant.

RESULTS

The age of the participants was ranging from 60 to 76 years of age in our study. In our study, the participants included were 18 women and 12 men. Each group contains 9 women and 6 men. In terms of comorbidities, 30% (n = 9) of the participants had Diabetes mellitus, 16.7% (n = 5) had Hypertension, 13.3% (n = 4) had both Diabetes mellitus and Hypertension but 40% (n = 12) of the participants had no comorbidities.

Among 75 macules treated with cryotherapy, a majority of 38.7% (n= 29) of the lesions showed grade 4 improvement of >75% repigmentation. 24% (n = 18) of the lesions showed grade 3 improvement, 12% (n = 9) lesions showed grade 2 improvement and grade 1 pigmentation was seen in 17.3% (n = 13). The poor responders with Grade 0 pigmentation were seen in only 8% (n = 6) of lesions (Table 1 and Figure 1). In this group, majority of the lesions had good clinical response after 1st sitting at 4 to 6 weeks (Figure 2). Among 75 macules treated with 50% TCA, a majority of 25.3% (n= 19) lesions showed only Grade 3 improvement of 51 – 75% pigmentation and grade 4 improvement of >75% pigmentation was seen in only 20% (n= 15) of the lesions. 24% (n = 18) showed grade 2 improvement and 9.3% (n = 7) showed grade 1 improvement. The poor responders with Grade 0 pigmentation were seen in 21.3% (n = 16) of lesions. In this group, majority of the lesions had good clinical response after 2nd sitting at 10 to 12 weeks (Figure 3). The P value is 0.008 between

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the therapeutic response of cryotherapy and 50% TCA.

Among the 15 participants treated with cryotherapy, 5.3% (n = 4) had persistent scabbing, 4% (n = 3) had post – inflammatory hyperpigmentation whereas a majority of 90.7% (n = 68) of lesions had no side – effects (Table 2). Among patients treated with 50% TCA, 13.3% (n = 10) had persistent scabbing, 2.7% (n= 2) had persistent scabbing and PIH, 2.7% (n= 2) had both persistent scabbing and scarring, 2.7% (n= 2) had post – inflammatory hyperpigmentation, 1.3% (n = 1) had scarring (Figure 4) and a majority of 77.3% (n = 58) had no side effects.

It was observed that participants for whom cryotherapy were used therapeutically, a majority of 66.7% (n = 10) had a patient satisfaction score of 4, 20% (n = 3) had a score of 3, 6.7% (n = 1) had a score of 2 and 6.7% (n = 1) had a score of 1. Among the participants who were treated with 50% TCA, only 20% (n = 3) had a patient satisfaction score of 4, 20% (n = 3) had a score of 3, a majority of 46.7% (n = 7) had a score of 2 and 13.3% (n = 2) had a score of 1. There was a significant P value of 0.035 and chi square value is 8.603 (Table 3 and Figure 5).

Table 1: Grading of repigmentation

Grading of repigmentation	Cryotherapy	50% TCA	Total
G4	29(38.7%)	15(20%)	44
G3	18(24%)	19(25.3%)	37
G2	9(12%)	18(24%)	27
G1	13(17.3%)	7(9.3%)	20
G0	6(8%)	16(21.3%)	22
Total(no. of macules)	75	75	150

Table 2: Distribution of side effects

Side effects	Cryotherapy	50% TCA
Persistent scabbing	4(5.3%)	10(13.3%)
Persistent scabbing, PIH	0	2(2.7%)
Persistent scabbing, scarring	0	2(2.7%)
PIH	3(4.0%)	2(2.7%)
Scarring	0	1(1.3%)
No side effects	68(90.7%)	58(77.3%)
Total(no. of macules)	75	75

Table 3: Patient satisfaction score

Patient Satisfaction Score	CRYOTHERAPY	50% TCA	Total
4	10 (66.7)	3 (20)	13 (43.3)
3	3 (20)	3 (20)	6 (20)
2	1 (6.7)	7 (46.7)	8 (26.7)
1	1 (6.7)	2 (13.3)	3 (10)
Total	15 (100)	15 (100)	30 (100)

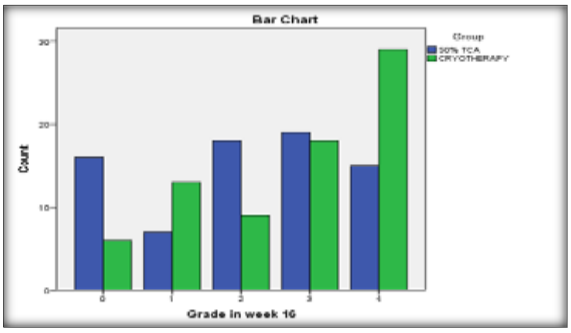

Figure 1: Distribution of therapeutic response at 16 weeks

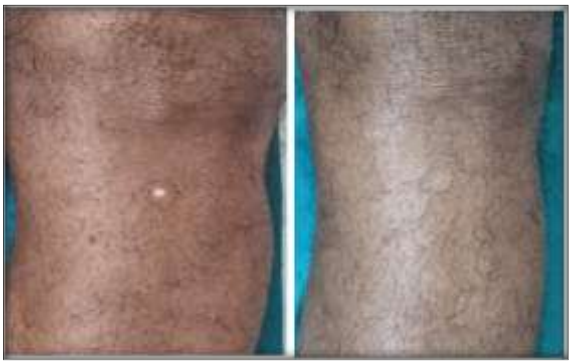

Figure 2: Cryotherapy – (a)before treatment and (b)after 1st sitting

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Figure 3: 50% TCA – (a)before treatement and (b)after 2nd sitting

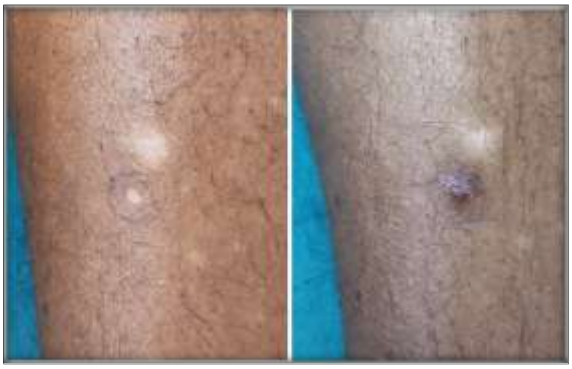

Figure 4: 50% TCA – (a)before treatment and (b)scarring after treatment

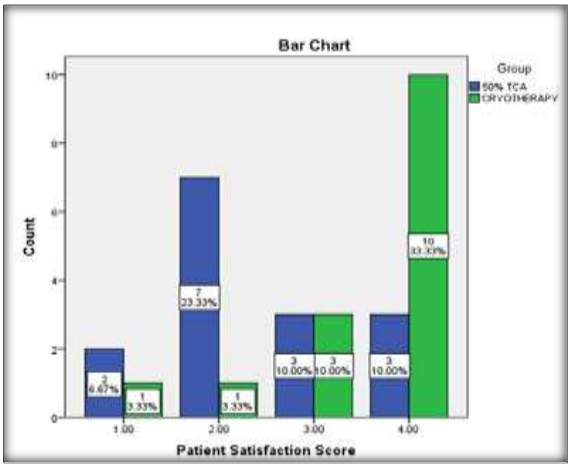

Figure 5: Distribution of patient satisfaction score

DISCUSSION

Idiopathic guttate hypomelanosis (IGH) was a benign, acquired hypopigmentation disorder characterized by small, round or oval, white macules that typically appear on sun-exposed areas of the skin. It was most commonly observed in middle-aged and older individuals, with its prevalence increasing with age. A variety of therapies with variable success described includes cryotherapy, superficial dermabrasion, topical steroids, therapeutic wounding with 88% phenol, topical retinoids & topical pimecrolimus. Despite several therapeutic modalities, the treatment of IGH still remains unsatisfactory and therapeutic challenge for dermatologists. The postulated mechanism of repigmentation following therapeutic wounding was that, during the process of wound healing inflammatory process stimulates follicular and perilesional melanocytes through liberation of cytokines to induce pigmentation.[4,5]

In our study, 15 participants underwent cryotherapy for IGH lesions located on the pre-tibial region. Each participant received short contact cryotherapy using the cotton dip-stick method for 3 to 5 seconds, applied once a month for up to three sessions. Among the 75 treated macules, a majority of 38.7% had 75% repigmentation and exhibited a good clinical response after the first session, with good clinical improvements within 4 to 6 weeks after 1st sitting and a total of 6 lesions showed Grade 4 pigmentation after 1st sitting but not in 50% TCA applied lesions.

A randomized controlled study by Laosakul et al,[6] involving 101 lesions treated with a single 5-second cryotherapy session reported that 82.3% of treated lesions showed more than 75% improvement in pigmentation at 4 months, compared to only 2% in the control group. A study by Rajegowda et al,[7] found that 60% of lesions treated with short contact cryotherapy (3–5 seconds) showed excellent repigmentation only after 6 to 8 weeks, while 16% showed good response. Kumarasinghe et al,[8] reported that 100% improvement in pigmentation with 3–5 second cryotherapy, indicating a significantly higher efficacy. Ploysangam et al,[9] found that 90.8% of lesions treated with 10-second cryotherapy showed repigmentation within 6–8 weeks.

In comparison to other treatment modalities, cryotherapy has demonstrated superior efficacy and safety. But in our study, we have used cotton dip-stick method whereas other studies had used cryoprobe or cryotip for application.

In our study, the other 15 participants were treated with 50% trichloroacetic acid (TCA) applied once a month for up to three sessions. Among the 75 treated macules, only 20% had >75% repigmentation and a majority of 21.3% had no repigmentation. The lesions exhibited a good clinical response after the second session, with visible improvements within 8 to 10 weeks. A pilot study by Dhotre et al,[10] involving 20 patients compared the efficacy of 50% TCA application and dermabrasion in treating IGH. The study found that 50% TCA application resulted in repigmentation up to 25% and between 25–50% in 48.6% and 41.7% of lesions, respectively. Vedamurthy et al,[11] had concluded that 50% trichloroacetic acid is a safe and effective therapeutic option to achieve successful repigmentation in the management of idiopathic guttate hypomelanosis but details of the study couldn't be elicited.

Both cryotherapy and 50% TCA have demonstrated efficacy in the treatment of IGH. Cryotherapy appears to offer a higher percentage of lesions achieving excellent repigmentation with a shorter

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treatment interval, whereas TCA may require more sessions for optimal results. Given its simplicity, cost-effectiveness, and favourable safety profile, cryotherapy may be considered a first-line therapeutic option for patients with IGH seeking cosmetic improvement.

CONCLUSION

IGH was a common pigmentary disorder that affects a large proportion of the population and can be aesthetically undesirable for patients. There was no definitive treatment at present and the currently available treatment options have varied efficacy. In our study, short contact cryotherapy had good clinical response, efficacy, safety profile and good patient reported outcome when compared with 50% Trichloroacetic acid.

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Conflicts of interest: Nil

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