

A Prospective Study to Compare the Efficacy of Cryotherapy Versus Intralesional Steroid in Alopecia Areata

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Abstract

Background: Alopecia areata (AA) is an autoimmune disease that results in the loss of hair on the scalp and elsewhere on the body. The present study was conducted to compare the intralesional steroid and cryotherapy in the treatment of AA. **Materials and Methods:** The present clinical study was conducted in the Department of Dermatology, Venereology, and Leprology, Muzaffarnagar Medical College. The simple random sampling technique was used for randomly dividing the subjects into two groups: group I (local cryotherapy) and group II (intralesional corticosteroid). **Results:** A positive response was significantly more among the intralesional steroid group (86.0%) when compared with the cryotherapy group (62.0%). There was a significant difference in relapse between intralesional steroid group (22.0%) and cryotherapy group (16.0%). An excellent response was significantly more among the intralesional steroid group (44.0%) when compared with the cryotherapy group (18.0%). Poor response was significantly more among the cryotherapy group (18.0%), compared with the intralesional steroid group (0.0%). The mean pre-treatment, post-treatment, and the change from pre- to post-treatment Severity of Alopecia Tool [SALT] were compared between cryotherapy and intralesional steroid groups using the unpaired *t*-test. The mean pre-treatment, post-treatment, and the change from pre- to post-treatment SALT were significantly more among the intralesional steroid group when compared with the cryotherapy group. **Conclusion:** The authors found that superficial cryotherapy could be a meaningful adjuvant treatment option for AA patients. There was a significantly less relapse rate with cryotherapy. Among the currently available topical modalities for the treatment of AA, the best response was to the intralesional steroids followed by cryotherapy.

Keywords: Alopecia areata, cryotherapy, intralesional steroid

INTRODUCTION

Alopecia areata (AA) is an autoimmune disease that results in the loss of hair on the scalp and elsewhere on the body. Despite recent advancements in understanding the pathology of this disease, there remain no approved treatment options. AA is a chronic condition that is highly unpredictable and the disease course is different for each person, ranging from a few patches to complete loss of hair on affected areas. Hair can spontaneously regrow or fall out again at any time. AA can cause significant psychological and social challenges for patients and their families. Depression, anxiety, and suicidal ideation are health issues that can accompany AA.^[1]

Cryotherapy has been advocated as second-line treatment choice for AA. It is a controlled and targeted destruction of diseased tissue by application of a cold substance. In

the present age, despite the advent of several ablative procedures such as radiofrequency or laser therapy, cryotherapy continues to occupy a very important position in therapeutic armamentarium of a dermatologist. It is very safe, inexpensive, reproducible, repeatable, and simple procedure.^[2]

Triamcinolone acetonide (Kenacort) is a steroid solution that has been used as a treatment for AA for over 50 years.^[3] It is administered via injection into the scalp and appears to have some efficacy for patients with mild-to-moderate AA. Intralesional corticosteroids, particularly triamcinolone acetonide, remain first-line

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therapy in adults with limited, patchy AA.^[4] The present study was conducted to compare the intralesional steroid and cryotherapy in the treatment of AA.

MATERIALS AND METHODS

The present clinical study was conducted after obtaining clearance from Ethical Committee in the Department of Dermatology, Venereology, and Leprology, Muzaffarnagar Medical College during the period from March 2018 to November 2019. The study subjects were chosen as per the inclusion criteria such as willingness of patients for the procedure, both gender patients, patients above 10 years, patients with patchy hair loss, and those not taking any treatment for the last 6 months. Exclusion criteria were patients below 10 years of age, blood dyscrasias of unknown origin, patients with alopecia other than AA, patients with history of bleeding disorders or on anticoagulant medications, patients with active infection at the local site, patients with keloidal tendency, patients with low pain threshold, and dark-skinned people [Figure 1].

The simple random sampling technique was used for randomly dividing the subjects into two groups: group I (local cryotherapy) and in group II (intralesional corticosteroid). The manner of cryotherapy was superficial cryotherapy. The area to be treated is exposed adequately and cleaned thoroughly with spirit or povidone iodine. Usually, intralesional or topical anesthesia is not required. The technique of application is timed spot freeze technique. The cryogen is sprayed directly on the lesion through an appropriate sized nozzle. The nozzle is held 1 cm from the skin surface, and the cryogen is sprayed in the center of the lesion until an ice ball that completely encompasses the lesion and the desired margin is reached. The spraying is continued for adequate duration after which the lesion is allowed to thaw to complete one freeze–thaw cycle. Complete thawing is suggested by disappearance of the frozen white surface. Each cycle was of 3–5 s.

ILC in the concentration of 10 mg/mL (maximum volume of 3 mL per session) was the preferred concentration



Figure 1: (A) Pre-operative and (B) post-operative photographs of the patient treated with cryotherapy

for scalp. For the eyebrows and face, 2.5 and 5 mg/mL can be used, respectively. Triamcinolone acetonide is injected intradermally with a 0.5-in long, 30-gage needle as multiple 0.1-mL injections at 1-cm intervals (12 of same). BD insulin (1 cc) syringes were used. Sterile saline was preferred over xylocaine as a diluent, because the latter stings more. Optional topical anesthetic can be applied 30–60 min before treatment to minimize pain from the injections; this will be useful when treating eyebrows. Fifty-six intralesional corticosteroids may also be administered by a needleless device (e.g., Derma jet™). The device should be sterilized between patients. Treatments are repeated every 4–6 weeks. Response and complications were followed up till 3 months. Clinical response was defined as hair regrowth in the manner of without response (0–30% regrowth), mild response (30–60% regrowth), moderate (60–90% regrowth), and complete response (90–100% regrowth) and SALT scoring.

The patients clinically diagnosed with AA lesions were evaluated by trichoscopy. Objective evaluation was carried out based on SALT scoring, that is, “Severity of Alopecia Tool Score” as the scalp was divided into the following four areas: vertex: 40% (0.40) of scalp surface area, right profile of scalp: 18% (0.18) of scalp surface area, left profile of scalp: 18% (0.18) of scalp surface area, and posterior aspect of scalp: 24% (0.24) of scalp surface area. The data were entered into Microsoft Excel and the statistical analysis was performed.

RESULTS

There were 67 (67.0%) males and 33 (33.0%) females among the study population [Table 1]. Positive response was significantly more among the intralesional steroid group (86.0%), compared with the cryotherapy group (62.0%). There was a significant difference in relapse between the intralesional steroid (22.0%) and cryotherapy groups (16.0%). Adverse effects were compared between the cryotherapy and intralesional steroid groups using the χ^2 test. Inflammation, mild itching, pain, pruritus, and swelling were significantly more among the cryotherapy group when compared with the intralesional steroid group.

DISCUSSION

Cryotherapy and hypothermia have been associated with reduced *in-vitro* and *in-vivo* T-cell and monocyte activation response, reduced IL-17 release in T cells, reduced IL-1b/IL-23 activation of T cells, and reduced granzyme B.^[5] Several studies have assessed the efficacy of cryotherapy in the treatment of AA. A study comparing cryotherapy and clobetasol propionate lotion in patchy recalcitrant AA showed response rates of 80% and 91.5% hair regrowth in respective treatment groups.^[6]

In the present study, there were 67.0% males and 33.0% females among the study population. This was similar to

Table 1: Distribution of patient assessment score between cryotherapy and intralesional steroid groups

Patient assessment score	Groups		Total
	Cryotherapy	Intralesional steroid	
Poor	9 18.0%	0 0.0%	9 9.0%
Fair	14 28.0%	14 28.0%	28 28.0%
Good	18 36.0%	14 28.0%	32 32.0%
Excellent	9 18.0%	22 44.0%	31 31.0%
Total	50 100.0%	50 100.0%	100 100.0%

χ^2 value = 14.952, *P*-value = 0.002*

the study by Sardesai *et al.*^[7]: 18 (60%) were males and 12 (40%) were females. Sharma *et al.*^[8] in 1996 reported a male-to-female ratio of 1:0.57.^[8]

Positive response was significantly more among the intralesional steroid group (86.0%) when compared with the cryotherapy group (62.0%) in our study. In the study by Jun *et al.*,^[9] among 353 patients, there were 60.9% of the responders which was similar to the present study.

In our study, excellent response was significantly more among the intralesional steroid group (44.0%) when compared with the cryotherapy group (18.0%), whereas poor response was significantly more among the cryotherapy group (18.0%) compared with the intralesional steroid group (0.0%).

Amirnia *et al.*^[10] studied 120 patients of AA in whom they compared intralesional triamcinolone injections with LN cryotherapy and noticed that AA patches treated with intralesional triamcinolone injections gave superior results but concluded that cryotherapy treatment alone can induce hair regrowth in AA.

Cryotherapy may act through either singly or by a conglomeration of the following mechanisms resulting in hair regrowth in AA. After initial vasoconstriction with cryotherapy, there is a significant local vasodilatation during the thaw period as the temperature reaches zero degree Celsius. Thus, cryotherapy is speculated to dilate the vessels around the affected hair follicles, with an increase in the blood flow leading to follicular hair regrowth.^[11] Moreover, local edema and inflammation occurring after cryotherapy may play a role in inducing vasodilatation [Figure 2].^[12]

The mean Trichoscan (hair density) in our study was significantly more in the intralesional steroid group compared with the cryotherapy group [Table 2]. Radhakrishnan *et al.*^[13] reported hair regrowth in 92% of the patients at 4–6 weeks with triamcinolone acetonide (using the Porto-jet injector), compared with 7% in control subjects injected with isotonic saline.



Figure 2: (A) Pre-operative and (B) post-operative photographs of the patient treated with intralesional corticosteroids

In our study, the mean pre-treatment, post-treatment, and the change from pre- to post-treatment SALT were significantly more among the intralesional steroid group, compared with the cryotherapy group [Table 3].

In the current study, there is a significant difference in relapse between the intralesional steroid (22.0%) and cryotherapy groups (16.0%). This was similar to the study by Wahab.^[14]

In the current study, inflammation, mild itching, pain, pruritus, and swelling were significantly more among the cryotherapy group. Ganjoo and Thappa^[15] found that atrophy occurred in 16% of the treated patches. Skin hypopigmentation or depigmentation was not seen. Radhakrishnan *et al.*^[13] in their study showed that adverse effects among the 84 patients included hemorrhage, atrophy (two), pain (two), and a depressed plasma cortisol level (one).

According to the study by Lee *et al.*,^[16] superficial cryotherapy can induce clinical improvement of AA by blocking a yet unrevealed pathophysiologic process associated with abnormal melanocytes with large and bizarre melanosomes, found around the hair follicles of AA patients.

CONCLUSION

The authors found that superficial cryotherapy could be a meaningful adjuvant treatment option for AA patients.

Table 2: Comparison of mean Trichoscan (hair density) between cryotherapy and intralesional steroid groups

Groups	Mean	Std. deviation	Mean difference	P-value
Cryotherapy	7.08	2.38	-5.84	0.005
Intralesional steroid	12.92	2.83		

Table 3: Comparison of mean pre-treatment, post-treatment, and change from pre- to post-treatment SALT score between cryotherapy and intralesional steroid groups

Severity alopecia tool [SALT]	Groups	Mean	Std. deviation	Mean difference	P-value
Pre-treatment	Cryotherapy	0.59	0.10	-0.02	0.310
	Intralesional steroid	0.61	0.08		
Post-treatment	Cryotherapy	0.67	0.10	-0.07	0.001*
	Intralesional steroid	0.79	0.10		
Change in score	Cryotherapy	13.58%	5.30%	-0.04	0.001*
	Intralesional steroid	28.86%	9.67%		

Table 4: Comparison of mean patients' overall satisfaction score between cryotherapy and intralesional steroid groups

Groups	Mean	Std. deviation	Mean difference	P-value
Cryotherapy	2.54	0.99	-0.62	0.001*
Intralesional steroid	3.16	0.84		

Considering that it is less painful and easier to perform, superficial cryotherapy is especially worthy of application to patients with mild AA who have difficulty with conventional treatments such as intralesional steroid injection. There was a significantly less relapse rate with cryotherapy when compared with intralesional steroid therapy [Table 4].

Among the currently available topical modalities for the treatment of AA, the best response was to the intralesional steroids followed by cryotherapy. Side effects include transient atrophy, which can be prevented by the use of smaller concentrations and volumes, minimizing the number of injections per site and avoiding injecting too superficially. Intralesional steroids are safe and effective treatments for patients with extensive AA.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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