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THERAPEUTIC EFFICACY OF SUPERFICIAL CRYOTHERAPY WITH LIQUID NITROGEN IN ALOPECIA AREATA

Dermatology

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ABSTRACT

Alopecia areata has lifelong potential for hair regrowth. In the above study forty patients of both sexes were enrolled. A cryocan with withdrawal apparatus is required for the storage of cryogen along with cotton tipped applicator for the procedure. Liquid nitrogen is applied by dipstick method. All the patients were followed up weekly for upto 12 weeks subjectively, objectively and photographic evaluation was done.

The therapeutic response was determined as regrowth of hair on the treated areas. At the end of 12 weeks, out of 40 patients, 25 (62.5%) patients showed complete hair growth, 10 (25%) patients had 75% hair growth, 2 (5%) patients had < 50% hair growth and only 3 (7.5%) patients didn't respond at all. There are minimal side effects with cryotherapy like mild burning sensation on application, mottled pigmentation.

KEYWORDS

Alopecia Areata, Cryotherapy, Liquid Nitrogen.

Hair are concerned with sexual and social communication. Alopecia areata is a benign condition and most patients are asymptomatic; however, affected individuals are self-consciousness and under tremendous distress. The incidence rate of alopecia areata according to a study was 0.1-0.2% with a lifetime risk of 1.7% [1]. Messenger et al found that hair bulb keratinocytes aberrantly expressed HLA-DR antigen, a phenomenon indicative of immunological cell injury [2].

Anagen follicles show perifollicular and intrafollicular inflammatory cell infiltrate, in and around the hair bulb. Little or no inflammatory infiltrate is seen around the isthmus of hair follicle, the site of follicle stem cells as compared to scarring alopecias [3] so the follicles are not destroyed in alopecia areata. Van Scott showed that the growth of these follicles was arrested in early anagen (anagen IV), following which they return prematurely to telogen. This truncated anagen-telogen cycle is termed as nanogen [4,5] . The onset of alopecia may be at any age but peaks between the second and fourth decades. Its occurrence after 60 years is unusual. In an Indian study, the proportion of children affected were higher at 31% [6]. There is stippled pitting of nails but some cases show trachyonychia or atrophic dystrophy. The frequency of nail involvement is 10-20% with possibility of "20 nail alopecia areata sine alopecia" [7]. Commonest change includes superficial uniform minute pits arranged regularly along and across the nail giving a "scotch plaid" effect or coalescing into "ripples". Poor prognostic indicators are early age of onset, extensive scalp involvement, loss of eyebrows and eyelashes, alopecia totalis / universalis. A number of studies have shown that cryotherapy is effective in various dermatological conditions .The present study has been carried out to evaluate the therapeutic efficacy of superficial topical cryotherapy with liquid nitrogen in alopecia areata. Huang P, Huang S , Wei G treated 123 cases of Alopecia areata with liquid nitrogen in 1986[8]. Kuflik E G observed good response of superficial hypothermic cryotherapy with liquid nitrogen in alopecia areeata in 1991[9]. In 1994 a study was done by Kim et al with cryotherapy in some lesions and I/L triamcinolone in other lesions simultaneously. It was concluded that effect of cryotherapy was not less than I/L triamcinolone[10]. The study was conducted in the Department of Dermatology, Veneorology and Leprology at Guru Gobind Singh Medical College and Hospital, Faridkot. Forty patients of alopecia areata were enrolled from outpatient department of Dermatology. Patients included were having a minimum of two patches of alopecia areata and subjects of both sexes between the ages of ten to fifty years. The patients Excluded were those with scarring alopecia, cold intolerance , cold urticaria, with Raynaud's disease and presence of active fungal or any other infection. Each patient was subjected to various investigations at the time of reporting. The equipment used was liquid nitrogen cryocan with withdrawal apparatus, liquid nitrogen and cotton tipped applicators.

At test site, after cleaning the involved area with povidone iodine solution, the autoclaved cotton tipped applicators dipped in liquid nitrogen was applied on the involved area and repeated to complete two freeze thaw cycles of two seconds each.

At control site, after cleaning the involved area with povidone iodine solution, the autoclaved cotton tipped applicators will be dipped in distilled water (at room temperature) and applied in same way as test site. A total of 5 applications were given at weekly interval, from day 0 to week 4. After treatment, follow ups were at two weekly intervals for another 8 weeks, completing a total period of 12 weeks.

The therapeutic response was determined as regrowth of hair on the treated areas. The patients' response to treatment was graded as follows:

G O < 25% of hair growth (poor)
G 1 – 25% - 50% hair growth (fair)
G 2 – 50%-75% hair growth (good)
G 3 - 75%-90% hair growth (excellent)
G 4 > 90% hair growth (complete regrowth)

Results were analyzed photographically and statistically after follow up of 12 weeks.

DISCUSSION

Alopecia areata may involve any hairy area of the body from head to toe. Effects of alopecia areata are mainly psychological because of loss of self image due to hair loss. In the present study attempt has been made to relieve this human agony with the help of cryotherapy. In this study of 40 patients were included, majority of patients were in the age group of 20-29 yrs (32.5%), closely followed by 12 (30%) in the age group of 10-19yrs. There were 10 (25%) patients in the age group of 30-39years and 5 (12.5%) patients between 40-50yrs of age. In the present study of 40 patients there were 13 (32.5%) females and 27 (67.5%) males. We observed that unmarried patients exceeded the married ones. The number of unmarried patients were 24 (60%) and the number of married patients were 16 (40%). Out of 40 patients maximum were students 16 (40%), 7 (17.5%) were associated with agriculture, 6(15%) were businessmen, 3 (7.5%) housewives, 3 (7.5%) teachers, 5 (12.5%) were engaged in private job. Rural patients outnumbered the urban ones. 22 (55%) patients were of rural area while 18 (45%) were urban. According to our study maximum number of 22 (55%) patients had alopecia areata of scalp, 14 (35%) patients had alopecia barbae, 4 (10%) patients presented with both the types. In 10% of the cases sites other than scalp are affected singly or in combination. Ophiasic pattern of alopecia was most stubborn to treatment.

Duration of the disorder varied from 3 months to 4-5years. One (2.5%) out of 40 patients had positive family history of the disease. 22 (55%) patients had minimum 2 patches of alopecia and 18 (45%) patients had 3-10 patches of alopecia. Nail changes were present in 21(52.5%) of the 40 patients in the form of pitting, leukonychia, pterygium, trachyonychia, longitudinal ridging, yellowish discoloration. Nail changes are present in 10% of patients of alopecia with a range of 7% - 66%.

RESULT

On application of cryogen with cotton tipped applicator results started showing in 5 patients after a week of therapy with the appearance of fine hair in the centre of the alopecic patch. The hair were initially fine and golden resulting in hetrochromia.

By two weeks 25 patients had 25% hair growth i.e. grade 1 improvement. As another week followed 29 patients had 25% hair growth and 6 patients had 50% hair growth i.e. grade 2 improvement. The control group showed no results by this time. After 4 weeks of therapy one patient had 75% hair growth thereby reaching grade 3 improvement while in the control group 3 patches started showing grade 1 improvement in patches located near to the test patches. The control alopecic patches which were situated away from test patches showed no hair growth. During the follow up visits which were done every two weekly showed further results with grade 2 (50%) improvement in 29 patients and grade 3 (75%) hair growth in 3 patients in the test group while in the control patches situated near the test patches,n7 patches showed grade1 (25%) hair growth at first follow up. On the second follow up visit on day 56, 16 patients had grade3 (75%) hair growth, 19 patients had grade 2 (50%) growth and the 3 patients started having new growth in the test patches. By now, 20 control patches at the nearby test site had grade1 (25%) hair growth compared to the exuberant growth at the test site. By day 70, 2 patients had full hair growth, 26 had 75% growth, 8 patients had 50% growth while 2 had 25% growth and 2 had no growth at the test site.

At the control site in the vicinity of the test site, 22 patients had 25% hair growth. Further follow up on day 84, 11 patients turned up with full hair growth at the test site, 23 had 75% growth, 2 each had 50% and 25% while 2 had no growth of hair at the test site. At the control site, 29 patients showed grade1 and 2 improvement while 11 patients had no growth of hair. Finally on day 98 patients showed encouraging results with 27 patients having full hair growth, 9 patients had 75% (grade 3) hair growth, 1 patient had 50% (grade 2) growth, another 1 patient 25% (grade1) hair growth and 2 patients had patches stubborn to treatment with cryotherapy in a total of 40 patients. Comparing it with the control site, no patient had full hair growth at final follow up, 1 patient had 75% (grade3) hair growth, 19 were at grade 2 (50%) growth, 9 patients had 25% (grade1) growth and 11 patients show no growth of hair. At the control site, hair growth occurred more so when the patches were situated in the vicinity of the test patches being treated with cryotherapy. The patches situated at sites away from the test site like some other body showed showed no hair growth at the control site. During the follow up period, one patient reported with recurrence at the same site which was treated again with cryotherapy This patient had a maximum number of ten patches on the scalp and the beard region. Later on all the patches were treated with cryotherapy. P value was calculated using chi square chart which showed to be highly significant in test group as compared to the control i.e. <.001.

The side effects associated with cryotherapy were minimal like burning sensation felt immediately after application of liquid nitrogen. Mottled hyperpigmentation appeared in a few subjects after a few weeks of cryotherapy while majority of the patients i.e. 30 (75%) had no side effects associated with the therapy.

Cryotherapy should be the preferred treatment as it can be used on all body parts except eyes, extensive and large patches can be treated without significant side effects. Even small children are comfortable with this treatment and in pregnant women other types of treatment may not be possible. So it is a safe and effective mode of therapy.

CONCLUSION

According to the other studies which were conducted in comparison to intra lesional steroids the results were found to be equivalent with added advantage of minimal side effects which may be associated with corticosteroids. It was concluded that cryotherapy with liquid nitrogen is a safe and effective therapeutic modality in alopecia areata. Advantages are ease of use, low cost,good cosmetic results, high cure rate, no requirement of anesthesia, rarity of complications and above all patients of all ages including pregnant females can be treated. It could be used as a new mode of therapy for treating alopecia areata.

Test site day 0

Control site day 0

Test site 3rd week

Control site 3rd week

Test site at 8th week

Control site at 8th week

Day 0

2nd week

3rd week

4th week

8th week

12th week

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