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Effect of Intralesional Triamcinolone Acetonide on Alopecia Areata

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Abstract:
Background: *Alopecia areata (AA) is a chronic, non-scarring autoimmune disorder characterized by patchy hair loss, significantly impacting patient quality of life. The lifetime prevalence of AA is approximately 1.7%, with substantial emotional and psychological implications.* ***Objectives:*** *This study primarily sought to investigate the efficacy of two different concentrations of intralesional triamcinolone acetonide (ILT) in managing patchy scalp alopecia areata.* ***Methodology:*** *An open clinical trial was conducted at the National Institute of Diseases of the Chest and Hospital, Dhaka Bangladesh and private chamber, from January 2023 to June 2024. The study enrolled 55 patients with patchy alopecia areata involving less than 50% of scalp surface area. Participants were systematically divided into two treatment groups: Group 1 (n=27) received intralesional triamcinolone acetonide at 5 mg/mL, while Group 2 (n=28) received 10 mg/mL concentration. Patients underwent monthly intralesional injections, with comprehensive assessments performed at 12 weeks and a one-year follow-up to evaluate treatment response and potential recurrence.* ***Results:*** *Treatment efficacy demonstrated remarkably consistent outcomes across both concentration groups. Approximately 42.9-44.4% of patients achieved complete hair regrowth, with 63-64.3% experiencing satisfactory overall results. The 10 mg/mL concentration exhibited marginally faster initial response at the 4-week assessment. Side effect profiles were minimal and statistically similar between groups, primarily manifesting as localized atrophy, telangiectasia, and occasional folliculitis. A notable finding was the recurrence rate of 44-50% within the one-year follow-up period, highlighting the chronic nature of alopecia areata. The study provides crucial insights into intralesional triamcinolone acetonide treatment for alopecia areata. The comparable efficacy of 5 mg/mL and 10 mg/mL concentrations suggests clinicians have flexibility in treatment approach. The research underscores the importance of early intervention and comprehensive patient management.* ***Conclusions:*** *Intralesional triamcinolone acetonide represents a valuable treatment modality for localized alopecia areata. While demonstrating significant potential for hair regrowth, the study also revealed the challenges associated with long-term management, characterized by relatively high recurrence rates.*

Keywords: *Alopecia areata, Intralesional triamcinolone acetonide, Scalp hair regrowth, Steroid injection therapy, Autoimmune hair loss, Treatment concentration efficacy, Dermatological management*

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I. Introduction

Alopecia areata (AA), is a chronic, remitting, non-scarring, presumed autoimmune disease of the hair follicles leading to hair loss. AA is commonly linked to severe emotional discomfort and has a 1.7% lifetime frequency. A very diagnostic feature is the appearance of distinct, hairless areas with yellow spots and short, broken hairs (exclamation mark hairs) surrounding the edges [1-4]. There are several treatment approaches that should be customized based on the depth and severity of the sickness as well as the patient's psychological state. Regretfully, there is no cure or preventative therapy [5-7].

One of the initial therapeutic choices for AA in adults is often intralesional steroids, typically triamcinolone acetonide (TA) in dosages of 2.5–10 mg/mL. The patient's age, the degree of hair loss, and the results of prior treatments all influence the treatment option. The best options for treating localized AA in adults with less than 50% scalp involvement are topical calcineurin inhibitors, oral corticosteroids, intralesional (IL)

corticosteroid injections, and local immunotherapy (diphencyprone, anthralin) [1,8,9]. The first-line IL corticosteroid treatment for people with patchy, limited AA is still triamcinolone acetonide (TA). Different clinics employ different IL corticosteroid dosages and dilutions for AA therapy, and doctor expertise influences the IL injection dosages [1,10]. Generally, TA doses of 2.5 mg/mL are advised for the face (beard, eyebrows) and 5 mg/mL for the scalp [11]. However, case series with small sample numbers and diverse patient groups make up the majority of the present research [3]. Alopecia areata has long been treated with intradermal corticosteroid injections. A series employing hydrocortisone was originally reported by Kalkoff & Macher in 1958. Later, Gombiner & Malkinson (1961) reported the use of triamcinolone 10 mg/mL, while Orentreich et al. (1960) presented injections of insoluble forms of prednisolone, hydrocortisone, and fludrocortisone as a viable technique to treat AA [12,13,14]. The advantages of IL injections of 5 mg/mL triamcinolone hexacetonide and 10 mg/mL TA were reported by Porter and Burton (1971) [15,16]. Hair regrowth after 12 weeks was best accomplished in the ITA group, according to prior open-label randomized research evaluating the effectiveness of topical bethametasone valerate foam, tacrolimus ointment, and intralesional triamcinolone acetonide (ITA) (10 mg/mL) for the treatment of localized AA [17].

II. Methodology

It was a study with open clinical trial. Within the period of data collection, 55 patients were enrolled in this study if they had been diagnosed clinically and/or histologically with AA. This study was conducted in the outpatient in National Institute of Diseases of the Chest and Hospital and private chamber, Bangladesh and private chamber from January 2023 to June 2024, and were subsequently treated with ILT, specific inclusion criteria were: patients of all ages with patchy AA on the scalp that involved less than 50% of scalp surface area, who were treated by monthly injection of triamcinolone acetonide 5 mg/mL or 10 mg/mL. Patients with extensive scalp involvement (surface area >50%, alopecia totalis or universalis), and those on combination therapy were excluded. While individuals exhibiting AA patches on both scalp and extra scalp sites (eg, beard, moustache, eye brows) were included, assessment was only performed on the scalp patches. All patients or their guardians provided informed consent to be included in the study. Patients' medical records and the serial photographs (if available) were taken. The data took from medical records included demographic characteristics (age, gender), AA characteristics (duration, number of patches, scalp surface area affected, nail and extra scalp involvement), and medical history (past history of AA, atopy, comorbidities, and family history of AA). BD insulin (1 cc) syringes are a good choice, due to lack of leak between syringe and needle. Sterile saline is preferred over Xylocaine as a dilutant, because the latter stings more. Optional topical anaesthetic can be applied 30 to 60 minutes before treatment to minimize pain from the injections, this will be useful when treating eyebrows. ILCs may also be administered by a needleless device (e.g. Dermajet™). The device should be sterilized between patients.

Treatments are repeated every four to six weeks. Initial regrowth is often seen in four to eight weeks. If there is no improvement after six months of treatment, the ILCs should be stopped. The decreased expression of thioredoxin reductase 1 in the outer root sheath may be the cause for glucocorticoid resistance in some AA patients. Children younger than 10 years are not usually treated with ILCs because of pain localized at the injection sites. For all patients, ILT was done on a monthly basis, whereby the steroids diluted with lidocaine or normal saline were injected using a 30-gauge needle at 1 cm intervals, starting from the periphery of the patch and moving toward its center, approximately 0.1−0.2 mL was injected per site. Treatment response and the side-effects were recorded prior to the second and third treatment, and assessment for recurrence was performed 1 years after the last injection, during the follow-up visit.

III. Result

Table 1. Distribution of the respondents' according to socio-demographic characteristics (n=55)

Parameter	Group A ILT: 5 mg/mL (N = 27)		Group B ILT: 10 mg/mL (N = 28)		P-value
	n	%	n	%	
Gender					
Female	12	44.4	13	46.4	0.323
Male	15	55.6	15	53.6	
Age					
Mean (SD) (years)	20.9 (11)		20.0 (12)		
≤18	10	37.0	10	35.7	0.333
19–30	12	44.4	13	46.4	
>30	5	18.5	5	17.9	

Table 2. Distribution of the respondents' according to clinical features and medical history (n=55)

Parameter	Group A ILT: 5 mg/mL (N = 27)		Group B ILT: 10 mg/mL (N = 28)		P-value
	n	%	n	%	
Duration of treated AA patches					
Mean (SD) (months)	13.6 (27)		12.8 (26)		0.835
≤2	9	33.3	10	35.7	
3–6	8	29.6	8	28.6	
>6	10	37.0	10	35.7	
Number of patches					
Mean (SD)	3.4 (4.2)		3.5 (4.0)		0.452
1	9	33.3	10	35.7	
2	8	29.6	8	28.6	
≥3	10	37.0	10	35.7	
Scalp surface area affected					
Mean (SD)	5.4 (5.2)		5.0 (4.8)		0.658
<3	8	29.6	9	32.1	
3–5	9	33.3	10	35.7	
6+	10	37.0	9	32.1	
Past history of AA	6	22.2	7	25	0.553
Personal history of atopy (atopic dermatitis, asthma, allergic rhinitis)	8	29.6	8	28.6	0.587
Comorbidities (hypothyroidism, low ferritin, hypertension, diabetes mellitus,	8	29.6	8	28.6	0.587
juvenile rheumatoid arthritis, vitiligo, psoriasis, depression, anxiety)					
Nail involvement (fine pitting, trachyonychia, leuconychia)	2	7.4	3	10.7	0.522
Extra scalp sites (eyebrow, moustache, legs, beard)	6	22.2	6	21.4	0.663
Family history of AA	4	14.8	4	14.3	0.536

Figure 1 A patient with occipital and temporal patches showing complete hair regrowth after single injection of ILT10 mg/mL

Figure 2 Skin atrophy observed at sites of ILT injection (arrows).

Table 3. Distribution of the respondents' according to response of treatment group 1 ILT: 5 mg/mL (N=27)

Variables	ILT 5 mg/mL (N=27)	
	n/N	%
Patients with complete hair regrowth at 12 weeks	12/27	44.4
Patients with satisfactory outcome at 12 weeks	17/27	63.0
Overall side-effects	5/27	18.5
Atrophy	3/27	11.1
Atrophy and telangiectasia	1/27	3.7
Folliculitis	1/27	3.7
Hypopigmentation	0/27	0.0
Recurrence after 1 years of follow-up	12/27	44.4

Table 4. Distribution of the respondents' according to response of treatment group 2 ILT: 10 mg/mL (N=28)

Variables	ILT 10 mg/mL (N=28)	
	n/N	%
Patients with complete hair regrowth 12 weeks	12/28	42.9%
Patients with satisfactory outcome at 12 weeks	18/28	64.3%
Overall side-effects	5/28	17.9%
Atrophy	3/28	10.7%
Atrophy and telangiectasia	1/28	3.6%
Folliculitis	1/28	3.6%
Hypopigmentation	0/28	0.0%
Recurrence after 6 months of follow-up	13/28	50.4%

IV. Discussion

In this investigation, we included two patient groups with comparable clinical and demographic characteristics. According to the results, the two most often used ILT doses (5 and 10 mg/mL) for treating patchy AA on the scalp may be similarly effective after 12 weeks. ILT 10 mg/mL, however, had somewhat quicker outcomes and was better after four weeks. Only a small number of studies that primarily examined the effectiveness of varying ILT concentrations in the treatment of patchy AA were found in the literature review; these studies used disparate approaches and had inconsistent findings. Three ILT concentrations (2.5 mg/mL, 5 mg/mL, and 10 mg/mL) were shown to be similarly efficacious and superior to normal saline in an intrapilot research with four patients [18]. Although the results of a different trial with 15 patients showed that ILT response is concentration dependent, they were not statistically significant [19]. More recent research found that 5 mg/mL

and 10 mg/mL were equally beneficial, based on a systematic review and meta-analysis of seven earlier investigations. However, the authors pointed out discrepancies among the studies that were part of the review about the main outcome that was examined, the method, the frequency, and the length of therapy, as well as the availability of clinical characteristics and demographic data [3].

However, a randomized controlled study had demonstrated that ILT 10 mg/mL was more effective than ILT 5 mg/mL, which was more effective than ILT 2.5 mg/mL. ILT 10 mg/mL was associated with a higher frequency of cutaneous adverse effects. However, there were just a few patches on the scalp in this study—28 patches received ILT 10 mg/mL treatment, compared to 27 patches receiving ILT 5 mg/mL—and patients were not monitored for more than six months [1]. Since only mild and local side effects (atrophy, telangiectasia, folliculitis, and dyspigmentation) were noted, ILT safety was clearly proven in this research. Although they were somewhat more common in the ILT 10 mg/mL group, the difference was not statistically significant. With 48% of patients in both groups achieving total hair regrowth and 70% experiencing excellent outcomes after 1–3 injections, the current study's results show a strong response to ILT therapy. The adverse impact of a longer disease duration (>6 months) was shown, suggesting that early treatment may increase the chance of a favorable outcome. This is in line with a previous study that found longer AA duration was associated with lack of response to both topical and intralesional corticosteroid regimens [20].

Our results also show that, regardless of the ILT dosage, over half of AA patients will relapse. This study showed common correlations between AA and autoimmune diseases. Some of these illnesses were only discovered through examinations or follow-up, even though the majority of patients had them known upon presentation. For instance, three of the seven individuals with hypothyroidism were identified by baseline screening. Furthermore, a young woman who had received effective treatment for patchy AA was later diagnosed with juvenile rheumatoid arthritis, and same sequential relationships were documented [21,22]. Patients' exposure to the local and systemic adverse effects of steroids. This corpus of research would greatly benefit from a comparison of even lower ILT concentrations (e.g., 2.5 mg/mL vs. 5 mg/mL). In fact, a recent study has demonstrated that several corticosteroid regimens (topical, intralesional, or their combination) are equally effective in treating focal AA [20].

V. Conclusion

This study provides valuable insights into the management of alopecia areata using intralesional triamcinolone acetonide. The findings demonstrate that both 5 mg/mL and 10 mg/mL concentrations offer comparable efficacy in treating patchy scalp AA, with the 10 mg/mL concentration showing marginally faster initial response. The relatively high rate of satisfactory outcomes and complete hair regrowth underscores the potential of ILT as a treatment option. However, the significant recurrence rate suggests that AA remains a challenging condition with a tendency for relapse. The study also highlighted important clinical observations, such as the potential association of AA with other autoimmune conditions like hypothyroidism and juvenile rheumatoid arthritis, emphasizing the need for comprehensive patient evaluation and follow-up.

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