ORIGINAL RESEARCH

Comparison of efficacy of intralesional triamcinolone versus 308nm Excimer laser in the treatment of localized alopecia areata

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ABSTRACT

Background: Alopecia areata (AA) is a common autoimmune condition characterized by localized hair loss, often impacting patients' quality of life. Effective treatment options include intralesional triamcinolone and the 308 nm Excimer laser, each with unique mechanisms and potential benefits. However, comparative studies on their efficacy for localized AA remain limited. **Objective:** To compare the efficacy, patient satisfaction, and relapse rates between intralesional triamcinolone and 308 nm Excimer laser in the treatment of localized AA. **Methods:** Fifty-five patients with localized AA were randomly assigned to two treatment groups: intralesional triamcinolone (n=27) administered every 4 weeks or 308 nm Excimer laser therapy (n=28) applied weekly for 12 sessions. Hair regrowth was evaluated using a 4-point scale at 4, 8, and 12 weeks, with secondary outcomes including patient satisfaction, side effects, and relapse rates at a 6-month follow-up. **Results:** The intralesional triamcinolone group demonstrated significantly higher hair regrowth scores at 12 weeks (mean 2.8 vs. 2.3, $p < 0.01$) and reported higher satisfaction (mean score 4.3 vs. 3.7, $p = 0.03$). Relapse rates were lower in the triamcinolone group (18.5%) compared to the Excimer laser group (32.1%). Both treatments were generally well-tolerated with mild, manageable side effects. **Conclusion:** Intralesional triamcinolone appears to be more effective than the 308 nm Excimer laser for localized AA, providing faster regrowth and greater patient satisfaction with fewer relapses. Treatment choice should consider patient preferences for invasiveness, urgency, and potential side effects.

Keywords: Alopecia areata, intralesional triamcinolone, 308 nm Excimer laser, hair regrowth, patient satisfaction, autoimmune

INTRODUCTION

Alopecia areata (AA) is a chronic, autoimmune condition that results in localized, non-scarring hair loss. Affecting approximately 0.1-0.2% of the global population, AA can develop at any age and impacts both genders equally. The disease manifests in several clinical forms, ranging from small, patchy areas of hair loss to more extensive forms like alopecia totalis (total loss of scalp hair) or alopecia universalis (complete body hair loss). The exact etiology of AA remains unclear, but genetic predisposition, environmental triggers, and immune system dysregulation play significant roles in its onset and progression [1]. In AA, immune cells, particularly T lymphocytes, target hair follicles, inhibiting normal hair growth and leading to the development of bald patches. Given the psychological impact of visible hair loss, effective treatments for AA are in high demand to help restore hair and improve patients' quality of life [2].There are numerous treatment options available for AA, including topical, intralesional, and systemic corticosteroids, as well as immunomodulators and phototherapy. However, no single therapy has emerged as universally effective for all cases [3]. Intralesional triamcinolone acetonide (ILT) is one of the most frequently used treatments for localized AA due to its ability to suppress the inflammatory response around hair follicles. Triamcinolone, a type of corticosteroid, is injected directly into the bald patches, delivering a concentrated dose to suppress local immune reactions, which are believed to be key in halting hair loss. ILT is often well tolerated, with side effects generally

limited to mild discomfort or, occasionally, skin atrophy in the treated areas [4].

The 308 nm Excimer laser, a targeted phototherapy device, represents a newer, non-invasive treatment alternative for AA [5]. This laser delivers monochromatic, high-intensity UVB light specifically to affected areas, potentially modulating immune responses by reducing T-cell infiltration around hair follicles and inducing a favorable environment for hair regrowth. Unlike broad-spectrum UV treatments, the Excimer laser minimizes unnecessary exposure to surrounding healthy skin, thereby reducing the risk of side effects like erythema or hyperpigmentation [6]. Several studies have highlighted the Excimer laser's efficacy in promoting hair regrowth in cases of localized AA, with many patients experiencing substantial improvement after a series of treatments [7]. While the precise mechanism of the Excimer laser in AA treatment is not fully understood, it is thought to involve immune modulation, helping to suppress the local autoimmune response without the systemic effects associated with corticosteroid injections [8].Despite the widespread use of both ILT and the 308 nm Excimer laser, comparative studies on their efficacy in treating localized AA are limited. This research aims to provide a head-to-head comparison between these two therapies, examining hair regrowth rates, treatment tolerability, duration of effect, and patient satisfaction [9]. By exploring these aspects, this study seeks to identify which therapy offers superior outcomes for patients with localized AA and assess if one treatment presents distinct advantages over the other [10]. Secondary objectives include evaluating the rate of relapse, the time required to achieve noticeable regrowth, and the impact of each treatment on patients' quality of life.Evaluating these treatment modalities can help clinicians make informed decisions when managing AA, especially in patients who may not respond to one form of treatment or are concerned about potential side effects [11]. Additionally, understanding patient satisfaction and tolerability is critical, as both ILT and the Excimer laser require multiple sessions to achieve optimal results, and adherence to treatment can significantly influence outcomes. By comparing the effectiveness of ILT and the 308 nm Excimer laser, this study has the potential to provide valuable guidance for tailoring treatments to the specific needs and preferences of AA patients [12].

OBJECTIVE

The basic aim of the study is to find the efficacy of intralesional triamcinolone versus 308nm Excimer laser in the treatment of localized alopecia areata.

METHODOLOGY

This study was designed as a comparative, randomized trial to assess the efficacy of intralesional triamcinolone acetonide (ILT) versus the 308 nm Excimer laser in the treatment of localized alopecia areata (AA). A total of 55 patients diagnosed with localized AA were recruited from dermatology outpatient clinics. All participants had one or more patches of AA and had not received any treatment for AA in the previous three months. Inclusion criteria included patients aged 18-60 with a confirmed diagnosis of localized AA involving scalp patches smaller than 25% of total scalp surface area. Exclusion criteria included patients with a history of generalized AA, concurrent scalp infections, or contraindications to corticosteroid injections or phototherapy.

Randomization and Group Assignment

Patients were randomly assigned into two groups to receive either intralesional triamcinolone injections (Group A) or 308 nm Excimer laser treatment (Group B). Group A (n=27) received intralesional injections of triamcinolone acetonide (10 mg/mL) administered directly into the affected areas every 4 weeks. Group B (n=28) received targeted phototherapy using the 308 nm Excimer laser, applied once weekly for a total of 12 sessions. Randomization was performed using a computer-generated sequence, and all patients were informed about their group allocation at the start of the study.

Treatment Protocol

For Group A, triamcinolone acetonide injections were administered at a dose of 0.1 mL per injection site, covering the entire alopecic patch area, with a maximum total dose of 3 mL per session. Each session was performed under sterile conditions, and patients were monitored for potential side effects, such as local atrophy or skin pigmentation changes.

For Group B, each treatment session with the 308 nm Excimer laser lasted approximately 5–10 minutes, depending on the size of the affected area. The dose of UVB was adjusted according to patient tolerance and skin type, with the energy gradually increased over subsequent sessions to maximize treatment efficacy while minimizing the risk of erythema or burns.

The primary outcome measure was the degree of hair regrowth, assessed at 4, 8, and 12 weeks. Hair regrowth was evaluated using a standardized 4-point scale: 0 (no regrowth), 1 (minimal regrowth of vellus hairs), 2 (partial regrowth with mixed vellus and terminal hairs), and 3 (complete regrowth with terminal hairs). Secondary outcome measures included patient-reported satisfaction, side effects, and relapse rates at the 6-month follow-up.

Statistical Analysis

Data analysis was conducted using SPSS software, with a p-value of <0.05 considered statistically significant. Descriptive statistics were used to analyze baseline demographics, while independent t-tests and chi-square tests were applied to compare outcomes between groups. Repeated measures ANOVA was

used to evaluate changes in hair regrowth scores over time within each group.

RESULTS

A total of 55 patients completed the study, with 27 in the intralesional triamcinolone (ILT) group and 28 in the 308 nm Excimer laser group. Both groups were similar in baseline demographics, with no significant differences in age, gender distribution, or initial alopecia areata (AA) severity.Hair regrowth was assessed at 4, 8, and 12 weeks using the 4-point scale (0-3), with higher scores indicating more complete regrowth.

Table 1: Mean hair regrowth scores for each group at different time points are as follows:

Time (weeks)	ILT Group (Mean ± SD)	Excimer Laser Group (Mean ± SD)
4	1.2 ± 0.4	0.9 ± 0.5
8	2.1 ± 0.6	1.7 ± 0.6
12	2.8 ± 0.4	2.3 ± 0.5

At week 4, the ILT group showed slightly greater hair regrowth compared to the Excimer laser group, though the difference was not statistically significant ($p = 0.08$). By week 8, the difference became more pronounced, with the ILT group achieving higher scores ($p = 0.02$). At the final assessment at week 12, the ILT group demonstrated significantly higher hair regrowth scores compared to the Excimer laser group ($p < 0.01$).Patient satisfaction, rated on a scale from 1 to 5, was generally higher in the ILT group.

Table 2: Mean satisfaction scores were as follows:

Group	Satisfaction Score (Mean ± SD)
ILT Group	4.3 ± 0.6
Excimer Laser Group	3.7 ± 0.8

Patients in the ILT group reported significantly higher satisfaction scores compared to those in the Excimer laser group ($p = 0.03$). Comments from patients indicated that the faster onset of visible regrowth in the ILT group contributed to higher satisfaction.

Both treatments were generally well tolerated, with side effects observed in a small percentage of patients:

- **ILT Group**: 4 patients (14.8%) experienced mild skin atrophy at the injection sites, which resolved over time. One patient (3.7%) reported temporary pigmentation changes.
- **Excimer Laser Group**: 3 patients (10.7%) reported mild erythema after treatment, and 2 patients (7.1%) experienced temporary hyperpigmentation in the treated areas.

Table 3: **At the 6-month follow-up, relapse rates were higher in the Excimer laser group than in the ILT group:**

Group	Relapse Rate (%)
ILT Group	18.5%
Excimer Laser Group	32.1%

Patients treated with the Excimer laser experienced a higher rate of relapse compared to those treated with ILT, though this difference was not statistically significant ($p = 0.09$). A higher percentage of patients in the ILT group (55.6%) achieved complete regrowth (score of 3) compared to the Excimer laser group (25.0%), indicating a statistically significant improvement in hair regrowth for the ILT group by week 12 ($p < 0.01$).

Table 4: Hair Regrowth Distribution at 12 Weeks

Hair Regrowth Score (0-3)	ILT Group (n=27)	Percentage (ILT)	Excimer Laser Group (n=28)	Percentage (Excimer)
0 (No regrowth)	2	7.4%	4	14.3%
1 (Minimal regrowth)	3	11.1%	7	25.0%
2 (Partial regrowth)	7	25.9%	10	35.7%
3 (Complete regrowth)	15	55.6%	7	25.0%

The ILT group exhibited a faster response, with 51.9% of patients showing hair regrowth within the first 4 weeks, compared to 28.6% in the Excimer laser group. This faster response may contribute to the higher satisfaction ratings observed in the ILT group.

Table 5: Time to Initial Response

Time to Initial Response	ILT Group (n=27)	Percentage (ILT)	Excimer Laser Group (n=28)	Percentage (Excimer)
Within 4 weeks	14	51.9%	8	28.6%
Within 8 weeks	10	37.0%	13	46.4%
Within 12 weeks	3	11.1%	7	25.0%
No Response by 12 weeks	0	0%	0	0%

DISCUSSION

The findings from this study highlight the comparative effectiveness of intralesional triamcinolone (ILT) and the 308 nm Excimer laser in treating localized alopecia areata (AA). While both treatment modalities proved beneficial for hair regrowth, the ILT group exhibited superior results in terms of overall regrowth, patient satisfaction, and relapse rates, with a faster time to initial response. The primary outcome of hair regrowth was more favorable in the ILT group, with 55.6% of patients achieving complete regrowth (score of 3) by the 12-week mark, compared to 25.0% in the Excimer laser group. These findings align with previous research demonstrating that ILT effectively suppresses the local autoimmune reaction in AA, allowing for a more robust and consistent regrowth pattern [13]. In contrast, while the Excimer laser effectively stimulates immune modulation and hair regrowth, the response tends to be less immediate and pronounced. The delayed response observed in the Excimer laser group suggests it may be more suitable for patients who prefer non-invasive options or those with mild forms of localized AA who can tolerate a longer time frame to see regrowth.Higher satisfaction ratings in the ILT group may be attributed to its faster and more noticeable results. The immediate feedback patients receive with ILT likely enhances motivation and adherence to the treatment regimen [14]. Although both treatment groups reported side effects, they were generally mild and temporary. Notably, a small subset of ILT patients experienced skin atrophy at injection sites, which, while resolving over time, remains a concern. Conversely, Excimer laser side effects, such as mild erythema and hyperpigmentation, were less frequent but more manageable and did not affect patients' adherence or perception of the treatment. Thus, while ILT's efficacy appears superior, Excimer laser therapy offers a viable alternative for patients sensitive to injections or concerned about steroid use [15].Relapse rates provide another critical consideration in evaluating the long-term efficacy of these treatments. At the 6-month follow-up, the relapse rate was higher in the Excimer laser group (32.1%) compared to the ILT group (18.5%). This difference, though not statistically significant, indicates that ILT may offer longer-lasting results, potentially due to its direct suppression of autoimmune activity within the hair follicles [16]. Excimer laser therapy may be less effective at sustaining immune suppression, leading to a higher likelihood of hair loss recurrence. These findings imply that patients seeking a long-term solution might benefit more from ILT, whereas those with concerns about relapse might also consider combination therapies to improve durability.These results underscore the importance of individualized treatment plans for AA. ILT offers rapid, robust hair regrowth, making it an attractive option for patients needing quick results or experiencing substantial psychological distress due to hair loss. However, clinicians should discuss potential side effects, such as skin atrophy, and weigh these against the patient's preferences and medical history [17]. The 308 nm Excimer laser, while less aggressive, provides an effective alternative for patients seeking a non-invasive approach or those contraindicated for corticosteroids. Furthermore, the Excimer laser may be appropriate for pediatric patients or those with comorbidities where corticosteroid use is restricted.While the study yielded significant findings, it is important to note its limitations, such as the relatively small sample size and short duration [18]. A longer follow-up period would be valuable in assessing the long-term effects and relapse rates associated with both treatments. Future studies should consider including a broader patient demographic and exploring combination therapies, such as ILT followed by Excimer laser maintenance sessions, to reduce relapse rates. Additionally, further research on optimizing dosage and session frequency for the Excimer laser could enhance its efficacy and potentially make it more competitive with ILT in achieving rapid hair regrowth.

CONCLUSION

It is concluded that intralesional triamcinolone provides faster and more complete hair regrowth than the 308 nm Excimer laser in treating localized alopecia areata, with higher patient satisfaction and lower relapse rates. Both treatments are effective and well-tolerated, but the choice should consider patient preferences for invasiveness, urgency, and potential side effects.

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