

---

## Treatment of Patchy Alopecia Areata Using Topical 15% Lactic Acid Solution

Nabeel O. Kadir\*  
MBChB

Sabeeh A. Al-Mashhadani\*\*  
MBChB, MSc

Makram M. Al-Waiz\*\*  
MBChB, DDS, PhD

---

### Abstract

**Background:** There are many modalities used in treatment of AA. However, there is no universally accepted therapy. Lactic acid has been tried in diversity of skin diseases such as warts, xerosis, wrinkles, chemical peeling and repigmentation of vitiligo.

**Objective:** The present work has been arranged to evaluate the efficacy and tolerability of topical 15% lactic acid solution in the treatment of patchy alopecia areata.

**Patients & Methods:** A study was designed as a single blind therapeutic trial. Twenty nine patients suffering from 59 patches of alopecia areata were included in the study. Their ages ranged from 1.5-61 years with a mean  $\pm$ SD of  $23.88 \pm 14.3$  years. Patches were divided into three groups. First group (22 patches) were treated with topical 15% lactic acid solution twice weekly. The second group (17 patches) were treated with topical 15% lactic acid solution thrice weekly. The third group (20 patches) were randomly selected from patients with multiple patches; they were treated with tap water for comparison. Patients with alopecia totalis, alopecia universalis and treated cases were excluded from the study. Patients were regularly evaluated for hair regrowth and side effects every 2 weeks for 3 months.

**Results:** In the first group, the final hair regrowth assessment revealed hair regrowth of 68% of the treated patches. In the second group, 82.4% of the treated patches showed complete hair regrowth. In the control group, the final hair regrowth assessment showed 30% of the patches with hair growth. After four weeks of therapy, erythema with mild scaling was noticed in 90% of treated patches of the first group and in 100% of patches in the second groups. These features disappeared completely at the end of treatment.

**Conclusion:** Topical 15% lactic acid solution is an effective, safe and tolerable method of treating patchy alopecia areata with minimal side effects and cost benefit therapy. Thrice weekly application of topical 15% lactic acid solution achieved better rate of hair regrowth in a shorter period than twice weekly application.

**Key words:** Alopecia areata, Lactic acid.

---

### Introduction

Alopecia areata (AA) is a common asymptomatic skin disease characterized by a rapid onset of non-scarring hair loss in a sharply defined area. Any hair-bearing surface may be affected, especially the scalp. The exact etiology of AA is unknown but a genetic, immunologic, infection, emotional stress, intrinsically abnormal melanocytes or keratinocytes and neurological factors may contribute<sup>[1]</sup>.

Clinically the initial lesion is commonly a circumscribed, totally bald and smooth patch. Exclamation mark hairs may be present at its margin indicating active disease, where hairs that appear normal may also be readily extracted. The pull test may be positive at the margins of the patch, indicating disease activity<sup>[2]</sup>.

Treatment of AA include non-specific irritants (e.g. anthralin, garlic, onion and phenol), immune inhibitors (e.g. topical steroids and PUVA), immune enhancers (e.g. contact dermatitis induction by DNCB) and others like minoxidil, herbs, vitamin supplement, heat treatment and electrotherapy<sup>[3,4]</sup>.

Lactic acid is a member of alpha-hydroxy acids. It is a colorless or slightly yellow, liquid that is odorless, or has a light but not unpleasant odor

and a mildly acidic taste in dilute aqueous solution<sup>[5]</sup>.

Lactic acid was used tremendously in the last years as a peeling agent in our department in treating melasma. It also improves wrinkling, roughness, and mottled pigmentation of photodamaged skin. Because of its antioxidant action it might help in repigmentation of vitiligo patches. Also it used to control dry skin in ichthyosis, follicular hyperkeratosis, seborrheic keratosis, actinic keratosis, and verrucae vulgaris<sup>[6]</sup>.

The two major side effects of alphahydroxy

Acids are irritation and sun sensitivity. Symptoms of irritation include redness, burning, itching, pain and possibly scarring<sup>[6]</sup>.

The present work has been arranged to evaluate the efficacy and tolerability of topical 15% lactic acid solution in the treatment of patchy alopecia areata.

### Patients & Methods

Twenty nine patients with AA were included in a single blind therapeutic trial study in the Department of Dermatology and Venereology in Baghdad Teaching Hospital during the period from May 2003 to October 2004.

The diagnosis of alopecia areata was done clinically. All patients were thoroughly assessed in relevance to their condition. Patients with alopecia totalis and alopecia universalis and treated cases were excluded from the study. All cases were newly diagnosed of not more than three months duration. In patients with multiple patches one patch was left as a control for comparison.

Photographs were taken for each patient before and after the treatment.

Fifty-nine patches were included in the study. Forty-three patches (73%) were on the scalp, while sixteen patches (27%) were on the beard area. Patches were divided into three groups. In the first group there were 22 patches, which were treated with topical 15% solution twice weekly. The second group were 17 patches, treated with topical 15% lactic acid solution thrice weekly. The third group were 20 patches, randomly selected from patients with multiple patches; treated with tap water for comparison as a control group.

Lactic acid solution (Hopkins and Williams LTD. England) which was diluted with tap water to have a final concentration of 15%. It is stored in an air tight container and applied by the patient using wood stick to the affected patches over night, twice and thrice weekly according to treatment group.

All patients were regularly assessed every two weeks for hair regrowth and inquired for any adverse effects such as itching, erythema and scaling. The final regrowth was categorized into two groups. The first group, were those patches with complete hair growth with terminal hair. The second group, were those patches with partial hair growth with villous hair.

### Results:

Twenty-nine patients with AA were recruited in the study; twenty-two patients (76%) were male, while seven patients (24%) were female. Their ages ranged from 1.5-61 years with a mean  $\pm$ SD of 23.88  $\pm$  14.3 years. Sixteen patients (55%) had multiple patches, while thirteen patients (45%) had single patches. The duration of the illness ranged from 1-12 weeks with a median of 4 weeks. Seven patients (24%) had previous history of AA, while eight patients (27.9%) had a family history of AA. Only one patient had atopy. Seventeen patients (58.6%) had history of a recent emotional upset. Seventeen patients (58.6%) had nail pitting on examination while only one patient had nail ridging.

Forty-three patches (73%) were on the scalp, while sixteen patches (27%) were on the beard area.

There was no statistically significant difference regarding the size and duration of the patches

between the three groups before starting the treatment (p value >0.05).

Exclamation mark was seen in twenty-seven patches (46%) with no statistically significant difference between the three groups (P value > 0.05).

First group (lactic acid twice weekly):

Regrowth: Hair regrowth started after 4 weeks in 9.1%, at 6 weeks in 22.7%, at 8 weeks in 40.9%, at 10 weeks in 63.6%, and after 12 weeks of treatment, hair regrowth was 68% of the treated patches (table 1). The final hair regrowth assessment showed 53.3% of the treated patches with terminal hair growth, while 14.7% with villous hair growth and 32% of the treated patches did not show any hair regrowth.

Side effects: During the period of therapy, at 2 weeks, erythema was seen in 86.4%, at 4 weeks in 90.9%, at 8 weeks in 18.2%, and at the end of treatment course none of the patches had erythema.

Second group (lactic acid thrice weekly):

Regrowth: Hair regrowth started after 2 weeks in 11.85%, at 4 weeks in 76.5%, and at 6 weeks in 82.4%, and after 12 weeks of treatment hair regrowth were 82.4% of the treated patches (table 1). The final hair growth assessment showed 82.4% of the treated patches with terminal hair, while the remainder show no growth.

Side effects: During 12 weeks follow up, after 2 weeks erythema was seen in 100% of the treated patches which persist in all cases after 4 weeks. At 8 weeks, 64% of the treated patches showed erythema, and at the end of treatment erythema disappeared completely.

Third group (tap water):

Regrowth: During 12 weeks follow up, hair regrowth started after 4 weeks in 5%, after 6 weeks in 10%, at 8 weeks in 15%, at 10 weeks in 20%, and at the end of treatment hair regrowth was 30% of the control patches (table 1). The final hair regrowth assessment showed 17% of the patches with complete terminal hair growth, 13% showed villous hair growth while 70% did not show any hair regrowth.

Hair regrowth rate in patches treated with topical 15% lactic acid solution thrice weekly was higher than twice weekly application and this was statistically significant using test of proportion (Z test) which was (p <0.01).

Follow up:

Each patient was followed up for 4 weeks after finishing the course of treatment. During follow up, relapse was seen only in one patch in a patient treated with lactic acid twice weekly.

**Table (1): Hair regrowth rate in the patches of AA during 3 months of therapy.**

	2nd week	4th week	6th week	8th week	10th week	12th week
1st group	0%	9.1%	22.7%	40.9%	63.6%	68%
2nd group	11.8%	76.5%	82.4%	82.4%	82.4%	82.4%
3rd group	0%	5%	10%	15%	20%	30%

\*1st group: Patients treated with lactic acid twice weekly.

\*2nd group: Patients treated with lactic acid thrice weekly.

\*3rd group: Patients treated with tap water.

### Discussion

Alopecia areata is a non-scarring hair loss. Most authors tend to classify alopecia areata as an autoimmune disease (2). There are many modes of therapy including both topical and systemic agents acting through different mechanisms like irritants sensitizers, immunomodulator, and others [2].

The variable and uncertain natural history of AA account for the multiplicity of uncritical claims for a large variety of therapeutic procedures. In contrast it is fortunate to have multiple choices of therapy and all these are in favour of its irritant effect.

Lactic acid was used topically in 15% concentration in different skin problems. It was used for vitiligo with good results; it probably acts by stimulating the keratinocytes to secrete inflammatory mediators thus causing mild inflammation that stimulate the melanocytes [6].

In the current study topical 15% lactic acid was used to treat AA. It was used twice and thrice weekly in different groups.

The response of AA to topical 15% lactic acid solution was good achieving 82% complete hair growth of the patches treated thrice weekly and 53% complete hair growth of the treated patches in patients treated twice weekly during the period of therapy. The difference in response between

There was statistically significant the treated patches and the comparison patches were highly significant at the end of the course of the treatment. Difference (using Z-test) in the regrowth of AA patches treated with topical 15% lactic acid solution thrice compared to twice weekly favouring thrice weekly application. The regrowth rate of the patches treated with twice weekly application was gradually increasing to reach 68% of the treated patches after 3 months of therapy. While patches treated with thrice weekly application achieve 78% of regrowth at first month of therapy and 82% at

second month of therapy. This may justify using thrice weekly application of lactic acid for 6-8 weeks instead of 3 months.

Most of therapies used to treat AA are usually causing a variety of side effects [2]. Topical 15% lactic acid solution showed little and tolerable side effects that completely disappeared at the end of therapy. Thus, we can consider this remedy as a safe, effective and tolerable mode of therapy. In addition, it is of low cost and can be used for short period resulting in better compliance of patients.

Relapse in AA is common, both acutely and over life time regardless the measures used for treatment (2). In this study, all patients were followed up for 4 weeks after the last treatment and relapse was seen only in one patient treated by twice weekly application. Further extension of the follow up was impossible due to the current insecure situation of the country.

Other therapeutic modalities were used in treating AA. Baghdadin device (a device which gives a direct electrical current) resulted in 85% response after 6 weeks of therapy [4] and onion juice resulted in 86% after 6 weeks duration. In our study hair regrowth after topical 15% lactic acid solution used thrice weekly was 78% after 4 weeks and 82% after 8 weeks of therapy. This result was comparable to the previous studies. However, the first study needs a special device and a frequent (weekly) hospital visit; while in the second study the odour of the onion juice may be unacceptable to some patients that may limit their use. In contrast, Lactic acid is odourless solution that easily applied by the patients with less frequent hospital visits resulting in better compliance of patients.

It is difficult to define the precise mode of action of lactic acid in treating AA. Lactic acid may act through its irritant effect suggested by our results regarding irritation and erythema which was 100% of the patches treated with 15% lactic acid

thrice weekly at the 1st month of therapy and 90% of the patches treated with 15% lactic acid twice weekly application.

In conclusion, topical 15% lactic acid solution is an effective, safe and tolerable method of treating patchy alopecia areata with minimal side effects and cost benefit therapy. Thrice weekly application of topical 15% lactic acid solution achieved a better rate of hair regrowth in a shorter period than twice weekly application.

#### **References**

- 1-Habif TP. Hair Diseases. Clinical Dermatology/A color guide to diagnosis and therapy, fourth (ed). Sttouis, Toronto Princeton. The Mosby Company, 1996.PP:834
- 2-Madni S & Shapiro J. Alopecia areata Update. J Am Acad Dermatol, 2000; 42: 549-66.
- 3-Dawber RPR, de Berker D & Wojnarowska F.

Disorders of hair. In: Champion RH, Burton JL & Burns DA (Eds.) Rook Wilkinson Textbook of Dermatology. Blackwell Scientific Publications, Boston, 1998. PP 66, 2869-973.

- 4-Sharquie KE & Al-Hilo M. Treatment of alopecia areata with electrical current. Eur Acad Dermatol Venereol 2001 15: 213
- 5-Slave JW. Consideration in  $\alpha$ -hydroxy acid peel. Clinics in plastic surgery 1998; 25:45-52.
- 6-Sharquie KE and Abdullah MS. Treatment of vitiligo with topical 15% lactic acid solution in combination with ultra violet-A. Saudi Med J. 2005; 26:1013-14.

---

\*Department of Dermatology and Venereology, Baghdad Teaching Hospital.

\*\*Department of Dermatology and Venereology, College of Medicine, University of Baghdad, Iraq.