

Case Report

Alopecia Areata Universalis: Hair Regrowth with Fractioned CO₂ Laser Therapy

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Keywords

• Fractioned laser therapy; Alopecia areata universalis; Drug delivery system; Fractioned CO₂ laser

Abstract

Alopecia Areata (AA) is an autoimmune disease that can affects 1-2% of the population. Management of AA depends on the type of AA. Treatment include topical irritant, topical and intralesional steroids and, for severe cases, systemic corticosteroids, immunosuppressive drugs and immunomodulatory treatments. An uncommon and severe form of AA is Alopecia Areata Universalis (AAU) that involve hair loss over the entire scalp and body.

We report a case of a 35 years old man, with AAU for 16 months developed after hypothyroidism. The suggested treatment was: a monthly Ablative Fractioned CO₂ Laser in low fluence followed by steroid topical lotion at scalp. Laser power output was set at 6-7w, with a density of 300-500µm and a dwell time of 300ms (Mode Stack 1).

The Fractioned Laser Therapy (FLT) is a second-line therapy in AA. It makes microscopic thermal columns in the dermis, minor trauma and wound healing itself can drive hair growth and can also be used as a Drug Delivery System with low side effects. Randomized controlled trials in a larger number of patients are required to confirm the efficacy of this treatment and optimal therapeutic parameters.

ABBREVIATIONS

AA: Alopecia Areata; AAU: Alopecia Areata Universalis; FLT: Fractioned Laser Therapy; LI: Lymphocytic Infiltration

INTRODUCTION

Alopecia Areata (AA) is an autoimmune disease that can affects 1-2% of the population. Management of this condition depends on the type of AA, general health status, disease duration, patient's age and his/her motivation. Treatment include topical irritant, topical and intralesional steroids and, for severe cases, systemic corticosteroids, immunosuppressive drugs and immunomodulatory treatments.

Alopecia Areata Universalis (AAU) is an uncommon and severe form of AA involving hair loss over the entire scalp and body. It is often difficult to treat, have a poor prognosis, high relapse rate and can cause psychological stress and low self esteem.

The Fractioned Laser Therapy (FLT) is a second-line therapy in AA. It works making microscopic thermal columns in the dermis, creates a healing process and, in the case of ablative fractional lasers, can also be used as a drug delivery system (Figures 1 and 2). The drug delivery system has been used successfully in cases of hair loss and AA.

CASE PRESENTATION

A 35 years old man, with history of Alopecia Areata Universalis for 16 months, developed after hypothyroidism (Figure 3). Dyslipidemia is an aggravating health problem.

A systemic treatment was ruled out due to the difficulty in frequent monitoring of the patient who lives in the countryside and his refusal after failure of previous treatments, besides the high relapse rate of AAU.

The suggested treatment was an Ablative Fractioned CO₂ Laser in low fluency followed by steroid topical lotion and home treatment with topical minoxidil 5% in the morning and corticosteroid lotion at night (clobetasol propionate 0.05%). Initially every 15 days, twice a month and then monthly.

Laser power output was set at 6-7w, with a density of 300-500µm and a dwell time of 300ms in a Mode Stack 1 (SmartXide Dot® - Deka Laser). Only one application already encompassed the entire scalp area of alopecia to be irradiated. Laser treatment was performed over 20 months in a total of 30 applications. Treatment was well tolerated with mild side effects (edema, erythema, burning). Laser has not been applied to others areas of the body.

Initial hair growth was observed after 3 months (Figure 4) and complete regrowth after 1 year, with the occipital area still resistant (Figure 5). No relapse was observed during the follow-

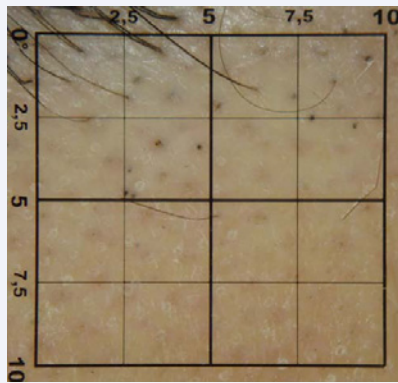


Figure 1 Tricoscopy after laser (10x): microthermal treatment zone with “fractional columns” (iron) on the surface. Black dots and folicular opening of AA.

1) Reports are supporting the hypothesis that low level laser therapy might induce hair growth due to their ability to induce T-cell apoptosis or decrease inflammation. 2) Another possible mechanism is a decrease in perifollicular lymphocytic infiltration through “scattering of perifollicular lymphocytes”. The FLT makes microscopic thermal columns in the dermis, and then creates a healing process that includes lymphocyte infiltrations. These phenomena may scatter perifollicular lymphocyte infiltration, which is a characteristic histologic feature of AA, around the column lesions [1]. 4) Therefore, FLT may halt disease progression by arresting the hair follicles in the telogen stage of the hair cycle and increasing the anagen stage [2]. 5) Laser can also induce minor trauma and wound healing process which might facilitate hair growth [3].

Permeability alterations induced by ablative fractional laser can increase the delivery of different substances into the skin [4]. In this case, ablative fractioned CO₂ laser was also used as transepidermal drug delivery system to the topical steroid. An interesting detail about the treatment is that the laser wasn't applied to other areas of body, but the hair regrowth was universal.

Fractioned CO₂ laser therapy, in low fluence, can be an option to AAU treatment with low side effects. FLT makes microscopic thermal columns in the dermis, creates a healing process and can also be used as a Drug Delivery System in Alopecia Areata cases. The number of sessions varied according to the clinical response.

As there are few reports on medical literature about hair

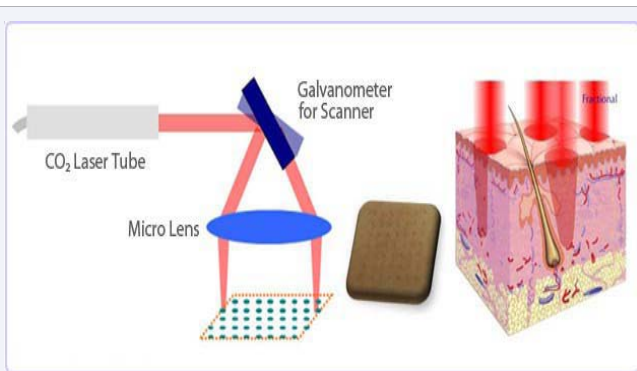


Figure 2 Action mechanism of fractional laser producing micro-columns of dermal thermic injury.



Figure 3 35-year-old male patient with Alopecia Areata Universalis - pre-treatment.

up period of 2 years. Eyebrows, eyelashes, beard and body hair had some regrowth as well (Figure 6). Male Pattern Hair Loss (Norwood III-Vertex) was observed after repilation.

DISCUSSION

The mechanism of FLT of hair regrowth in AA lesions is thought to be the induction of T-cell apoptosis and enhancement of hair growth [1].



Figure 4 Initial treatment (3 months).



Figure 5 Mild treatment (1 year).

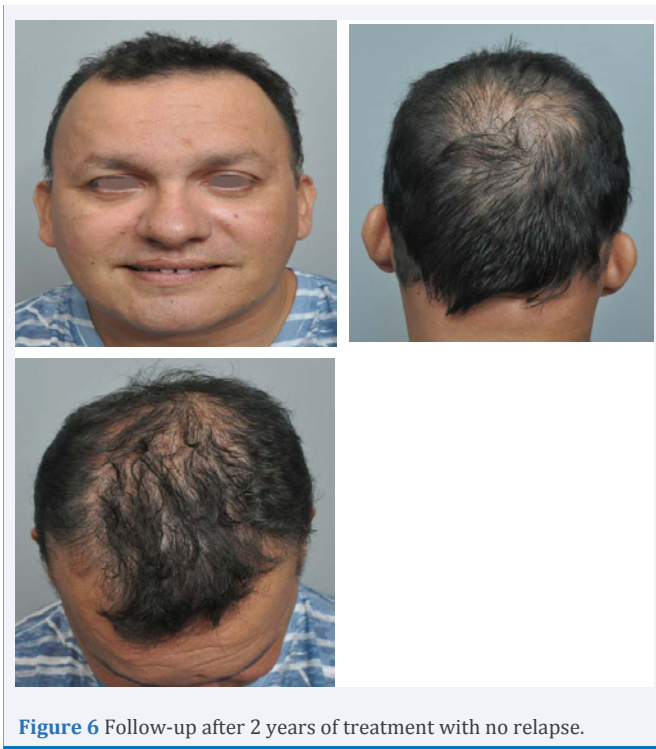


Figure 6 Follow-up after 2 years of treatment with no relapse.

regrowth and fractional laser therapy, randomized controlled trials in a larger number of patients are required to confirm the efficacy of this treatment and optimal therapeutic parameters. However, the good result achieved in this case opens a new window for the treatment of this difficult condition.

REFERENCES

1. Yoo KH, Kim MN, Kim BJ, Kim CW. Treatment of alopecia areata with fractional photothermolysis laser. *Int J Dermatol.* 2010; 49: 845-847.
2. Wu YF, Wang SH, Wu PS, Fan SM, Chiu HY, Tsai TH, et al. Enhancing hair follicle regeneration by nonablative fractional laser: Assessment of irradiation parameters and tissue response. *Lasers Surg Med.* 2015; 47: 331-341.
3. Bae JM, Jung HM, Goo B, Park YM. Hair Regrowth through Wound Healing Process after Ablative Fractional Laser Treatment in a Murine Model. *Lasers Surg Med.* 2015; 47: 433-440.
4. Issa MC, Pires M, Silveira P, Xavier de Brito E, Sasajima C. Transepidermal drug delivery: a new treatment option for areata alopecia? *J Cosmet Laser Ther.* 2015; 17: 37-40.

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