

# Targetoid Polycyclic Concentric Hair Regrowth Pattern Is a Sign of Immunological Recovery in Alopecia Areata

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## Abstract

**Background:** Alopecia areata is a common autoimmune disease, where there are many topical and systemic therapies, during which hair growth appears in a uniform pattern. In certain cases, hair regrowth takes a polycyclic pattern simulating a target, so called targetoid phenomena. **Objective:** To screen all cases of treated alopecia areata for hair targetoid regrowth pattern. **Methods:** This is an observational study, was conducted in Dermatology Department of Baghdad Teaching Hospital in Iraq, during the period, August 2017 to October 2017. All cases treated for alopecia areata with IM triamcinolone 20 - 40 mg injection every 2 weeks with topical clobetasone ointment and zinc sulfate 2 mg/kg/day for 2 months, were examined for the targetoid concentric hair regrowth pattern. **Result:** Among all cases of alopecia areata, seven patients were recorded to have the targetoid concentric hair pattern, which seen 2 - 4 weeks after therapy, their ages ranged from 4 to 25 years old with a mean 14.5, all of them were males. All these patients returned back with hair growth in a form of rings of hair growth alternating with rings of little or no hair growth forming a typical picture of target. **Conclusion:** Targetoid polycyclic concentric hair regrowth pattern is an important phenomenon seen in patients receiving treatment for alopecia areata, which is a good sign of recovery where its etiopathogenesis could not well be elucidated but alternating immunological reactions could explain this targetoid pattern.

## Keywords

Alopecia Areata, Targetoid Phenomenon, Zinc Sulfate

## 1. Introduction

Alopecia areata (AA), a nonscarring patterned alopecia, most commonly presents as patchy circular areas of alopecia. It is a common autoimmune disease that affects hair-bearing skin, and it targets the anagen hair follicle with T-cell involvement [1]. It is thought to be an organ-specific autoimmune disorder with a genetic predisposition [2]. Alopecia areata is also associated with other autoimmune disorders, such as vitiligo, thyroid abnormalities, and diabetes, and AA is commonly reported together with these cases [3] of alopecia of the scalp vary widely in terms of shape and extent, from a single round patch to a large surface area (termed as alopecia totalis) [4]. Much atypical hair regrowth in AA has been reported and been considered a rare phenomenon [5]. During attack of alopecia areata, hair involvement occurs in a synchronized way, so in one patch all the hair follicles are affected, but during therapy the hair might regrow in waves, the so called targetoid concentric hair regrowth, and this pattern although is rare but it's well documented in literature. An explanation for these phenomena was never satisfying.

## 2. Patients and Methods

This observational work was performed in Dermatology Department, Baghdad Teaching Hospital, Iraq during August 2017 to October 2017. Patients with AA were enrolled in this study. A history was taken from each patient regarding the following characteristics: age, gender, address, duration and number of lesions, lesion recurrence, and history of previous therapy; we also captured family history, past medical history, and past drug history. Oral and written consent was obtained from all patients prior to therapy initiation. Additionally, the ethics of the protocols of this study were approved by the Scientific Council of Dermatology, Iraqi Board for Medical Specializations. Examination was performed for location and the size of patchy hair loss. All cases treated with IM triamcinolone 20 - 40 mg injection every 2 weeks with topical clobetasone ointment and oral zinc sulfate 2 mg/kg/day for 2 months [6]. Seven patients were examined for the targetoid concentric hair regrowth pattern.

## 3. Results

A total of seven patients among all patients treated with alopecia areata had targetoid phenomenon, all of them were males and their ages ranged from 4 to 25 years with a mean: 14.5 years. The number of lesions ranged from one to three patches with variable sites and sizes. All patients showed targetoid polycyclic concentric hair pattern where the new hair growth was arranged in an alternating circles or rings of complete hair regrowth and incomplete or little hair regrowth in the patches of alopecia areata forming so called targetoid pattern (Figure 1 and Figure 2).

## 4. Discussion

Hair recovery in AA usually occurs as a uniform process with thin white hair

emerging first, changes in hair texture which become straight or curly then followed by healthy hair. However, some authors have described atypical patterns of hair growth [7] [8] [9].

Many paradoxical forms of hair regrowth have been described like: sudden graying (Marie Antoinette type in women, Sir Thomas More type in men): overnight hair shed of pigmented shaft [10] perinevoid alopecia where the hair regrowth is around nevoid lesion [11]. Alsorenbok phenomena (inverse Koebner phenomena): hair growth on psoriatic plaque of the permanence of hairy congenital nevi in patients with AA [10] was described. Also castling phenomenon where the appearance of hair following immunotherapy treatment was observed such as that seen with squaric acid, dibutylester ester, or diphencyprone [10] [11]. In addition, concentric targetoid regrowth with concentric zones of hair regrowth alternating dark hair were recorded. White hair and alopecia bands have also been reported [10]. And lastly atypical black hair regrowth in red-haired AA patients was described (Sinclair red hair) [12].



**Figure 1.** Concentric polycyclic hair regrowth, in a 25 years old male, on the parietal & temporal areas.



**Figure 2.** Concentric polycyclic hair regrowth.

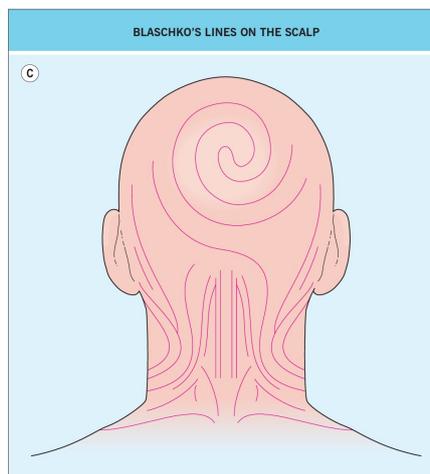
Targetoid hair regrowth pattern (THRP) in AA was first described by Orecchia and Rabbiosi in 1988 [13]. El-Dars *et al.* also described a THRP in a patient with AA treated with topical corticosteroid gel [14]. Del Río described a patient treated with intradermal triamcinolone for AA and developed a THRP [15]. The THRP was also described by Tan and Delaney in eight patients as a possible result of the centrifugal accumulation of the corticosteroid cream [16]. Priego-Recio *et al.* described paradoxical hair regrowth forms in 1.84% of the patients and the most frequent forms were THRP (43%) and castling phenomenon (43%) [7]. Ramot *et al.* reported atypical regrowth of black hair in two red-haired patients [17]. Sharquie reported two cases of very typical targetoid regrowth pattern in 2006 (Figure 2) [18].

A theory suggested in 1968 by Eckert *et al.* think that AA occurs as an earthquake, begins at the center and peripherally spreads in waves (spreading waves of anagen hair growth that reach refractory hair follicles in telogen giving rise typically to the concentric appearance) [16]. This “earthquake”, beginning in the “epicentre”, expands peripherally in a wave-line manner. According to Eckert *et al.*, an anagen/telogen wave enlarges from a core marginally expanding the alopecia [15].

The anagen/telogen wave theories and the possible accumulation of corticosteroid effect are not well known. Recently, Li and Sinclair had measured the hairs taken from a patch of alopecia and discussed the anagen wave theory: At the start, a single hair in telogen is stimulated to enter the growth (anagen) phase and it communicates with its close immediate neighbor, signalling for that hair to go to the anagen. Hence the initial regrowth signal is sent to all the hairs within the alopecia patch, in a “domino” fashion [19].

In all skin diseases, multiple area might be involved at the same time, despite that there is a systemic immune factors, like psoriasis, dermatitis, vitiligo, alopecia areata etc., a question to be raised why only a localized area of skin involved instead of affecting the whole skin. This question is difficult to be answered, but we can speculate that in many diseases the immune reaction is localized and regional to some areas but not to others [20]. Accordingly, we are now going to express new hypothesis regarding this peculiar targetoid phenomenon.

The first hypothesis is that hair follicular units are well arranged in Blaschko’s line, the embryonic migration pathway of skin cells [21], during hair regrowth signal can transmit between follicular units of the same Blaschko’s lines, leads to the clinical picture of polycyclic concentric regrowth phenomena. But we know that Blaschko’s lines take the picture of concentric targetoid shape in the vertex of the scalp but not the temporal scalp (Figure 3). So this hypothesis doesn’t fully explain the concentric polycyclic pattern of hair regrowth in temporal area, in addition if hair recovery would always follow the Blaschko’s line and the shape of lesion should be fixed to all patients. But in the present work, what we had seen is a variable pictures of wavy polycyclic hair regrowth and it could be observed anywhere on the scalp. Another hypothesis to explain this targetoid



**Figure 3.** Blaschko's lines on the scalp [22].

phenomenon could be raised is that hair regrowth might follow follicular units anatomical distribution of the scalp, but in this theory again the pattern of hair regrowth should be fixed in all patients.

Finally we think can hypothesize that regional immunological variation of the skin reaction is responsible for this targetoid pattern, as area of increased immunological reaction respond less to treatment, giving the clinical picture of incomplete hair growth or bold circle while areas with normal immune response respond better to treatment, giving the clinical picture of targetoid complete hair growth circle.

## 5. Conclusion

Targetoid concentric hair regrowth pattern is a sign of immunological recovery of alopecia areata that appears shortly after treatment and we can speculate that alternating immunological reactions in patches of alopecia areata could explain this phenomenon.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- [1] Sperling, L.C., Sinclair, R.D. and El Shabrawi-Caelen, L. (2012) Alopecia. In: Bologna, J.L., Jorizzo, J.L. and Schaffer, J.V., Eds., *Dermatology*, 3rd Edition, Elsevier Saunders, Philadelphia, 1100.
- [2] Paus, R., Olsen, A.E. and Messenger, G.A. (2008) Hair Growth Disorders. In: Fitzpatrick, T.B., Wolff, K., Goldsmith, A.L., Gilchrist, A.B., Paller, S.A. and Leffell, J.D., Eds., *Dermatology in General Medicine*, 7th Edition, Mc-Graw-Hill, New York, 753-777.
- [3] Thomas, E.A. and Kadyan, R.S. (2008) Alopecia Areata and Autoimmunity: A Clinical Study. *Indian Journal of Dermatology*, **53**, 70-74.

- <https://doi.org/10.4103/0019-5154.41650>
- [4] Rhee, C.H., Kim, S.M., Kim, M.H., Cinn, Y.W. and Ihm, C.W. (2009) Two Cases of Linear Alopecia on the Occipital Scalp. *Annals of Dermatology*, **21**, 159-163. <https://doi.org/10.5021/ad.2009.21.2.159>
- [5] Delorenze, L.M., Gavazzoni-Dias, M.F.R. and Aide, M.K. (2016) Concentric Polycyclic Regrowth Pattern in Alopecia Areata. *International Journal of Trichology*, **8**, 35-37. <https://doi.org/10.4103/0974-7753.179397>
- [6] Sharquie, K.E., Noami, A.A. and Shwail, E.R. (2012) Oral Zinc Sulfate in Treatment of Alopecia Areata (Duble Blind; Cross-Over Study). *Journal of Clinical & Experimental Dermatology Research*, **3**, 150.
- [7] Priego-Recio, C.M., Rodríguez-Pichardo, A. and Camacho-Martínez, F.M. (2014) Unusual Forms of Alopecia Areata in a Trichology Unit. *Journal of the European Academy of Dermatology and Venereology*, **28**, 1394-1396. <https://doi.org/10.1111/jdv.12250>
- [8] Cicero, R.L., Micali, G. and Sapuppo, A. (1993) Paradoxical Hair Regrowth during the Treatment of Severe Alopecia Areata with Squaric Acid Dibutylester (SAD-BE). *European Journal of Dermatology*, **3**, 321.
- [9] Ramot, Y., Sinclair, R.D. and Zlotogorski, A. (2012) Regrowth of Black Hair in Two Red-Haired Alopecia Areata Patients. *Australasian Journal of Dermatology*, **53**, e91-92. <https://doi.org/10.1111/j.1440-0960.2011.00868.x>
- [10] Hordinsky, M.K. (2013) Overview of Alopecia Areata. *Journal of Investigative Dermatology Symposium Proceedings*, **16**, S13-15. <https://doi.org/10.1038/jidsymp.2013.4>
- [11] Bansal, M., Manchanda, K. and Pandey, S. (2013) Annular Alopecia Areata: Report of Two Cases. *International Journal of Trichology*, **5**, 91-93. <https://doi.org/10.4103/0974-7753.122970>
- [12] Madani, S. and Shapiro, J. (2000) Alopecia Areata Update. *Journal of the American Academy of Dermatology*, **42**, 549-566. <https://doi.org/10.1067/mjd.2000.103909>
- [13] El-Dars, L.D., Kamath, S. and Logan, R. (2009) Targetoid Pattern of Hair Regrowth in Alopecia Areata: A Case Report. *Clinical and Experimental Dermatology*, **34**, 413. <https://doi.org/10.1111/j.1365-2230.2008.02943.x>
- [14] del Rio, E. (1998) Targetoid Hair Regrowth in Alopecia Areata: The Wave Theory. *Archives of Dermatology*, **134**, 1042-1043. <https://doi.org/10.1001/archderm.134.8.1042>
- [15] Eckert, J., Church, R.E. and Ebling, F.J. (1968) The Pathogenesis of Alopecia Areata. *British Journal of Dermatology*, **80**, 203-210. <https://doi.org/10.1111/j.1365-2133.1968.tb11960.x>
- [16] Li, J. and Sinclair, R. (2014) Clinical Observations in Alopecia Areata: Implications and Hypotheses. *Australasian Journal of Dermatology*, **57**, e29-e31.
- [17] Orecchia, G. and Rabbiosi, G. (1988) Patterns of Hair Re-Growth in Alopecia Areata. *Dermatologica*, **176**, 270-272. <https://doi.org/10.1159/000248718>
- [18] Sharquie, K.E. (2006) Alopecia with Peculiar Regrowth Pattern (Targetoid Hair Growth in Alopecia Areata).
- [19] Li, J. and Sinclair, R. (2016) Clinical Observations in Alopecia Areata: Implications and Hypotheses. *Australasian Journal of Dermatology*, **57**, e29-e31. <https://doi.org/10.1111/ajd.12227>
- [20] Sharquie, K.E., Noaimi, A.A. and Al-Khafaji, Z.N. (2016) Direct Transplant of Melanocytes from Normal Donor Area into Vitiliginous Recipient Area by Intra-

sional Injection of Melanocytes Using Spade Like Needle Technique. *Journal of Cosmetics, Dermatological Sciences and Applications*, **6**, 174-179.

<https://doi.org/10.4236/jcdsa.2016.64022>

- [21] Bologna, J.L. (2012) Genodermatosis, Mosaicism and Linear Lesions. In: Bologna, J.L., Jorizzo, J.L. and Schaffer, J.V., Eds., *Dermatology*, 3rd Edition, Elsevier Saunders, Philadelphia, 944.
- [22] Celia, M. (2012) Mosaicism and Linear Lesions. In: Bologna, J.L., Jorizzo, J.L. and Schaffer, J.V., Eds., *Dermatology*, 3rd Edition, Elsevier Saunders, Philadelphia, 944.