

Letters

OBSERVATION

Hair Regrowth in a Patient With Long-standing Alopecia Totalis and Atopic Dermatitis Treated With Dupilumab

Dupilumab is an interleukin (IL)-4 receptor alpha antagonist that was approved by the US Food and Drug Administration in March 2017 for the treatment of adult patients with moderate to severe atopic dermatitis not adequately controlled with topical therapies. Dupilumab is a fully human monoclonal antibody that binds to the alpha subunit of the IL-4 receptor and inhibits downstream signaling of IL-4 and IL-13, thus inhibiting the helper T cell, type 2 (T_H2) pathway activation and cytokines that play a key role in atopic diseases.¹ While dupilumab has been associated with adverse reactions including injection-site reactions, conjunctivitis, blepharitis, oral herpes, keratitis, eye pruritus, other herpes simplex virus infection, and dry eye,¹ there have been no reports to our knowledge of hair growth in alopecia areata (AA) related to dupilumab. We report herein the first known case of hair growth in a patient with alopecia totalis associated with the use of dupilumab.

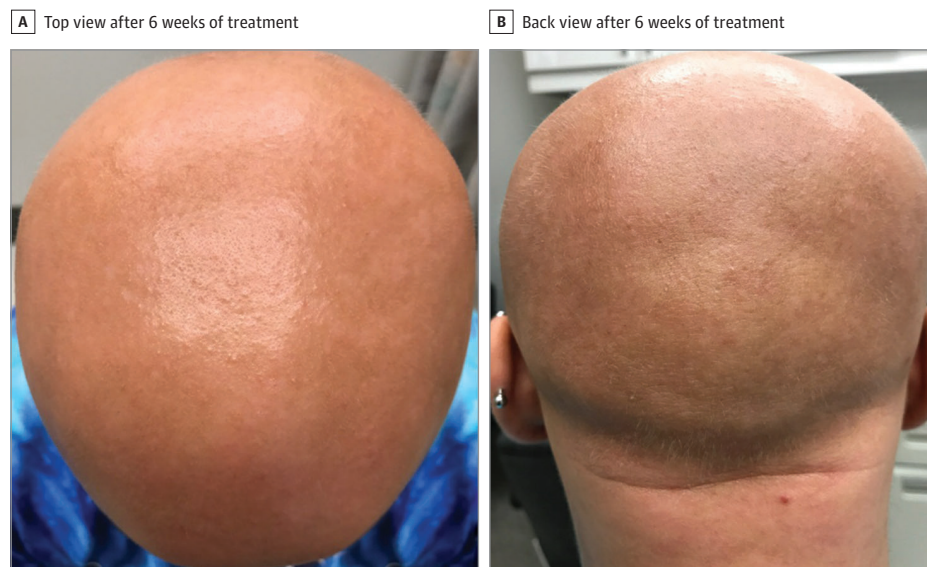
Report of a Case | A 13-year-old girl presented with a history of extensive, treatment-resistant atopic dermatitis (AD) since age 7 months and persistent alopecia totalis (AT) present since age 2 years. She had been treated for the AT years prior to presentation with topical squaric acid and anthralin without improvement. Two months before presentation, she began a trial treatment with pulsed prednisone, 50 mg on the first 3 days of each

month, and oral methotrexate, 10 mg/wk, for her AD and AT, with the methotrexate dose gradually increased to 15 mg/wk. This yielded some improvement in the AD but no hair growth, and 4 months later, this regimen was discontinued. The patient resumed topical steroid treatment for AD, but did not have an adequate response.

A little more than 2 years after initial presentation, she began treatment with dupilumab, 300-mg subcutaneous injection, every other week for refractory AD covering 70% of her body surface area. After 6 weeks of treatment, the patient noted significant improvement of her AD. She reported adverse effects of minimal dry eye but also noted numerous vellus hairs growing on her scalp (**Figure 1**). Nine months after beginning dupilumab treatment, the patient had grown pigmented, terminal hairs on approximately 60% of the scalp. Of note, for insurance reasons there was an 8-week period when she stopped taking dupilumab, during which she noted hair shedding. She then resumed dupilumab treatment, and at last follow-up, 11 months after the first dupilumab dose, considerable hair growth was noted (**Figure 2**).

Discussion | The dual efficacy of dupilumab for AD and AA may be explained by their shared immune characteristics.² AD is a T_H2 -mediated disease with elevated IL-4, IL-5, IL-13, and IL-31. Dupilumab improves AD via downregulation of serum and skin T_H2 markers, and blockage of IL-4 and IL-13 signaling. The pathogenesis of AA is incompletely understood, but recent studies point to a strong T_H2 component. Polymerase chain reaction analysis of AA scalp samples

Figure 1. A Case of Alopecia Totalis in a Young Woman



These clinical images show a female patient with an 11-year history of complete scalp hair loss who began to grow vellus scalp hairs 6 weeks after starting dupilumab treatment.

Figure 2. Substantial Hair Growth in a Patient With Alopecia Totalis After Treatment With Dupilumab

A Top view 11 months after first dose



B Back view 11 months after first dose



Eleven months after the first dose of dupilumab, terminal hair growth is noted on almost the entire scalp.

compared with controls have revealed T_H2 , T_H1 , IL-23, and IL-9/ T_H9 cytokine activation.³ Additionally, AA genome studies have revealed an upregulation of T_H2 -related genes.^{4,5} In AA, treatment with both intralesional corticosteroids and ustekinumab has been associated with significant downregulation of T_H2 cytokines and chemokines (ie, IL-13, CCL26, CCL5, CCL13).⁶ Dupilumab's antagonism of the T_H2 pathway could therefore explain its utility in both conditions. Larger controlled clinical trials are needed to confirm this observation.

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