

NEWS, VIEWS, AND REVIEWS

Treatment or Trigger? The Use of Biologic Therapy for Alopecia Areata

Mina Farah BA, Nikkia Zarabian BS, Dora Kanu BS, Nidhi Shah MD, Adam Friedman MD FAAD

Department of Dermatology, George Washington University School of Medicine and Health Sciences, Washington, DC

INTRODUCTION

Alopecia areata (AA) is a chronic autoimmune disorder resulting in patchy, non-scarring hair loss on the face, body, and/or scalp.[1] It is postulated to result from the collapse of hair follicle immune privilege, which, under normal conditions, is maintained by suppressing MHC class I expression and producing immunosuppressive factors.[2] In AA, loss of this immune privilege leads to upregulation of MHC class I and II molecules, infiltration of immune cells, and the release of Th1-mediated pro-inflammatory cytokines such as interferon (IFN)-γ, tumor necrosis factor (TNF), interleukin (IL)-12, IL-15, and IL-18. This process disrupts the normal hair cycle by inducing premature catagen or telogen and ultimately resulting in hair loss.[2] The driving role of Th2-mediated cytokines in AA has also been suggested, as studies have reported elevated serum levels of IL-4, IL-13, and CC chemokine ligand (CCL)17 in patients with AA.[3] AA has also been associated with other autoimmune diseases, such as asthma, atopic dermatitis (AD), psoriasis, systemic lupus erythematosus, thyroiditis, vitiligo, and allergic rhinitis.[4-6]

Common AA treatments include topical, intralesional, or oral corticosteroids, minoxidil, cyclosporine, methotrexate, diphenylcyclopropenone, light-based therapies, and small-molecule drugs such as Janus kinase (JAK) inhibitors.[2,4] Recent case reports and case series have proposed off-label biologic therapies, such as dupilumab and secukinumab, as novel treatments for AA.[1,5,7-10] Conversely, multiple studies have reported the development of AA in patients treated with dupilumab and secukinumab.[6,8,11-15] Given this mixed evidence, this review evaluates the current literature on dupilumab and secukinumab as treatments and triggers of AA.

Biologics as Treatment

Emerging literature has reported dupilumab, an IL-4 and IL-13 receptor antagonist, as an AA treatment.[7] Currently approved in pediatric and adult patients for moderate to severe atopic dermatitis (AD), dupilumab has a well-established safety profile, with conventional adult dosing of 300 mg injected subcutaneously biweekly.[16] Dupilumab has gained increasing attention as an off-label AA treatment, particularly in patients with comorbid AD, given the potential overlapping Th2-mediated mechanisms.[5] Dupilumab may be especially useful in AA patients with elevated serum IgE, a potentially predictive biomarker for treatment response.[5] Evidence has also demonstrated reductions in Th2-related markers and increases in hair keratins in AA patients treated with dupilumab.[5]

A retrospective study of nine patients with AA and concurrent AD demonstrated significant improvement in AA on dupilumab therapy at conventional dosing, with 89% achieving a 50% improvement in their Severity of Alopecia Tool (SALT) score after 24 months.[5] Further studies have demonstrated the utility of dupilumab, with one report of complete hair regrowth after 17 months of treatment in an alopecia totalis patient refractory to typical therapies, and a case series demonstrating that seven out of ten AA patients achieved ≥50% hair regrowth after a median of eight months of treatment with conventionally dosed dupilumab.[1,7] Additionally, a recent systematic review reported that 77.5% of AA patients (n=89) experienced hair regrowth with dupilumab.[8] Overall, there is substantial evidence of successful, well-tolerated AA treatment with dupilumab, particularly in patients with comorbid AD, and additional evidence of efficacy even in patients without AD. However, the studies are largely limited to case reports, reviews with small sample sizes, and retrospective designs. Further research is needed to clarify the mechanistic details of dupilumab in AA treatment and to assess its utility in AA without concurrent AD.

Secukinumab, an IL-17 antagonist, is another biologic therapy proposed as an off-label treatment for AA. Approved for psoriasis, psoriatic arthritis, and hidradenitis suppurativa, secukinumab has also been used for AA, with one report demonstrating significant hair regrowth in a patient with a 25-year history of alopecia universalis and a 2-year history of psoriasis, three months after initiating secukinumab 300 mg monthly.[9,17] The patient subsequently experienced alopecia recurrence after discontinuing therapy six months later.[9]

IL-17 inhibition in AA management remains poorly understood. While AA is predominantly driven by Th1-mediated processes, elevated serum and lesional scalp levels of IL-17 have been reported, prompting the hypothesis for IL-17 inhibition in alopecia management.[10] However, evidence remains inconsistent and has not been clearly linked to disease severity or duration.[10] Nonetheless, the presence of elevated serum IL-17 in a subset of patients, coupled with reports of successful treatment, supports continued exploration of secukinumab in individuals with AA.

While further studies are warranted, both dupilumab and secukinumab have emerged as potential treatment options for AA in patients with comorbid conditions for which these biologics are indicated. This supports the possibility that reducing systemic inflammation from the underlying disease may also benefit AA, especially in individuals refractory to conventional treatment.

Biologics as Trigger

Although several studies have suggested dupilumab and secukinumab as potential treatments for AA, there is also growing evidence demonstrating opposing findings. A recent retrospective

study evaluating 23,782 individuals treated with dupilumab for AD found a statistically significant increase in the risk of AA after 16 weeks of conventional-dose therapy (P=0.0167).[11] Additionally, a systematic review of 89 patients on dupilumab reported new-onset or worsening AA in 22.5% of individuals, with a mean of 4.7 months after starting dupilumab; these cases resolved with treatment discontinuation, topical/intralesional/oral corticosteroids, cyclosporine, and topical minoxidil.[8] Interestingly, two patients who developed AA experienced hair regrowth after extending the dupilumab dosing interval from every two weeks to every four weeks, further highlighting the drug's potential influence on AA.[8]

While Th2 pathway suppression has been proposed to treat AA, it remains possible that Th2 suppression may lead to immune rebalancing, thereby upregulating Th1/Th17 pathways.[11] Other explanations include the unmasking of latent AA in predisposed individuals or a reflection of the inherently higher prevalence of AA among patients with AD, independent of dupilumab treatment.[11] Although evidence does not demonstrate a causal link, the prevalence of AA development during dupilumab therapy, and notably its resolution upon drug discontinuation, warrants further study.

Similarly, cases of AA developing during secukinumab treatment have been presented. A 64-year-old woman with no history of AA developed biopsy-confirmed AA 6 weeks after initiating secukinumab 300 mg monthly, with near-complete hair regrowth after discontinuation and transition to guselkumab, suggesting a secukinumab-related trigger.[12] Another report described a patient with palmoplantar pustulosis who developed rapid-onset AA within 1 week of starting secukinumab 300 mg, which progressed over several weeks and improved after discontinuation and initiation of tofacitinib.[13] Additional cases have described AA onset approximately 2–6 months after secukinumab initiation, including patients with prior adalimumab exposure, which has been associated with paradoxical AA development, or a personal/family history of AA, raising the possibility that immune priming or underlying susceptibility may contribute to this reaction.[13,14,15]

It has been suggested that secukinumab may alter the Th17 axis and upregulate Th1 pathways, leading to inflammatory destruction of hair follicles.[6] Across reports, continuation of secukinumab was generally associated with persistent or worsening alopecia despite adjunctive therapies such as intralesional corticosteroids, whereas discontinuation more consistently led to hair regrowth.[6,12,13,15] Collectively, these findings support an association between secukinumab and AA and suggest that prior biologic use, history of AA, and drug-induced immune shifts may contribute to disease development. However, it is important to note key limitations that preclude the conclusion that secukinumab is a direct trigger of AA. Many reports included patients with a prior history of AA, suggesting that cases observed during secukinumab therapy may reflect unmasking of preexisting disease rather than a direct drug effect. Prior adalimumab use may represent another area for exploring its potential influence on AA. Additionally, individuals with psoriasis have a 2.4-fold increased risk of developing AA, which may further explain its occurrence during treatment.[6] Larger prospective studies are needed to better clarify the relationship between secukinumab and AA.

CONCLUSION

This review evaluates dupilumab and secukinumab as both treatments and triggers for AA. Overall, the evidence suggests dupilumab's therapeutic potential in select patients, particularly those with comorbid AD, with stronger evidence supporting the benefit in AA treatment over triggering. Reports of AA following dupilumab initiation may reflect underlying susceptibility, including prior AA or increased baseline risk within AD populations, rather than direct causation. In contrast, secukinumab appears more frequently associated with triggering AA rather than treating. However, its exact role remains unclear due to the limited evidence and occurrences in those with pre-existing risk factors, such as prior AA, adalimumab use, and comorbid psoriasis, further complicating the association.

Overall, these findings highlight the importance of careful patient selection and close monitoring when initiating biologic therapy in individuals at risk for AA. Future prospective, controlled studies are needed to clarify the association, identify predictive biomarkers of response and risk, and better define which patient populations may benefit from or be adversely affected by biologic therapies.

DISCLOSURES

Conflicts: MF's work is funded through independent research grants from Incyte and Johnson & Johnson. NZ's work is funded through an independent research grant from Galderma. AF is a speaker/consultant for Regeneron, Sanofi, Novartis, Pfizer, and Lilly. DK and NS have no conflicts to disclose.

REFERENCES

1. Huang J, Jian J, Li T, et al. Dupilumab therapy for alopecia areata: a case series and review of the literature. *J Dermatolog Treat*. 2024;35(1):2312245. doi:10.1080/09546634.2024.2312245
2. Kim SY, Lee HJ, Heo J, et al. Alopecia areata: from immunopathogenesis to emerging therapeutic approaches. *Front Immunol*. 2025;16:1681163. doi:10.3389/fimmu.2025.1681163
3. Song T, Pavel AB, Wen HC, et al. An integrated model of alopecia areata biomarkers highlights both TH1 and TH2 upregulation. *J Allergy Clin Immunol*. 2018;142(5):1631-1634.e13. doi:10.1016/j.jaci.2018.06.029
4. Abarca YA, Scott-Emuakpor R, Tirth J, et al. Alopecia areata: understanding the pathophysiology and advancements in treatment modalities. *Cureus*. 2025;17(1):e78298. doi:10.7759/cureus.78298
5. Tavoletti G, Valtellini L, Mattioli MA, et al. Effectiveness of dupilumab in the treatment of alopecia areata in patients with concurrent atopic dermatitis: a real-life retrospective study. Int *J Dermatol*. 2024;63(12):e434-e436. doi:10.1111/ijd.17288
6. Antoury L, Maloney N, Cheng K. Development of alopecia in patients treated with interleukin-17 inhibitors. *Dermatol Ther*. 2020;33(6):e14527. doi:10.1111/dth.14527
7. Velaoras AT, Doss-Hom NS, Hirose A, et al. From bald to bold: reversal of alopecia totalis in an adolescent using dupilumab monotherapy. *J Drugs Dermatol*. 2026;25(3):273-274. doi:10.36849/JDD.9148
8. Srivatsa A, Romanski MG, Rehman W, et al. Friend or foe: a systematic review of dupilumab and alopecia areata. *J Am Acad Dermatol*. 2025;93(3):825-827. doi:10.1016/j.jaad.2025.05.1387
9. Pagnanelli G, Cavani A, Canzona F, et al. Mild therapeutic response of alopecia areata during treatment of psoriasis with secukinumab. *Eur J Dermatol*. 2020;30(5):602-603. doi:10.1684/ejd.2020.3866
10. Ramot Y, Marzani B, Pinto D, et al. IL-17 inhibition: is it the long-awaited savior for alopecia areata? *Arch Dermatol Res*. 2018;310(5):383-390. doi:10.1007/s00403-018-1823-y
11. Sontam T, Nfn H, Li JY, et al. Alopecia areata associated with dupilumab: national database study. *Diagnostics (Basel)*. 2025;15(14):1828. doi:10.3390/diagnostics15141828
12. Choi E, Thomson O, Smith D. Alopecia areata after initiation of secukinumab therapy for plaque psoriasis. *Cureus*. 2023;15(5):e38986. doi:10.7759/cureus.38986
13. Zhang C, Kang T, Qian T, et al. Secukinumab-induced alopecia areata successfully treated with tofacitinib in a patient with palmoplantar pustulosis. *Clin Cosmet Investig Dermatol*. 2023;16:2879-2883. doi:10.2147/CCID.S430156
14. Reiss-Huss S, Hilewitz D, Yacobovitz S, et al. Tumor necrosis factor α inhibitor-induced alopecia in pediatric patients: a cohort of 20 patients and review of the literature. *Arch Dermatol Res*. 2025;317(1):799. doi:10.1007/s00403-025-04300-0
15. Öğüt ND. Two paradoxical reactions in a patient with psoriasis and psoriatic arthritis: adalimumab-induced hidradenitis suppurativa and secukinumab-induced alopecia areata. *J Eur Acad Dermatol Venereol*. 2023;37(4):e468-e469. doi:10.1111/jdv.18601
16. Dupilumab. DailyMed. Available at https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=595f437d-2729-40bb-9c62-c8ece1f82780. Accessed March 31, 2026.
17. Secukinumab. DailyMed. Available at https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=77c4b13e-7df3-42d4-81db-3d0cddb7f67a. Accessed March 31, 2026.

AUTHOR CORRESPONDENCE

Adam Friedman MD FAAD

E-mail:..... ajfriedman@mfa.gwu.edu