Clinical, Cosmetic and Investigational Dermatology

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Upadacitinib Therapy in Adolescent Severe Alopecia Areata: A Case Series and Narrative Review

Yimeng Gao, Chenyu Zhu, Hongzhong Jin

Department of Dermatology, State Key Laboratory of Complex Severe and Rare Diseases, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, National Clinical Research Center for Dermatologic and Immunologic Diseases, Beijing, 100730, People's Republic of China

Correspondence: Hongzhong Jin, Department of Dermatology, State Key Laboratory of Complex Severe and Rare Diseases, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, National Clinical Research Center for Dermatologic and Immunologic Diseases, Beijing, 100730, People's Republic of China, Email jinhongzhong@263.net

Purpose: Alopecia areata (AA) is a common, immune-mediated, non-scarring form of hair loss. Janus kinase inhibitors provide considerable insight into the treatment of severe AA. However, the efficacy and safety of upadacitinib treatment of adolescents and pediatric patients with severe AA is unclear, especially in those without concomitant atopic diseases.

Patients and Methods: Adolescents with severe AA receiving upadacitinib were recruited from the Dermatology Outpatient department. This is a retrospective case series. Clinical characteristics, hair regeneration, and adverse events were analyzed to assess effectiveness and safety. We searched the PubMed, Web of Science Core Collection database and Cochrane Library to conduct a literature review on upadacitinib treatment of adolescents with severe AA.

Results: In the present study, three adolescents with severe AA without atopic comorbidity received upadacitinib 15 mg/day orally for 6 consecutive months. Regrowth of eyebrows and pubic hair began in the first and second months of treatment, respectively, and head hair regrowth was obvious after approximately 4 months of treatment. The median Severity of Alopecia Tool score dropped to 36.33 (representing 58.08% reduction) after 6 consecutive months of treatment. Our literature search identified seven papers covering a total of 26 adolescents with AA (including ours) aged from 9 to 17 years who had received upadacitinib treatment, 15 mg/day being the most commonly prescribed dosage. Upadacitinib contributed to improvement in comorbidities such as atopic dermatitis, vitiligo, and Crohn's disease. No severe adverse events were detected.

Conclusion: Upadacitinib is an effective and safe treatment option for adolescents with severe AA. Our study provides more data on adolescents with severe AA without atopic comorbidities.

Keywords: adolescent, alopecia areata, Janus kinase inhibitor, upadacitinib

Introduction

Alopecia areata (AA), a common, immune-mediated, non-scarring form of hair loss, affects up to 2% of the general population in all ethnic-, sex-, and age-based groups.[1] Besides patchy loss of head hair, AA may cause varying degrees of eyebrow, eyelash, pubic, and axillary hair loss. It can also cause nail dystrophy in severe cases. Baricitinib, an inhibitor of Janus kinase (JAK)1/2, has been approved for treatment of severe AA in adults by the Food and Drug Administration (FDA).[2] However, there is still scanty clinical evidence for the use of JAK inhibitors in adolescents and pediatric patients with severe AA. The impairment of quality of life, urgent need for treatment, frequent relapses, and safety issues around medication make the treatment of adolescent and pediatric AA patients challenging.

Upadacitinib, a JAK 1 inhibitor, has been used to treat atopic dermatitis in patients aged 12 and older,[3] despite its efficacy and safety in adolescents and pediatric patients with severe AA being unclear. Here, we report a case series of upadacitinib treatment of adolescents with severe AA and present the findings of a narrative review.

Received: 5 July 2025
Accepted: 21 August 2025
Published: 3 September 2025

Materials and Methods

Adolescents with severe AA were recruited from the outpatient department of dermatology and completed 6 months of follow-up between November 2023 and December 2024. The inclusion criteria were as follows: (1) age from 12 to 17 years at the time of enrollment; (2) severe AA as evidenced by Severity of Alopecia Tool (SALT) scores over 50; (3) AA refractory to more than 3 consecutive months of at least one type of systemic therapy, including corticosteroids and immunosuppressive agents; and (4) patient strongly desirous of further treatment. The exclusion criteria were as follows: (1) contraindications to upadacitinib such as severe infection, tumor, thrombosis, and allergy; (2) aged less than 12 or over 18 years at the time of enrollment; (3) mild or moderate AA as evidenced by SALT scores less than 50; (4) no systemic therapy before initiation of a JAK inhibitor or treatment course less than 3 months; and (4) failure to attend for follow-up visits. All enrolled patients underwent full laboratory examinations, including antinuclear antibodies, thyroid function, plasma trace elements, immunoglobulin, ferritin, vitamin A, vitamin E, coagulation function, chest radiograph and screening for Hepatitis B virus and tuberculosis. All participants received upadacitinib 15 mg/day orally. SALT scores were used to assess AA severity and activity at monthly follow-ups. Adverse events were recorded during follow-up. The study was approved by the Ethics Committee of Peking Union Medical College Hospital, and complied with the Declaration of Helsinki. Written informed consent for publication was obtained from these patients' legal guardians.

We conducted a literature review of the PubMed, Web of Science Core Collection database and Cochrane Library on 14th August 11, 2025. The search terms were ((alopecia areata) OR (alopecia totalis) OR (alopecia universalis)) AND (upadacitinib) AND ((Adolescent) OR (children) OR (pediatric)). Articles that met the following inclusion criteria were analyzed: (1) pediatric and adolescent patients; (2) patients with AA received upadacitinib treatment; and (3) papers written in English. The exclusion criteria were as follows: (1) adult patients who did not meet the age criteria.; (2) incomplete data; and (3) patient with comorbidities that cannot receive upadacitinib treatment. Two authors independently screened and extracted information from the articles.

Results

Case Series

This is a retrospective case series. The cohort of this case series comprised three adolescents with severe AA (Table 1). Their mean age was 16.33 years (range 15–17 years) and the median duration of disease 6 years (range 1–10 years). None of the patients in this case series had a family history of AA or personal history of atopic dermatitis, allergic rhinitis, or asthma. The immunoglobulin E concentrations of these three patients were all within the normal range. All three had severe AA, with a median SALT score of 86.67 (range: 73–100, all > 50). Besides severe loss of head hair, two of the patients also had loss of eyebrow, eyelash, pubic, and axillary hair; additionally, one had nail dystrophy. The disease of all three patients was refractory to at least one type of systemic therapy, prior treatment having included systemic corticosteroids (n=3), cyclosporine (n=1), glycyrrhizin (n=1), traditional Chinese medicine (n=1), and topical minoxidil (n=3).

All three participants had received upadacitinib treatment at 15 mg/day for 6 consecutive months (Figure 1). Regrowth of eyebrow and pubic hair occurred earlier than regrowth of head hair, regrowth of eyebrows and pubic hair occurring in the first and second months after upadacitinib treatment, respectively, whereas obvious regeneration of head hair occurred approximately 4 months after initiating upadacitinib treatment. The median SALT score dropped to 36.33 (range: 15–57), representing a reduction of 58.08%, after 6 consecutive months of upadacitinib treatment (Figure 2). Additionally, our patient's eyelashes regrew later than their head, eyebrow, and pubic hair. However, there was no improvement in nail dystrophy after upadacitinib treatment. All participants in this case series tolerated upadacitinib treatment well. Mild acne was the most common adverse event, developing in all three participants and resolving in response to topical fusidic acid. No moderate or severe adverse events were reported during follow-up. Upadacitinib treatment was continued after 6 months' treatment.

Literature Review

A total of seven papers were finally included after implementation of the inclusion and exclusion criteria.[4–10] Reported details concerning upadacitinib for treatment of AA in adolescent patients are summarized in Table 2. Up to now, a total of 26 adolescents with AA, including the three in the present study, from five countries, comprising Canada, China,

Table 1 The Demographic Data and Clinical Response for Upadacitinib Treatment in This Case Series

Patient	Age/ Gender	Disease Duration	Location	Nail	Weight	Prior Treatment	Upadacitinib Treatment	Initial SALT Score	Response	Adverse Events
P1	15y/F	1y	Hair loss	Nail dystrophy	53kg	Systemic corticosteroids, cyclosporine, topical minoxidil	15mg per day	SALT score 87	Hair regrowth after 4 months' treatment, SALT score 15 after 6 months	Acne
P2	17y/F	7y	Hair, eyebrow, eyelash, pubic hair, and armpit hair loss	None	48kg	Systemic corticosteroids, traditional Chinese medicine, topical minoxidil	15mg per day	SALT score 73	Eyebrow regeneration after 1month, pubic hair regeneration after 2 months, SALT score 37 after 6 months	Acne
P3	17y/M	10y	Hair, eyebrow, eyelash, pubic hair, and armpit hair loss	None	90kg	Systemic corticosteroids, glycyrrhizin, topical minoxidil	15mg per day	SALT score 100	Eyebrow regeneration after 1 month, SALT score 57 after 6 months	Acne

Abbreviations: y, year; F, female; M, male; kg, kilogram; SALT, severity of alopecia tool.

https://doi.org/10.2147/CCID.S549823

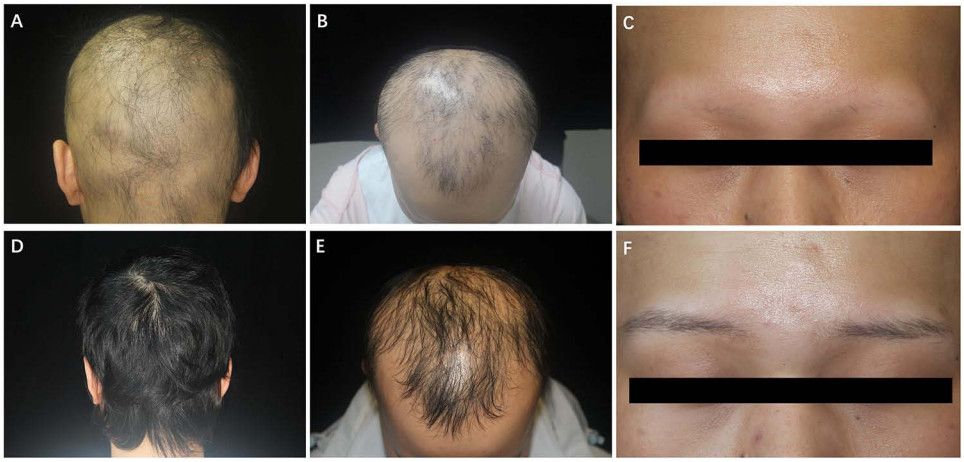

Figure 1 The clinical manifestations for severe AA adolescent patients. (**A**) Patient 1 before treatment; (**B**) Patient 2 before treatment; (**C**) Patient 3 before treatment; (**D**) Patient 1 after 6 months of upadacitinib treatment; (**E**) Patient 2 after 4 months of upadacitinib treatment; (**F**) Patient 3 after 1 month of upadacitinib treatment.

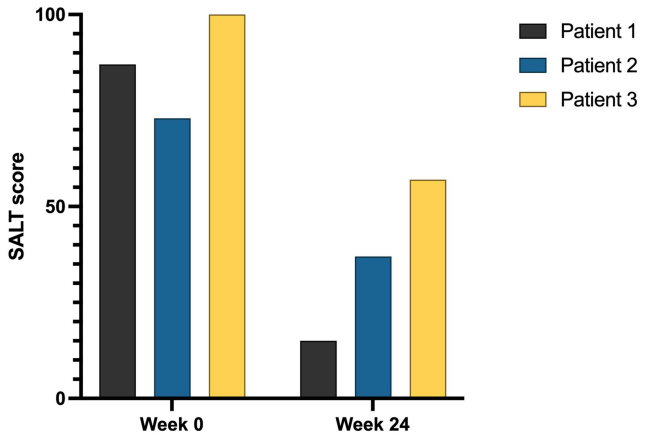

Figure 2 SALT score improvement before and after upadacitinib treatment.

Korea, Italy, and Poland, have reportedly received upadacitinib treatment. The youngest reported patient with severe AA to receive upadacitinib treatment was 9 years old. This patient had significant regrowth of head hair after 3 months' treatment and stopped upadacitinib treatment without relapse from the 5-month follow-up.[9] The most commonly prescribed dosage of upadacitinib in adolescents with severe AA was 15 mg/day. Sporadic hair regeneration has been reported to occur as early as the second week after initiating upadacitinib treatment.[9] However, the time of onset of hair regrowth in most reports is 4 to 6 weeks after initiating treatment[4,6,8] and the longest period of treatment with upadacitinib is 12 months.[5,10] Comorbidities in adolescents with severe AA receiving upadacitinib treatment have included atopic dermatitis (AD, n=10), vitiligo (n=1), thyroiditis (n=1), conjunctivitis (n=2), allergic rhinoconjunctivitis (n=1), Crohn's disease (n=1) and eosinophilic gastroenteritis (n=1). Additionally, besides inducing significant regrowth of hair, upadacitinib treatment has contributed to improvements in AD, vitiligo, and Crohn's disease. Our study provides more clinical data on response to upadacitinib treatment in adolescents with severe AA and without comorbidities. Overall, upadacitinib is a well-tolerated and safe treatment in adolescents with severe AA. Mild adverse events have been reported, including increased creatine phosphokinase (n=8), onset or exacerbation of acne (n=6), mild upper respiratory tract infection (n=1), and transient mild leukopenia (n=1). To our knowledge, severe adverse events have not been reported in adolescents with severe AA.

Table 2 The Literature Review Concerning Upadacitinib for Treatment of AA In Adolescent Patients

No.	Year	Authors	Country	Patient Number	Age/ Gender	Disease Duration	Coexist Disease	Dosage	Response	Adverse Events
1	2022	Bourkas AN et al[4]	Canada	1	14y/M	13y	AD	NA	Improvement of AA and AD after 6 weeks. SALT score 0 after 5 months.	NA
2	2023	Kołcz K et al[6]	Poland	1	14y/F	16m	AD	15mg per day	Improvement of AA and AD after 4 weeks. SALT score 0 after 3 months.	Transient mild leukopenia
3	2023	Yu D et al[9]	China	1	9y/F	7y	AD	15mg per day	Sporadic hairs after 2 weeks. SALT score 9 after 5 months. AD complete remission.	None
4	2024	Ha GU et al[5]	Korea	1	15y/F	11y	AD	15mg per day	Improvement in the eyebrows after 2 months. SALT score 11.7 after 12 months.	None
5	2024	Mu Y et al[7]	China	1	9y/F	2m	Vitiligo	15mg per day	Recovered 70% of the white plaque lesion area and hair regrowth with white hair after 7 months.	Elevated level of creatine kinase
6	2024	Picone V et al[8]	Italy	15	14.6y/ 7M8F	29.3m	AD (3), thyroiditis (1), conjunctivitis (2)	15mg per day	pSALT score reduced as early as 4 weeks. 60% patients responded well. pSALT50, pSALT75 and pSALT90 responses of 100%, 67% and 44% patients in 10 months.	Temporarily increased creatine phosphokinase (5), acne onset or exacerbation (3), mild upper respiratory tract infection (1)
7	2025	Battilotti C et al[10]	Italy	3	13y/3M	10.7m	AD (3), allergic rhinoconjunc-tivitis (1), CD (1), EGE (1)	15mg per day	Improvement of AA, AD and CD. Partial regrowth of eyebrow and eyelashes after 1 month. Median SALT score dropped to 5.27 after 12 months.	Mild transient CPK elevation (2)
8	2025	Our study	China	3	16.33y/ 1M2F	6y	None	15mg per day	Regrowth of eyebrows and pubic hair appearing in the first and second months. Median SALT score dropped to 36.33 after 6 months.	Acne (3)

Abbreviations: F, female; M, male; y, year; m, month; SALT, severity of alopecia tool; NA, not available; AD, atopic dermatitis; CD, Crohn's disease; EGE, eosinophilic gastroenteritis.

https://doi.org/10.2147/CCID.S549823

Discussion

A common autoimmune, non-scarring form of hair loss, AA has a slightly higher prevalence in pediatric and adolescent patients than in adults. It has been estimated that pediatric and adolescent patients with AA are more susceptible to autoimmune and metabolic disorders than are pediatric and adolescent individuals in general.[11] AD is one of the most common comorbidities in pediatric and adolescent patients with AA.[11] A systematic review found that topical corticosteroids and contact immunotherapy are the first and second commonly preferred treatments for pediatric and adolescent patients with AA.[12] However, the management of refractory, severe, or frequently relapsing AA in adolescent is sometimes complex.

The inhibitory effect of Janus kinase–signal transducers and activators of transcription signaling pathways is responsible for the favorable efficacy of JAK inhibitors in the treatment of both severe AA and AD. Up to now, there has been limited clinical evidence for the efficacy and safety of JAK inhibitors in adolescent and pediatric AA patients with and without comorbidities such as AD. Atopic diathesis, atopic comorbidities, and high serum concentrations of immunoglobulin E have been identified as risk factors for developing AA, especially coexisting AD. The genetic polymorphism of interleukins 13 and 4 and infiltration of mast cells and eosinophils in skin biopsies of patients with severe AA, and favorable responses to antihistamine and dupilumab therapy suggest that the mechanisms of Th1 and concomitant Th2 involved in AA.[13] Our literature review showed that most reported adolescents with severe AA who had received upadacitinib treatment had concomitant AD. In one patient, upadacitinib treatment induced both hair regrowth and improvement in symptoms of AD, as well as relief of vitiligo. Another patient showed relief of symptoms of Crohn's disease after upadacitinib treatment. The three patients in our study did not have a history of atopic diseases or atopic diathesis and had normal serum concentrations of immunoglobulin E, providing clinical evidence for the therapeutic efficacy of upadacitinib in adolescents with severe AA without AD. All three of our participants, none of whom had atopic comorbidity, responded well to upadacitinib treatment. In these patients, regrowth of eyebrow and pubic hair occurred earlier than did regrowth of head hair, the latter becoming obvious approximately 4 months after initiating treatment. Upadacitinib at 15 mg/day was the most commonly used treatment in reported adolescents with severe AA. Notably, the SALT score of our Patient 3 was still over 50 after 6 months of treatment. We gave further consideration to increasing this patient's upadacitinib dosage because he weighed 90 kgs. Although one reported 9-year-old patient had significant regrowth of head hair after 3 months' treatment and stopped upadacitinib treatment without relapse at the 5-month follow-up,[9] our patients needed to continue on upadacitinib treatment for more than 6 months.

A JAK 1 inhibitor, upadacitinib downregulates gamma-interferon signaling by inhibiting JAK activity, thereby preventing breakdown of hair follicles via immune mechanisms. Upadacitinib reportedly induced rapid regrowth of hair and significant improvement in quality of life in a retrospective study of 25 adults with AA.[14] The FDA has approved upadacitinib for patients with atopic dermatitis aged 12 and older and provided more clinical and safety evidence to support its application in adolescents with severe AA aged from 12 to 17 years. One study has reported adverse musculoskeletal and skin events in male patients receiving upadacitinib treatment, whereas musculoskeletal issues, infections, and abnormal laboratory tests were prevalent and severe in female patients receiving upadacitinib treatment.[15] According to our research and literature review, adverse reactions are mild in adolescents with severe AA receiving upadacitinib treatment. Increased creatine phosphokinase was the most common adverse event recorded in adolescents with severe AA treated with Upadacitinib, followed by onset or exacerbation of acne. Additionally, the adverse reactions did not differ significantly between sexes.

Two Phase III trials over 52 weeks have found that baricitinib, an inhibitor of JAK 1/2, is an effective treatment for AA.[16] The FDA has approved the use of baricitinib in adults with severe AA. There are also case reports supporting the off-label use of baricitinib for treating adolescents with severe AA. Compared with baricitinib, upadacitinib has the following advantages in treatment of adolescents with severe AA. First, upadacitinib more strongly inhibits the effect of JAK1/STAT on transcription than does baricitinib.[17] In some studies, upadacitinib has been used as conversion therapy for insufficiently effective responses to baricitinib treatment, indicating the significance of JAK 1 inhibition in management of AA.[18,19] Second, upadacitinib has been approved by the FDA for treatment of atopic dermatitis in children aged 12 and older, and it has been demonstrated that it is safer than baricitinib in adolescents aged 12 to 17 years. Third,

upadacitinib may have better therapeutic effects on comorbidities of AA. AD has been identified as a risk factor for developing AA and is one of the most common comorbidities in pediatric and adolescent patients with AA. Although various JAK inhibitors have shown some efficacy in the management of AD, a network meta-analysis concluded that upadacitinib is the optimal option according to short-term studies.[20] Further research is needed on the efficacy and safety of baricitinib and upadacitinib in the treatment of adolescents with severe AA.

This study has several limitations. First, as a retrospective case series, future randomized controlled trials with larger sample sizes are warranted to confirm the efficacy and safety of upadacitinib in adolescents with severe AA. Second, while the follow-up period exceeded 6 months, longer-term evaluation is required to comprehensively assess the treatment's sustained efficacy. Moreover, systematic assessment of disease recurrence following treatment discontinuation should be conducted in subsequent studies.

Conclusion

In conclusion, in the present study, we found that upadacitinib at 15 mg/day is an effective and safe treatment option for adolescents with severe AA, both in those with concomitant AD and vitiligo, but also in those without comorbidities. However, further long-term follow-up is warranted.

Acknowledgments

The study was approved by the Ethics Committee of Peking Union Medical College Hospital, and complied with the Declaration of Helsinki. Written informed consent for publication was obtained from these patients' legal guardians.

Funding

Beijing Key Clinical Specialty Construction Project; National Key Clinical Specialty Project of China.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Zhou C, Li X, Wang C, Zhang J. Alopecia areata: an update on etiopathogenesis, diagnosis, and management. *Clin Rev Allergy Immunol*. 2021;61(3):403–423.
2. Freitas E, Guttman-Yassky E, Torres T. Baricitinib for the treatment of alopecia areata. *Drugs*. 2023;83(9):761–770.
3. Paller AS, Ladizinski B, Mendes-Bastos P, et al. Efficacy and safety of upadacitinib treatment in adolescents with moderate-to-severe atopic dermatitis: analysis of the measure up 1, measure up 2, and AD up randomized clinical trials. *JAMA Dermatol*. 2023;159(5):526–535.
4. Bourkas AN, Sibbald C. Upadacitinib for the treatment of alopecia areata and severe atopic dermatitis in a paediatric patient: a case report. *SAGE Open Med Case Rep*. 2022;10:2050313x221138452. doi:10.1177/2050313X221138452
5. Ha GU, Kim JH, Jang YH. Improvement of severe alopecia areata in an adolescent patient on upadacitinib. *Pediatr Dermatol*. 2024;41(2):356–358. doi:10.1111/pde.15504
6. Kołcz K, Żychowska M, Sawińska E, Reich A. Alopecia universalis in an adolescent successfully treated with upadacitinib-a case report and review of the literature on the use of JAK inhibitors in pediatric alopecia areata. *Dermatol Ther*. 2023;13(3):843–856.
7. Mu Y, Pan T, Chen L. Treatment of refractory segmental vitiligo and alopecia areata in a child with upadacitinib and NB-UVB: a case report. *Clin Cosmet Invest Dermatol*. 2024;17:1789–1792. doi:10.2147/CCID.S467026
8. Picone V, Nappa P, Napolitano M, Vastarella M, Patruno C, Cantelli M. Upadacitinib for the management of severe alopecia areata in adolescent patients: a single-centre retrospective study. *Clin Exp Dermatol*. 2024;50(1):153–155. doi:10.1093/ced/llae309
9. Yu D, Ren Y. Upadacitinib for successful treatment of alopecia universalis in a child: a case report and literature review. *Acta dermato-venereologica*. 2023;103:adv5578. doi:10.2340/actadv.v103.5578
10. Battilotti C, Azzella G, Dattola A, et al. Efficacy of upadacitinib in treating alopecia areata, atopic dermatitis, and Th1 comorbidities in pediatric patients: a comprehensive case series and literature review. *J Clin Med*. 2025;14(11):3881.
11. Conic RZ, Tamashunas NL, Damiani G, Fabbrocini G, Cantelli M, Bergfeld WF. Comorbidities in pediatric alopecia areata. *J European Acad Dermatol Venereol*. 2020;34(12):2898–2901.
12. Barton VR, Toussi A, Awasthi S, Kiuru M. Treatment of pediatric alopecia areata: a systematic review. *J Am Acad Dermatol*. 2022;86(6):1318–1334.
13. David E, Shokrian N, Del Duca E, et al. Dupilumab induces hair regrowth in pediatric alopecia areata: a real-world, single-center observational study. *Archiv Dermatol Res*. 2024;316(7):487.
14. Flora A, Kozera E, Frew JW. Treatment of alopecia areata with the janus kinase inhibitor upadacitinib: a retrospective cohort study. *J Am Acad Dermatol*. 2023;89(1):137–138. doi:10.1016/j.jaad.2022.12.056
15. Yuan J, Lu H, Zuo X, Yin L, Pu Y, Zhang J. Adverse event assessment of upadacitinib: a pharmacovigilance study based on the FAERS database. *Pharmacoepidemiol Drug Saf*. 2024;33(10):e70030. doi:10.1002/pds.70030

16. Kwon O, Senna MM, Sinclair R, et al. Efficacy and safety of baricitinib in patients with severe alopecia areata over 52 weeks of continuous therapy in two phase III trials (BRAVE-AA1 and BRAVE-AA2). *American J Clin Dermatol*. 2023;24(3):443–451. doi:10.1007/s40257-023-00764-w
17. Traves PG, Murray B, Campigotto F, Galien R, Meng A, Di Paolo JA. JAK selectivity and the implications for clinical inhibition of pharmacodynamic cytokine signalling by filgotinib, upadacitinib, tofacitinib and baricitinib. *Ann Rheumatic Dis*. 2021;80(7):865–875. doi:10.1136/annrheumdis-2020-219012
18. Uchida H, Kamata M, Watanabe A, et al. Improvement of severe alopecia areata after 9-month baricitinib treatment followed by subsequent use of upadacitinib in a patient with atopic dermatitis. *J Dermatol*. 2023;50(11):e392–e393.
19. De la Torre-Gomar FJ, Velasco-Amador JP, Prados-Carmona Á, Ruiz-Villaverde R. Complete response of extensive alopecia areata refractory to baricitinib after five months of treatment with upadacitinib. *J Dermatol Treat*. 2024;35(1):2304630.
20. Wan H, Jia H, Xia T, Zhang D. Comparative efficacy and safety of abrocitinib, baricitinib, and upadacitinib for moderate-to-severe atopic dermatitis: a network meta-analysis. *Dermatologic Ther.* 2022;35(9):e15636.