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Alopecia Areata in Children and the Emerging Role of JAK Inhibitors

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INTRODUCTION

Alopecia areata (AA) is an immune-mediated condition resulting in non-scarring hair loss in both children and adults. It often begins in childhood or adolescence, affecting approximately 0.1% of the pediatric population.[1] The disease course varies, with episodes of spontaneous hair loss and regrowth that relapse and remits over time.[2] In more severe cases, AA can progress to complete scalp hair loss (alopecia totalis) or total loss of scalp and body hair (alopecia universalis).[1]

Topical corticosteroids are the standard first-line treatment for pediatric AA, with systemic immunosuppressants used in severe cases, though long-term safety is uncertain.[3] AA is typically diagnosed around age 8, yet many effective therapies are only approved for those 12 and older.[4] Janus kinase (JAK) inhibitors, which block JAK1, JAK2, JAK3, or TYK2 and disrupt interferon-γ and interleukin-15 signaling, are emerging as promising therapies.[5] With the growing clinical use of JAK inhibitors, we conducted a review to assess their effectiveness and safety in the pediatric population.

MATERIALS AND METHODS

To better assess the use of JAK inhibitors in the treatment of AA in children, we conducted a scoping review of all PUBMED and Embase articles published from inception to July 2025. For inclusion, articles had to be written in English and published as peer-reviewed case reports or case series describing JAK inhibitors for the treatment of pediatric AA. For each article that met the inclusion criteria, we collected data on the following variables: patient age, year of study, JAK inhibitor use, medication dose, and treatment outcomes.[6-23]

RESULTS

18 case reports and case series were included that investigated the following JAK inhibitors: abrocitinib (1), baricitinib (2), ruxolitinib (2), tofacitinib (6), upadacitinib (5), and ritlecitinib (2). They demonstrated notable hair regrowth, with the most significant reported adverse effects being the development of EBV and elevated liver enzymes.

DISCUSSION

JAK inhibitors reduce the autoimmune attack on hair follicles and promote regrowth by inhibiting interferon-gamma and other cytokines in the JAK-STAT pathway. As demonstrated in these studies, the oral route of these medications has proven more effective than topical or sublingual routes. Additionally, these agents are generally well tolerated, with a low side effect profile including headache, acne, upper respiratory tract infections, elevated cholesterol, and elevated creatine kinase.[24] Given their proven effectiveness and minimal risks, we advocate for these agents' broader use in pediatric AA's clinical management.

Although most wide-scale randomized controlled trials of JAK inhibitors for AA have been focused on adults, emerging evidence supports their effectiveness and safety in pediatric populations. Among all the JAK inhibitors, baricitinib is most commonly prescribed for pediatric patients with AA. A recent study investigating the use of baricitinib in pediatric patients found that the drug demonstrated clinical efficacy and good tolerability: 45.5% of patients achieved at least a 50% reduction in their Severity of Alopecia Tool (SALT) score after an average treatment duration of 6.5 months.[25]

Similarly, ritlecitinib has shown promising efficacy and safety in AA by selectively targeting JAK3-dependent immune pathways.[2] In the ALLEGRO Phase 2b/3 RCT, 44–80% of patients achieved clinically significant regrowth by Week 48.[26] By contrast, research on upadacitinib for AA remains sparse as the available literature is limited to anecdotal reports and small case series such as those described in Table 1. Additionally, there are currently no published case reports or clinical studies specifically examining the use of deuruxolitinib in children with AA.

JAK inhibitors have proven to be effective for AA in children, but they are not prescribed or utilized to their full potential, especially with limited research in children under 12. Overall, the reports reviewed highlight the effectiveness and tolerability of JAK inhibitors in the treatment of AA, supporting their role in expanding therapeutic options for this condition.

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TABLE 1.

Case Series and Case Reports of JAK Inhibitors in Pediatric Patients with AA						
Author	**Year**	**JAK Inhibitor**	**Age**	**Gender**	**Dose**	**Outcomes**
Huang et al[6]	2023	Abrocitinib	11	Male	100 mg oral QD	Marked scalp hair improvement after 4 months
Fang et al[7]	2024	Baricitinib	8	Female	2 mg oral QD (after 6 mo Dupilumab)	Near-complete hair regrowth and resolution of AD
Muratani et al[8]	2025	Baricitinib	9,10	Female (9) & Male (10)	4 mg oral QD	Complete hair regrowth within 4 months, AD improved
Peterson et al[9]	2020	Ruxolitinib	9	Male	20 mg BID 4 mo, 10 mg BID 8 mo, 10 mg QD for 3 mo, 10 mg QOD oral	Nearly complete regrowth; tapered over 12 months
Tembunde et al[10]	2024	Ruxolitinib	5	Female	1.5% topical cream BID	Significant hair regrowth noted by 3 months; near-complete resolution by 12 months; relapse after discontinuation
Youssef et al[11]	2023	Tofacitinib	7–16	Male & Female	5–10 mg oral BID	100% of patients achieved full hair regrowth; median 1–4 months to response; minimal AEs :mild acne
Dai et al[12]	2019	Tofacitinib	4,4,5	Male (4,4) & Female (5)	2.5 mg oral QD	2 had >90% regrowth at 12 months; 3rd had eyebrow/eyelash recovery + 50% scalp regrowth by 21 months
Dube[13]	2021	Tofacitinib	6	Female	2.5 mg oral QD	50% hair regrowth at 3 months; complete regrowth at 6 months
Bhokare[14]	2022	Tofacitinib	8	Male	2.5 mg oral BID	Near complete hair regrowth in 5 month
Craiglow et al[15]	2017	Tofacitinib	12–17	Male & Female	5 mg oral BID (adjusted as needed)	9/13 had clinically significant re-growth; mild AEs
Huang et al[16]	2023	Tofacitinib	7–12	Male & Female	Varied	73% of patients experienced hair regrowth; mild AEs
Battilotti et al[17]	2025	Upadacitinib	12,13,14	Male	15 mg oral	All had hair regrowth
Bourkas et al[18]	2022	Upadacitinib	14	Male	Not Specified	Significant hair regrowth of entire scalp in 5 months
Ha et al[19]	2024	Upadacitinib	15	Female	15 mg oral QD	Severe AA improved
Yu et al[20]	2023	Upadacitinib	9	Female	15 mg oral QD	Full regrowth of scalp and eye-brows; no AEs
Kołcz et al[21]	2023	Upadacitinib	14	Female	15 mg oral QD	Complete hair regrowth, resolution of eczema within 3 months; AEs: transient mild leukopenia
Huang et al[22]	2025	Ritlecitinib	6–11	Males & Females	Not Specified	6 patients achieved significant hair regrowth; mild AEs: urticaria and folliculitis
Yunhan et al[23]	2025	Ritlecitinib	4	Male	50 mg oral QD	Marked hair regrowth by 24 weeks; AEs: EBV, LFTs

DISCLOSURES

The authors have no conflict of interest to declare.

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