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Research Article

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Efficacy Trajectory and Hematologic Safety of Oral JAK Inhibitors in Elderly Patients with Moderate-To-Severe Atopic Dermatitis: A Prospective Real-World Study

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Abstract

Background: Elderly patients with moderate-to-severe Atopic Dermatitis (AD) often have multiple comorbidities and immunosenescence, raising concerns regarding the efficacy and safety of systemic therapies. Real-world evidence on oral Janus Kinase (JAK) inhibitors in this population remains limited.

Methods: In this prospective real-world cohort, 90 elderly patients with moderate-to-severe AD received abrocitinib or upadacitinib and were followed for up to 36 weeks. After early discontinuations, 80 patients were included in the final analysis. Disease severity (EASI, SCORAD, and DLQI) and laboratory parameters were assessed longitudinally, and linear mixed-effects models were applied to identify factors associated with treatment response.

Results: Both JAK inhibitors induced rapid and sustained clinical improvement. EASI50, EASI75, and EASI90 response rates increased as early as Week 4 and reached a stable plateau after Week 16. Upadacitinib was associated with faster and greater early improvement, whereas long-term efficacy was comparable between groups by Week 36. SCORAD and DLQI scores decreased significantly throughout follow-up (both $P < 0.001$). Shorter disease duration, treatment with upadacitinib, and higher body mass index were independently associated with greater EASI improvement. Both treatments were generally well tolerated. Herpes zoster occurred more frequently in the upadacitinib group but was mild to moderate and manageable, and no serious adverse events were observed.

Conclusions: In elderly patients with moderate-to-severe AD, both abrocitinib and upadacitinib demonstrated rapid, durable efficacy and an acceptable safety profile in a real-world setting, with upadacitinib showing a modest advantage in early disease control.

Keywords: Atopic Dermatitis; JAK Inhibitors; Upadacitinib; Abrocitinib; Elderly Patients.

INTRODUCTION

Atopic Dermatitis (AD) is a chronic, relapsing inflammatory skin disease driven by genetic susceptibility, immune dysregulation, and epidermal barrier dysfunction [1-3]. Its global prevalence has increased steadily in recent years. Although AD commonly begins in childhood, the burden of disease in middle-aged and elderly individuals has received growing attention [4]. Compared with younger patients, elderly individuals often have longer disease duration, more extensive skin involvement, persistent inflammation, severe pruritus, sleep disturbance, and impaired quality of life. Age-related structural changes in the skin, immune senescence, and chronic comorbid conditions contribute to distinct clinical features and therapeutic needs in this population [5].

Elderly patients frequently have comorbid hypertension, diabetes mellitus, chronic kidney disease, and atherosclerosis [6]. Age-related decline in hepatic and renal function further increases the risk of drug-related adverse effects. Traditional systemic therapies, including corticosteroids, cyclosporine, methotrexate, and other immunosuppressants, may provide short-term symptom control but are limited by hepatotoxicity, nephrotoxicity, infection risk, drug–drug interactions, and poor long-term tolerability [7]. These limitations are more pronounced in elderly patients, highlighting the need for safer long-term treatment options.

Targeted therapies have substantially altered the management of AD. Dupilumab, an IL-4/IL-13 pathway inhibitor, has become a cornerstone therapy for moderate-to-severe AD and provides meaningful benefit for many patients [4-9]. Nevertheless, some individuals experience inadequate responses or discontinue therapy because of adverse events such as conjunctivitis, underscoring the heterogeneity of AD pathophysiology and treatment response [10].

Oral JAK inhibitors, including upadacitinib and abrocitinib, inhibit the JAK–STAT pathway and downstream cytokines such as IL-4, IL-13, and IL-31, resulting in rapid improvement of skin inflammation and pruritus [11,12]. However, these agents may be associated with infections, dyslipidemia, and elevations in liver enzymes [13,14]. In elderly patients with immunosenescence and multiple comorbidities, balancing efficacy and safety is particularly important [15].

Despite increasing clinical use, prospective real-world data on JAK inhibitors in elderly patients with AD—especially regarding long-term efficacy trajectories and hematologic safety—remain limited. To address this gap, we conducted a prospective cohort study to evaluate the 36-week efficacy and safety of upadacitinib and abrocitinib in elderly patients with moderate-to-severe AD, with the goal of informing individualized treatment strategies.

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MATERIALS AND METHODS

Enrollment

This study was a prospective, real-world cohort conducted at the Affiliated Hospital of Xuzhou Medical University from September 2024 to September 2025. A total of 90 elderly patients with moderate-to-severe atopic dermatitis were enrolled: 44 in the abrocitinib group (Group A) and 46 in the upadacitinib group (Group B). During the 36-week follow-up, a total of 10 patients (4 in Group A and 6 in Group B) discontinued treatment before Week 12 because of economic or personal reasons. These discontinuations were not considered to be related to treatment efficacy. These individuals were excluded from the final efficacy and safety analyses. Ultimately, 80 patients (40 per group) completed the full follow-up and were included in the final dataset.

Study Population

Inclusion criteria: age ≥ 65 years; diagnosis of moderate-to-severe AD; clinical indication for JAK inhibitor therapy; ability to complete scheduled follow-up and provide informed consent.

Exclusion criteria: known contraindications to JAK inhibitors; active infection or severe dysfunction of major organs; coexisting malignancy or other conditions precluding enrollment; inability to complete baseline EASI or SCORAD assessment.

Withdrawal criteria: comprised worsening of disease rendering continuation of the assigned treatment inappropriate; occurrence of serious drug-related adverse events; development of intercurrent illnesses during treatment that could affect study outcomes; use of treatments prohibited by the study protocol; poor compliance, including failure to adhere to scheduled treatment or follow-up; voluntary withdrawal by the participant for personal reasons; or determination by the investigator that continued participation was not appropriate.

Interventions

Patients received oral JAK inhibitor therapy. Topical corticosteroids were permitted for severe lesions, while other systemic or injectable antipruritic treatments were not allowed. Group A received abrocitinib 100 mg once daily, and Group B received upadacitinib 15 mg once daily. Fixed dosing was applied during the induction phase (Weeks 0–16). After Week 16, patients who achieved EASI50 with stable disease control underwent gradual dose tapering to every-other-day dosing (qod), guided by regular efficacy and safety monitoring. Disease flare was defined as a marked increase in disease activity during dose tapering, indicated by an increase in EASI of ≥50% compared with the previous visit or a return to or exceeding the pre-tapering level. Concomitant systemic immunosuppressive therapies were prohibited.

Outcome Measures and Follow-Up

Primary outcomes were the proportions of patients achieving EASI50, EASI75, and EASI90 at Weeks 16 and 36. Secondary outcomes included longitudinal changes in SCORAD and DLQI, continuous EASI improvement for mixed-effects modeling, and safety outcomes (adverse events and laboratory abnormalities). Clinical assessments were performed every 4 weeks, and laboratory evaluations were conducted at baseline and every 12 weeks. After treatment discontinuation, patients entered a post-discontinuation follow-up period. Disease relapse was assessed at 4 and 12 weeks after treatment cessation. Relapse was defined as the reappearance or worsening of AD lesions requiring therapeutic intervention.

Data Collection

Data collected included demographic characteristics, disease severity indices, comorbidities, laboratory parameters, and adverse events graded according to CTCAE v5.0.

Statistical Analysis

Statistical analyses were performed using SPSS version 29.0 (IBM Corp., Armonk, NY, USA). Continuous variables are expressed as mean ± standard deviation or median (interquartile range), and categorical variables as frequencies and percentages. Within-group comparisons of EASI50, EASI75, and EASI90 at different time points were performed using McNemar's test. Between-group comparisons at corresponding time points were conducted using the chi-square test or Fisher's exact test, as appropriate. Longitudinal changes in EASI were analyzed using linear mixed-effects models. Safety outcomes were summarized descriptively. All tests were two-sided, with $P < 0.05$ considered statistically significant.

Ethical Considerations

This study was approved by the Ethics Committee of Xuzhou Medical University. All participants provided written informed consent. The study involved no additional interventions beyond routine clinical care and was conducted in accordance with minimal-risk research principles.

RESULTS

Baseline Characteristics

A total of 80 elderly patients with moderate-to-severe atopic dermatitis were included in the final analysis, including 40 treated with abrocitinib (Group A) and 40 with upadacitinib (Group B). Overall, 70.0% of patients were male. The two groups were comparable in age, sex distribution, disease duration, body mass index, and prevalence of cardiovascular disease and diabetes mellitus. Baseline disease severity, assessed by EASI, SCORAD, and DLQI, was similar between groups, indicating good baseline comparability (Table S1).

Efficacy Outcomes

1. Primary Efficacy Outcomes

Across the overall cohort, EASI50, EASI75, and EASI90 response rates increased progressively over time and stabilized during mid-to-late follow-up. EASI50 demonstrated the most rapid improvement, increasing from 30.0% at Week 4 to 46.25% at Week 8 and 75.0% at Week 12, reaching 88.75% by Week 16 and remaining high thereafter (96.25–100% during Weeks 20–36). EASI75 increased more gradually, from 17.5% at Week 4 to 25.0% at Week 8 and 42.25% at Week 12, reaching 56.25% at Week 16 and stabilizing at approximately 58–60% during later follow-up. In contrast, EASI90 responses emerged later, with achievement rates of 0% at Week 4, 1.25% at Week 8, and 3.75% at Week 12, increasing to 8.75% at Week 16 and remaining relatively stable at 10–11.25% thereafter. Overall, all efficacy endpoints showed substantial improvement before Week 16 and reached a stable plateau during subsequent follow-up. After achieving stable disease control at Week 16, 88.75% of patients initiated dose tapering for maintenance therapy, and no disease flare was observed during follow-up.

Subgroup analyses showed that both JAK inhibitors achieved rapid and sustained disease control, with differences observed in the speed and depth of response. In Group A (abrocitinib), the EASI50 response rate increased from 20.0% at Week 4 to 70.0% at Week 12 and stabilized at 95–100% from Week 20 onward. In Group B (upadacitinib), EASI50 responses were observed in 40.0% of patients at Week 4, increased to 80.0% at Week 12, and remained consistently high at 97.5–100% from Week 16 onward. For EASI75, Group A reached a stable response rate of approximately 50–55% from Week 20, whereas Group B achieved a plateau earlier, maintaining response rates of 62.5–65% from Week 16 onward. For EASI90, Group A achieved response rates of 5.0% at Week 16 and 5–7.5% during later follow-up, while Group B reached 12.5% at Week 16 and remained stable at 12.5–15% thereafter (Figure 1).

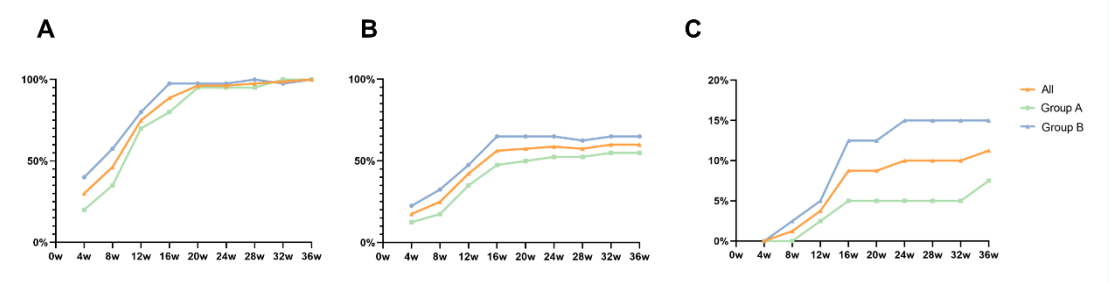

Figure 1. Temporal trends in EASI50, EASI75, and EASI90 response rates over the 36-week follow-up period. (A) Changes in EASI50 response rates over time, demonstrating a sustained increase in the overall population as well as in Groups A and B from Week 0 to Week 36.(B) Changes in EASI75 response rates over time, showing a rapid increase before Week 16, followed by stabilization in both treatment groups and the overall population. (C) Changes in EASI90 response rates over time, indicating that deep remission predominantly emerged after Weeks 12–16, with more pronounced improvement observed in Group B. (Lines represent the overall population, Group A, and Group B, respectively.)

To further characterize disease control trajectories over the 36-week period, Weeks 16 and 36 were predefined as key observation points. Within-group comparisons of EASI50, EASI75, and EASI90 achievement rates across Weeks 4, 16, and 36 were performed using the McNemar paired chi-square test, whereas between-group comparisons at each time point were conducted using Fisher's exact test. Significant improvements were observed at Week 16 compared with Week 4 across all response thresholds (all $P < 0.01$), and similar significant differences were noted between Week 36 and Week 4 (all $P < 0.01$). No significant differences were detected between Weeks 16 and 36 for any endpoint. In between-group comparisons, Group B showed a higher EASI50 response rate than Group A at Week 16 ($P = 0.029$), whereas no significant differences were observed for EASI75 ($P = 0.176$) or EASI90 ($P = 0.432$). At Week 36, both groups achieved 100% EASI50 response rates, with no significant between-group differences in EASI75 ($P = 0.364$) or EASI90 ($P = 0.481$).

2. Secondary Efficacy Measures

SCORAD

SCORAD scores decreased continuously over the 36-week follow-up in the overall population, with significant reductions from baseline at Weeks 16 and 36 (both $P < 0.001$). Compared with abrocitinib (Group A), upadacitinib (Group B) was associated with significantly lower SCORAD scores at both time points, indicating faster and more pronounced lesion improvement (Table S2).

DLQI

DLQI scores showed sustained improvement throughout the 36-week treatment period, with significant reductions from baseline at Weeks 16 and 36 (both $P < 0.001$). Upadacitinib (Group B) was associated with

Table 1. Fixed Effects

Model term	Coefficient	Standard error	t	P	95% CI (Lower)	95% CI (Upper)
Intercept	0.813	0.0738	11.023	<0.001	0.668	0.958
Age	−0.001	0.001	−0.485	0.628	−0.003	0.002
Male	0.013	0.0101	1.327	0.185	−0.006	0.033
Female	—	—	—	—	—	—
BMI	0.003	0.0013	2.549	0.011	0.001	0.006
Group A (Abrocitinib)	−0.042	0.009	−4.605	<0.001	−0.059	−0.024
Group B (Upadacitinib)	—	—	—	—	—	—
Disease duration	−0.014	0.0009	−14.335	<0.001	−0.015	−0.012
IgE	8.438E-6	1.0300E-5	0.819	0.413	-1.178E-5	2.866E-5
No cardiovascular disease	0.006	0.0094	0.654	0.514	−0.012	0.024
Cardiovascular disease	—	—	—	—	—	—
No diabetes mellitus	−0.006	0.0105	−0.569	0.569	−0.027	0.015
Diabetes mellitus	—	—	—	—	—	—

significantly lower DLQI scores compared with abrocitinib (Group A) at both time points, indicating faster and greater improvement in quality of life (Table S3).

EASI Improvement Rate Mixed-Effects Model

Mixed-effects model analysis showed that BMI, treatment group, and disease duration independently affected EASI improvement. Each 1-unit increase in BMI was associated with a 0.3% increase in improvement ($P = 0.011$), while group A had a 4.2% lower improvement rate than group B ($P < 0.001$). Each additional year of disease duration reduced improvement by 1.4% ($P < 0.001$). Age, sex, IgE, and presence of CVD or diabetes were not significant (all $P > 0.05$). Residual variance decreased over time, with high inter-individual variability at weeks 4–8; after week 16, variance stabilized and remained low through week 36 (Tables 1,2).

Safety

1. Adverse Events

During the 36-week follow-up period, the overall incidence of Adverse Events (AEs) in both groups was comparable to previous studies, though certain events showed a slightly higher trend in the elderly population. In Group A, the most common AEs included headache (12.5%), nausea (10%), gastrointestinal discomfort (7.5%), upper respiratory tract infection (7.5%), and 1 case of herpes simplex (2.5%). In Group B, upper respiratory tract infection (15%), gastrointestinal discomfort (7.5%), and headache (10%) were common. Three cases of herpes zoster (7.5%) occurred, exceeding previous RCT reports (approximately 1–3%), along with 2 cases of nausea (5%).

All adverse events were mild to moderate and resolved with symptomatic management, and no patients permanently discontinued treatment because of adverse reactions. No serious adverse events, including opportunistic infections, major adverse cardiovascular events, venous thromboembolism, or clinically significant hepatic or renal impairment, were observed. Overall, JAK inhibitors demonstrated an acceptable safety profile in elderly patients with AD, although infectious events such as herpes zoster occurred slightly more frequently, warranting careful monitoring.

2. Laboratory Parameters

Laboratory parameters were monitored at weeks 0, 12, 24, and 36, including complete blood count, hepatic and renal function, lipid profile, tuberculin γ interferon, quantitative hepatitis B and C viral load, and coagulation function. Regarding hematological indicators, three patients in Group A exhibited thrombocytopenia at week 12, with the lowest value recorded at 90 × 10^9/L. No further significant abnormalities were observed at weeks 24 and 36. For lipid profiles, Group A results fluctuated within normal ranges at all time points, with only one case showing a >20% increase from baseline at week 12. In contrast, Group B exhibited more pronounced lipid changes at week 12 follow-up: 12 patients showed >20% increases from baseline, including 4 with levels exceeding 3.40 mmol/L (maximum 3.81 mmol/L). Patients with dyslipidemia received dietary management advice and were referred to cardiovascular specialists. By follow-up at weeks 24 and 36, lipid levels in Group B had decreased from week 12, with all values falling below 3.4 mmol/L. Regarding liver function, mild elevations in transaminases were observed in both groups. Group A had 6, 4, and 3 cases of elevated transaminases at weeks 12, 24, and 36, respectively, while Group B had 7, 4, and 2 cases at the corresponding time points. None of these elevations had clear clinical significance and required no additional intervention. No abnormalities in tuberculosis, gamma interferon, or quantitative hepatitis B/C virus levels were observed during follow-up. See Figures 2 and 3.

Relapse

During post-discontinuation follow-up, no relapses were observed at 4 weeks after treatment cessation. At 12 weeks after discontinuation, mild relapses confined to specific anatomical areas (mainly flexural sites) were observed in a small number of patients (Group A: 2/40; Group B: 3/40). All relapses were mild in severity and resolved with topical therapy, without the need for systemic treatment re-initiation.

DISCUSSION

Based on a prospective real-world cohort, this study systematically evaluated the efficacy and safety of upadacitinib and abrocitinib in elderly patients with moderate-to-severe atopic dermatitis. The results demonstrate that both JAK inhibitors can induce rapid and sustained

Table 2. Residual Effects

Residual effect	Estimate	Standard error	Z	P	95% CI (Lower)	95% CI (Upper)
Var (Week 4)	0.146	0.023	6.251	<0.001	0.106	0.199
Var (Week 8)	0.078	0.013	6.203	<0.001	0.057	0.107
Var (Week 12)	0.03	0.005	6.154	<0.001	0.022	0.042
Var (Week 16)	0.015	0.002	6.274	<0.001	0.011	0.02
Var (Week 20)	0.011	0.002	6.313	<0.001	0.008	0.015
Var (Week 24)	0.01	0.002	6.296	<0.001	0.007	0.014
Var (Week 28)	0.01	0.002	6.253	<0.001	0.007	0.013
Var (Week 32)	0.01	0.002	6.154	<0.001	0.007	0.013
Var (Week 36)	0.01	0.002	6.077	<0.001	0.007	0.014

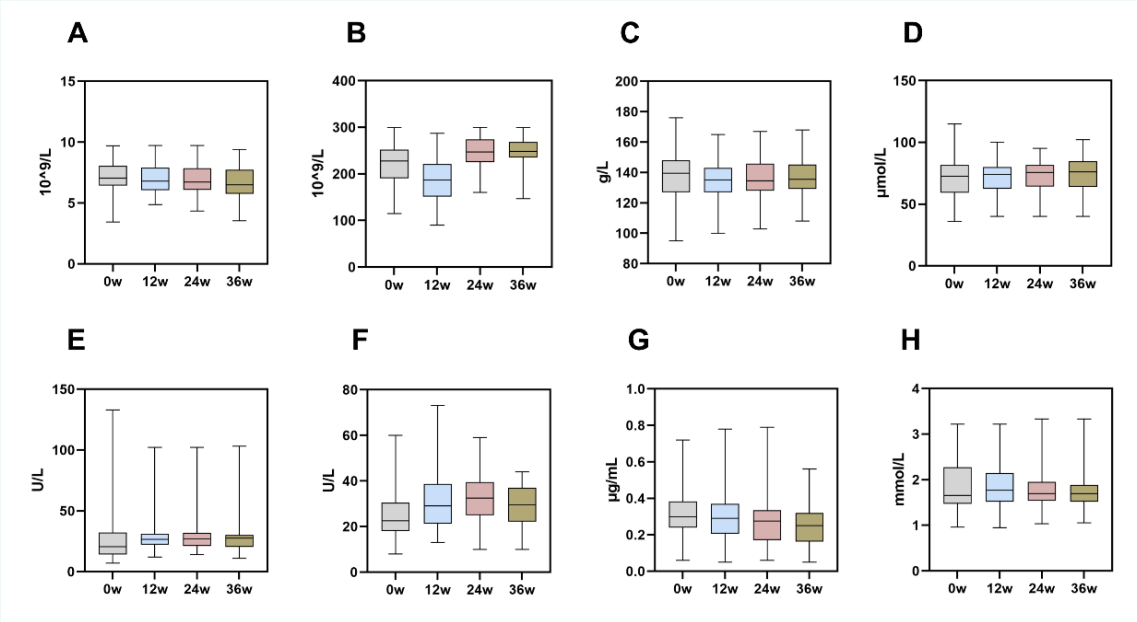

Figure 2: Changes in laboratory parameters in elderly patients with atopic dermatitis in Group A during JAK inhibitor treatment at Weeks 0, 12, 24, and 36. (A) White blood cell count (WBC, $\times 10^9$/L);(B) Platelet count (PLT, $\times 10^9$/L);(C) Hemoglobin (Hb, g/L);(D) Serum creatinine (Scr, μmol/L);(E) Aspartate aminotransferase (AST, U/L);(F) Alanine aminotransferase (ALT, U/L);(G) D-dimer (μg/mL);(H) Low-density lipoprotein cholesterol (LDL-C, mmol/L).

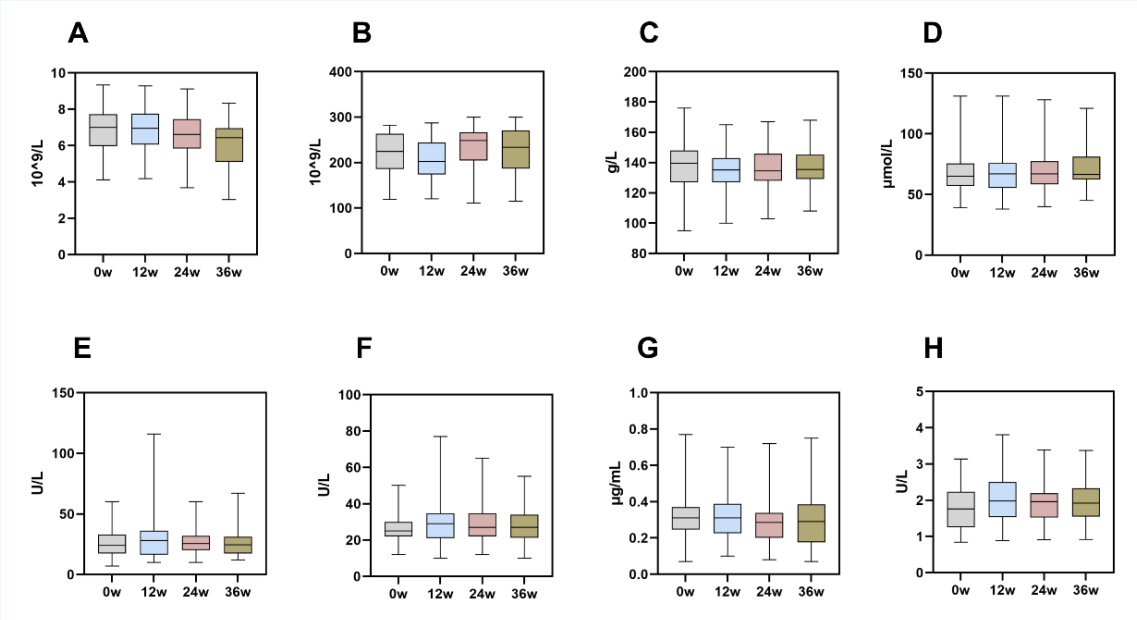

Figure 3: Changes in laboratory parameters in elderly patients with atopic dermatitis in Group B during JAK inhibitor treatment at Weeks 0, 12, 24, and 36. (A) White blood cell count (WBC, $\times 10^9$/L);(B) Platelet count (PLT, $\times 10^9$/L);(C) Hemoglobin (Hb, g/L);(D) Serum creatinine (Scr, μmol/L);(E) Aspartate aminotransferase (AST, U/L);(F) Alanine aminotransferase (ALT, U/L);(G) D-dimer (μg/mL);(H) Low-density lipoprotein cholesterol (LDL-C, mmol/L)..

therapeutic responses in this population [16]. The res pons rates for EASI50, EASI75, and EASI90 were consistent with those reported in large clinical studies, indicating that JAK inhibitors remain effective in elderly patients with multiple comorbidities. Clinical improvement occurred rapidly before Week 16 and subsequently reached a stable plateau. Sustained reductions in SCORAD and DLQI further support the durability of treatment efficacy.

Notably, although the two agents achieved comparable long-term outcomes (e.g., at Week 36), subgroup analyses revealed clinically meaningful early differences. Upadacitinib demonstrated faster response onset and deeper symptom relief during the early-to-mid treatment period (e.g., by Week 16), with significantly greater improvements in SCORAD, DLQI, and early EASI50 responses compared with abrocitinib. These findings suggest that for elderly patients with refractory disease or high inflammatory burden who require rapid disease control and deeper remission, upadacitinib may represent a more favorable initial treatment option [17].

In terms of safety, the overall incidence of adverse events (AEs) in both groups was generally consistent with prior reports [6-18], although certain events appeared slightly more frequent in the elderly population. In the abrocitinib group, the most common AEs included headache, nausea, and gastrointestinal discomfort, which were mostly mild and transient. In contrast, upper respiratory tract infections were the most frequent AEs in the upadacitinib group, and three cases of herpes zoster were observed, corresponding to a higher incidence than that reported in previous randomized controlled trials (approximately 1–3%)[19,20]. This difference may be attributable to age-related immune decline, an increased risk of latent viral reactivation, and the modest inhibitory effects of JAK inhibitors on antiviral signaling pathways such as the interferon–STAT axis. Although all herpes zoster cases in this study were mild to moderate and resolved promptly with appropriate treatment, these findings highlight the importance of careful assessment of prior infection history in elderly AD patients receiving JAK inhibitors [13,14].

Herpes zoster vaccination and early intervention may be considered in elderly patients receiving JAK inhibitors. Despite a slightly higher incidence of infection-related adverse events, no serious safety signals were observed, and no treatment discontinuations occurred. Overall, with appropriate monitoring, JAK inhibitors demonstrate an acceptable safety profile in elderly patients.

Dynamic changes in laboratory parameters further support these safety conclusions. Although occasional mild elevations in liver transaminases, lipid fluctuations, or transient decreases in platelet counts were observed in both groups, these abnormalities were reversible, clinically insignificant, and did not result in organ dysfunction. Of note, notable elevations in LDL cholesterol were more frequently observed in the upadacitinib group at Week 12, consistent with prior reports indicating a higher incidence of metabolic adverse events among JAK inhibitor users [21]. These findings highlight the importance of regular lipid monitoring and timely intervention in elderly patients. No tuberculosis conversion or hepatitis B/C reactivation was observed, further supporting the safety of JAK inhibitors in this population.

The low relapse rate during post-treatment follow-up suggests sustained disease control after JAK inhibitor therapy. When relapse occurred, it was mild and responsive to topical treatment, supporting the feasibility of step-down management.

Using mixed-effects modeling, treatment regimen and disease duration emerged as the primary determinants of therapeutic response. Upadacitinib was associated with greater improvement than abrocitinib, and shorter disease duration predicted a more pronounced response. BMI showed a weak but statistically detectable positive association with treatment response, whereas age, sex, IgE levels, and common chronic comorbidities did not significantly influence efficacy [22]. These findings suggest that, in elderly patients, disease-related factors and treatment selection are more influential determinants of response than demographic characteristics. The progressive reduction in residual variance after Week 16 indicates convergence toward a stable treatment response, supporting the rapid onset and durable effects of both JAK inhibitors.

This study has several limitations. The absence of a comparator group receiving conventional systemic therapies or biologics limits direct treatment comparisons. The single-center design and modest sample size may have reduced statistical power, and the lack of inflammatory biomarkers [23] skin barrier measures, and pharmacokinetic data restricts mechanistic interpretation. Although the 36-week follow-up reflects mid-term efficacy and safety, longer-term outcomes remain to be determined. Future multicenter studies with larger cohorts and extended follow-up are warranted to optimize JAK inhibitor–based management strategies in elderly patients with atopic dermatitis.

AUTHOR CONTRIBUTIONS

Conceptualization: Zhiping Wei, Guan Jiang.

Methodology: Lin Zhang, Sirong Xie, Hongze Han.

Investigation: Lin Zhang, Sirong Xie, Hongze Han, Yidi Zhu.

Data curation: Sirong Xie, Hongze Han.

Formal analysis: Sirong Xie.

Visualization: Lin Zhang, Sirong Xie.

Writing – original draft: Lin Zhang, Sirong Xie.

Writing – review & editing: Zhiping Wei, Guan Jiang.

Supervision: Zhiping Wei, Guan Jiang.

Lin Zhang, Sirong Xie, Hongze Han, and Yidi Zhu contributed equally to this work.

Zhiping Wei and Guan Jiang are co-corresponding authors, with Zhiping Wei serving as the primary corresponding author.

All authors have read and approved the final manuscript.

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This research received no external funding.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Institutional Review Board Statement

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of the Affiliated Hospital of Xuzhou Medical University (protocol code XYFY2024-KL166-01, approval date 2024-4-25). All procedures involving human participants were performed in accordance with institutional and national ethical standards.

Informed Consent Statement

Written informed consent was obtained from all subjects involved in the study.

Data Availability Statement

Data supporting the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy and ethical restrictions related to patient information.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest related to this work.

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