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ORIGINAL RESEARCH

Clinical Profile of Elderly Atopic Dermatitis in China

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Background: With global population aging, elderly atopic dermatitis (AD) is emerging as a distinct subtype. This study investigated the clinical and hematological phenotype of elderly AD patients in a Chinese cohort.

Methods: 593 patients who fulfilled the Chinese Criteria for Atopic Dermatitis (CCAD) were stratified into three age groups: 2–17, 18–59, and ≥ 60 years. Clinical features and risk factors were assessed via a standardized questionnaire and physical examination. Serum total IgE and complete blood counts were measured in a subset of patients along with age-matched healthy controls.

Results: Approximately three-quarters of the elderly AD patients were late-onset (first presentation ≥ 60 years old), with male predominance (male-to-female ratio 2.03:1). Lesions displayed a "widespread" distribution pattern in elderly AD. Over 80% of elderly AD patients had moderate-to-severe disease (SCORAD ≥ 25), with greater pruritus, quality-of-life impairment, and worse management outcomes compared with younger groups. The endogenous subtype increased with age, accounting for 47% of elderly AD. The elderly AD had higher monocyte count and percentage but lower lymphocyte count than other age groups. The Eczema Area and Severity Index (EASI) positively correlated with eosinophil count, and negatively with lymphocyte count and percentage in elderly AD.

Conclusion: Elderly AD exhibits a distinct clinical and hematological phenotype characterized by severe disease burden, widespread distribution, male predominance, and age-specific immune dysregulation. While the role of eosinophil is established, our findings underscore the need for age-tailored management strategies and highlight the monocyte-macrophage axis as a novel direction for future research.

Keywords: atopic dermatitis, elderly, eosinophils, hematologic phenotype, monocytes

Introduction

Elderly atopic dermatitis (AD), a common chronic skin disease, has garnered increasing medical attention in recent years. AD affects more than 230 million people worldwide, with high prevalence in children (15–30%) and adults (2–10%).[1] The Global Burden of Disease Study (1990–2017) reveals the highest AD prevalence in children, followed by a decline and subsequent increase in middle-aged and elderly populations.[2] The elderly AD population is expanding rapidly due to accelerated global aging, yet prevalence data for this age group remain limited.[3] Geographic variations in AD prevalence range from 1.6% to 4% and tend to rise with age.[4–6] The elderly AD often exhibit age-related immune dysfunction, impaired skin physiology, and a higher likelihood of multiple comorbidities that increase treatment challenges.[7]

In addition to type 2 inflammation, elderly AD patients exhibit greater heterogeneity with a mixed Th2/Th17/Th22 profile, including elevated IL-4, TARC, IL-17A, IL-22, IL-33, and TSLP.[8,9] However, the unique pathogenesis of elderly AD remains elusive, hindering potential therapeutic advancement. This study retrospectively analyzed the clinical spectrum and risk factors of a large Chinese AD cohort, expanding the phenotypic map of elderly AD. Importantly, we identified the monocyte-macrophage axis as a promising precision therapeutic target for elderly AD.

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Material and Methods

Diagnostic Criteria and Subject Enrollment

A total of 200 elderly AD patients who met the Chinese Criteria for Atopic Dermatitis (CCAD)[10] were enrolled. For comparative analysis, we recruited 200 pediatric AD patients, 193 adult AD patients and 154 healthy elderly controls. We excluded patients with secondary eczema, contact dermatitis, psoriasis, other inflammatory skin diseases, or patients receiving systemic immunosuppressive therapy within four weeks. This study protocol complies with the Declaration of Helsinki and was approved by the ethics committee of the Hospital for Skin Diseases, Institute of Dermatology, Chinese Academy of Medical Sciences & Peking Union Medical College (2022-KY-069), and written informed consent was obtained from all participants or their legal guardians. Written informed consent for publication of clinical images (Figure 1) was obtained from the patient.

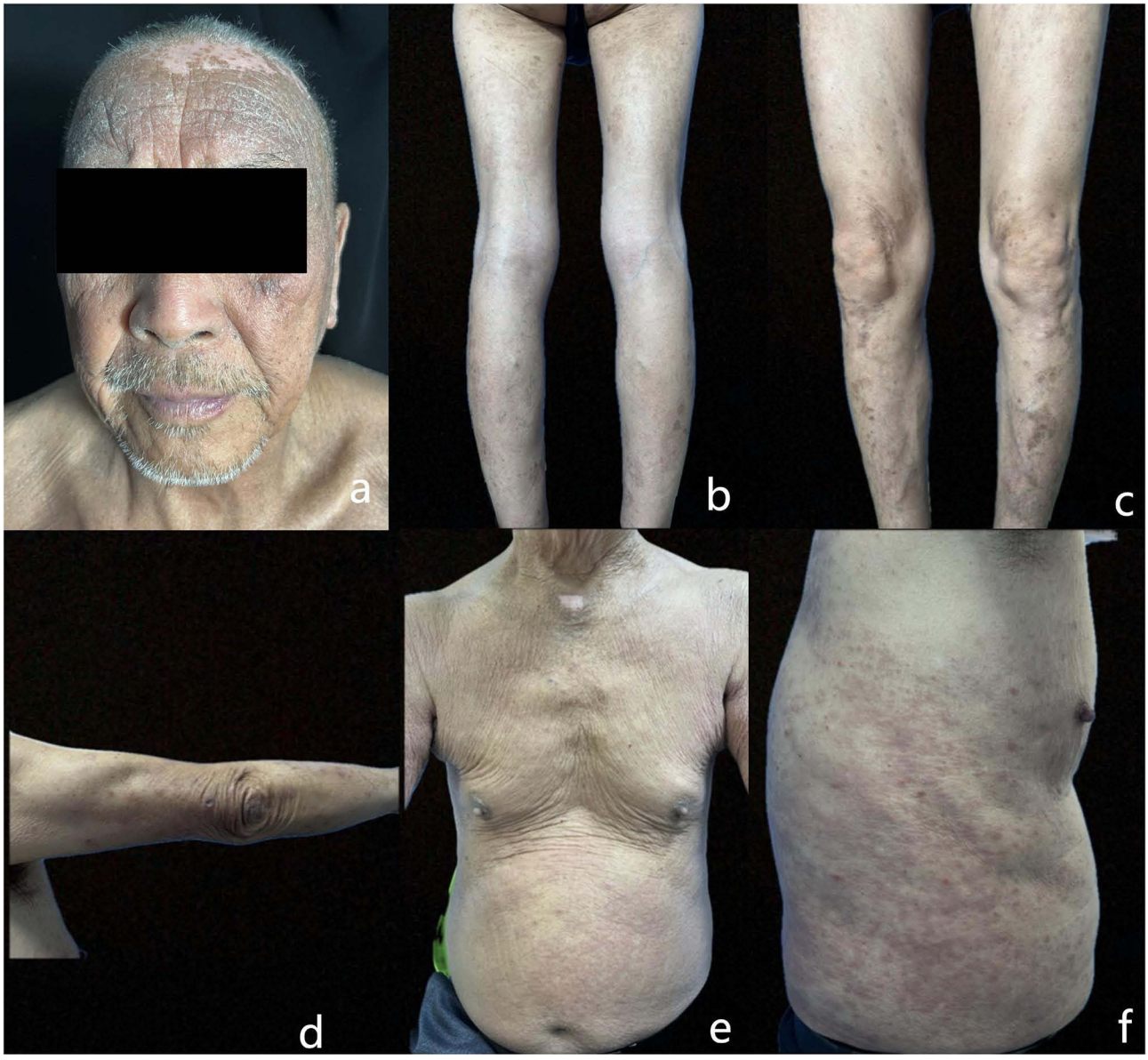

Figure 1 Typical clinical manifestation of elderly AD. Marked lichenifications, erythema, and papules are apparent, with widespread distribution. (**a**) Erythema and papules on the face and scalp, with partial lichenifications and dry scaling. (**b** and **c**) Scattered erythema and papules on the lower extremities. (**d**) Scattered erythema, papules, and nodules on the upper extremities. (**e** and **f**) Diffuse erythema and papules on the trunk with excoriations.
Abbreviation: AD, atopic dermatitis.

Demographic and Clinical Features

The following information was recorded: disease history, gender, age, age of onset, mean disease duration, previous diagnoses before AD, concurrent medical conditions, residence, skin manifestations and distribution, symptoms, personal or family history of atopic diseases (including allergic asthma, allergic rhinitis, and AD), lifestyle and living conditions.

Disease Evaluation

The severity of AD was independently assessed by two senior dermatologists using the Scoring Atopic Dermatitis Index (SCORAD), Investigator Global Assessment (IGA), Eczema Area and Severity Index (EASI), Numerical Rating Scale for peak pruritus (NRS), Dermatology Life Quality Index (DLQI), and Atopic Dermatitis Control Tool (ADCT); their average was adopted. Patient-reported outcomes were obtained through a structured questionnaire.

Serum IgE Level and Complete Blood Count

All serum immunoglobulin E (IgE) levels and complete blood count were performed during active disease prior to systemic therapy. IgE levels were assessed by the ImmunoCap System (Phadia, Uppsala, Sweden), and complete blood counts were obtained from electronic medical records. Exogenous and endogenous AD status was primarily determined by IgE level, with exogenous AD defined as IgE $\geq$ 200 kU/L and endogenous AD as IgE < 200 kU/L.[11]

Statistical Analysis

Statistical analyses were performed using SPSS software (version 22.0) (SPSS, Inc., Chicago, IL, USA). Quantitative results were expressed as mean ± standard error (SE). The count data represented the composition ratio, and descriptive statistics were performed on the general information, family medical history, lifestyle factors, skin clinical features, laboratory tests, and case evaluation of patients. Differences in complete blood count among groups were analyzed using a Mann–Whitney *U*-test. The correlation between laboratory indicators with SCORAD and EASI scores were analyzed using linear regression analysis. All analyses were conducted two-sided, with a significance level of $p < 0.05$.

Results

Demographic Features of Elderly AD Patients

A total of 200 elderly AD patients who visited our hospital between April 2023 and April 2024 were consecutively enrolled in this study. The cohort consisted of 134 males and 66 females, resulting in a male-to-female ratio of 2.03:1. The mean age of the patients was 72 ± 7 years. Patients were categorized based on the age of onset into childhood-onset (n=8, 4%), adulthood-onset (n=42, 21%), and late-onset (age >60 years) (n=150, 75%). Regarding the initial diagnosis, the majority of patients were diagnosed with eczema (n=142, 71%), followed by urticaria (n=30, 15%) and lichen simplex chronicus (n=15, 7.5%). A substantial proportion of elderly AD patients had concurrent allergic diseases, with asthma affecting 48 patients (24%) and allergic rhinitis affecting 68 patients (34%). Common systemic comorbidities included hypertension in 92 patients (46%), diabetes in 65 patients (32.5%), and coronary artery disease in 59 patients (29.5%). A detailed overview of these data is presented in Table 1.

Regarding the demographic, lifestyle and living conditions of elderly AD patients, 82% resided in urban areas, and 81.5% had a lower level of education. A significant majority (97.5%) lived with their families, while 56% came from middle-income families. Family medical history and lifestyle factors analysis revealed that a family history of atopic diseases (39.5%), frequent bathing ($\geq$ 5 times per week) (55%), and limited sun exposure (< 2 hours per day) (71%) were the three most prevalent factors among these patients, which may be associated with the pathogenesis of AD.

Distinct Clinical Characteristics of Elderly AD

The skin manifestations of elderly AD were characterized by a "widespread" distribution pattern, commonly affecting the head and face, limbs, and trunk. Typical lesions were erythematous papules, pruritic nodules, and lichenified eczema-like lesions. These were often accompanied by dry skin and intense pruritus, as illustrated in Figure 1.

Table 1 Characteristics of Elderly AD Patients

Variables	**N**	%
Patients	200	NA
Age(y), mean (SD)	72.0 (7.7)	NA
60–70	88	44
70–80	71	35.5
80–90	41	20.5
Gender		
Male	134	67
Female	66	33
Residence		
Urban Area	164	82
Rural Area	36	18
Age of onset		
Infancy	5	2.5
Childhood and Adolescence	3	1.5
Adulthood	47	23.5
Elderly	145	72.5
Mean Course		
6 months–1 year	59	29.5
1 year–10 years	88	44
>10 years	53	26.5
Initial Diagnosis		
Eczema	142	71
Urticaria	30	15
Prurigo Nodularis	8	4
Actinic Dermatitis	4	2
Lichen simplex chronicus	15	7.5
Bullous Pemphigoid	1	0.5
Personal history of atopic diseases		
Urticaria	6	3
Allergic Rhinitis	68	34
Asthma	48	24

(*Continued*)

Table 1 (Continued).

Variables	N	%
Concomitant Disease		
Hypertension	92	46
Coronary Artery Disease	59	29.5
Diabetes	65	32.5
Cerebrovascular Disease	30	15
Tumor	16	8
Renal Failure	9	4.5
Liver Disease	30	15

Abbreviation: NA, not applicable.

Lesion distribution analysis showed that extensive lesions were observed in 39% of elderly AD patients. The most commonly involved anatomical sites were the trunk (70.5%), limbs (94%), and head and neck (63%). A detailed breakdown of lesion distributions is presented in Table 2.

Table 2 Distribution of Skin Lesions in Elderly AD Patients

Location	N	%
Head and Neck	86	43
Scalp	60	30
Ear	10	5
Cheek	19	9.5
Forehead	24	12
Eyelid	8	4
Lips Area	1	0.5
Neck	25	12.5
Trunk	141	70.5
Chest	24	12
Abdomen	48	24
Back	54	27
Vulva Area	5	2.5
Hips	15	7.5
Limbs	93	46.5
Upper Limb	69	34.5
Lower Limb	76	38
Hands	29	14.5
Foots	14	7

Elderly AD Patients Presented a Higher Degree of Disease Severity

The disease severity of the 593 AD patients was summarised in Table 3. The SCORAD scores showed that moderate-to-severe disease was more common among elderly AD than in both pediatric and adult AD patients (88.8%, 69.0%, 67.3%, respectively, $p < 0.001$, for all comparisons). Consistently, the SCORAD score of the elderly AD was higher compared with that of pediatric and adult AD groups ($p < 0.001$, for all comparisons). The analysis of both the IGA and EASI scores yielded similar results. The NRS scores revealed that elderly AD patients experienced significantly greater pruritus compared to childhood and adult AD patients ($p < 0.001$, for all comparisons), with 67% of elderly patients reporting

Table 3 Evaluation of Disease Severity in Elderly AD Patients

Variables	Age Groups			P-Values	
	CAD (N=200)	AAD (N=193)	EAD (N=200)	EAD vs CAD	EAD vs AAD
SCORAD, mean (SD)	35.21(18.17)	35.30(16.92)	49.22(18.46)	< 0.001***	< 0.001***
< 25	62(31)	63(32.7)	23(11.5)		
25–50	101(50.5)	95(49.2)	89(44.5)		
>50	37 (18.5)	35(18.1)	88 (44.0)		
IGA, mean (SD)	2.71(1.27)	2.74(1.16)	3.32(0.92)	< 0.001***	< 0.001***
< 3	65 (32.5)	68 (35.2)	29 (14.5)		
≥3	135(67.5)	125(67.8)	171(85.5)		
EASI, mean (SD)	8.72 (8.32)	8.61 (6.65)	13.09 (11.07)	< 0.001***	< 0.001***
≤7	96(48.0)	90(46.6)	68(34.0)		
>7 and ≤21	90 (45.0)	94 (48.7)	96 (48.0)		
>21 and ≤50	13 (6.5)	9 (4.7)	33 (16.5)		
>50	1(0.5)	0(0.0)	3(1.5)		
NRS, mean (SD)	4.67(2.64)	4.63(2.64)	7.06(2.64)	< 0.001***	< 0.001***
< 4	65(32.5)	59(30.6)	24(12.0)		
4–6	66 (33.0)	67 (34.7)	42 (21.0)		
7–10	69 (34.5)	67 (34.7)	134 (67.0)		
DLQI, mean (SD)	8.85 (4.96)	8.83 (4.93)	11.54 (6.84)	0.001**	< 0.001***
≤5	58 (29.0)	51 (26.4)	38 (19.0)		
6–10	67 (33.5)	81 (42.0)	69 (34.5)		
>10	75 (37.5)	61 (31.6)	93 (46.5)		
ADCT, mean (SD)	13.38(6.67)	13.10(6.47)	15.34(6.51)	0.002**	0.001**
< 7	47(23.5)	43(22.2)	27(13.5)		
≥7	153(76.5)	150(77.8)	173(86.5)		

Notes: Statistical significance was set at $P < 0.05$ (two-tailed). **$P < 0.01$, ***$P < 0.001$.

Abbreviations: CAD, childhood atopic drmatitis; AAD, adulthood atopic drmatitis; EAD, elderly atopic drmatitis; vs, versus; SCORAD, Scoring Atopic Dermatitis Index; IGA, Investigator Global Assessment; EASI, Eczema Area and Severity Index; NRS, Peak Pruritus Numerical Rating Scale; DLQI, Dermatology Life Quality Index; ADCT, Atopic Dermatitis Control Tool.

severe itching. The intensive itch may contribute to greater sleep impairment, as reflected in the SCORing AD Sleep Loss Visual Analog Scale (data not shown).

Furthermore, the DLQI scores showed that elderly AD patients exhibited more pronounced decline in quality of life than the pediatric and adult AD patients ($p < 0.01$, $p < 0.001$, respectively). Over 80% of elderly AD patients reported moderate to severe impairment. Additionally, the ADCT scores suggested that elderly AD patients had relatively poor efficacy of management compared to non-elderly groups ($p < 0.01$, for all comparisons), with only 10% of elderly patients achieving adequate control of their condition (Table 3).

Elderly AD Patients Exhibited Distinct Laboratory Indicator Profiles

Levels of serum total IgE were measured in a cohort of 85 elderly AD patients. The average serum total IgE level was found to be 444.9 ± 877.9 kU/L. When categorized by the expression level of IgE, 52.9% of the patients were identified as having exogenous AD, while 47.1% had endogenous AD. The ratio of patients with the extrinsic form to those with the intrinsic form was calculated to be 1.125.

Laboratory indicators were compared among four distinct groups: 200 pediatric AD patients, 193 adult AD patients, 154 healthy elderly individuals, and 125 elderly AD patients. These comparisons were conducted during the same period, and the results are presented in Table 4. The results indicated that the leukocyte count was notably elevated in elderly AD patients compared with healthy elderly controls ($p < 0.01$). Furthermore, both the percentage and count of monocytes and eosinophils were significantly increased in elderly AD patients compared with healthy elderly individuals ($p < 0.001$, for all comparisons). Conversely, the lymphocyte count in elderly AD patients was significantly lower than that in healthy elderly controls ($p < 0.001$). There were no significant differences in platelet count (PLT), mean platelet volume (MPV), plateletcrit (PCT), and basophil percentage between elderly AD patients and healthy elderly individuals.

Among AD patients, the monocyte count and percentage were markedly elevated in the elderly group than in the pediatric ($p < 0.05$, $p < 0.001$, respectively) and adult AD groups ($p < 0.001$, for all comparisons). Moreover, in comparison to the pediatric and adult AD groups, the lymphocyte count was significantly decreased in the elderly AD

Table 4 Results of Blood Routine Test in Patients with AD Across Different Ages

Laboratory Indicators	Age Groups				P-Values		
	CAD (N=200)	AAD (N=193)	EAD (N=125)	EHC (N=154)	EAD vs CAD	EAD vs AAD	EAD vs EHC
Mean leukocyte count ($\times 10^9$), mean (SD)	8.00 (2.06)	6.68 (1.86)	7.33 (2.10)	6.35 (1.47)	0.004**	0.019*	0.001**
Average lymphocyte count ($\times 10^9$), mean (SD)	3.26 (1.10)	1.94 (0.65)	1.75 (0.63)	2.26 (0.69)	< 0.001***	0.033*	< 0.001***
Lymphocyte counting interval ($\times 10^9$), mean (SD)	1.20–6.90	0.70–4.50	0.70–3.40	1.01–4.16			
Average eosinophilic count ($\times 10^9$), mean (SD)	0.56 (0.53)	0.25 (0.21)	0.42 (0.54)	0.17 (0.16)	< 0.001***	0.045*	< 0.001***
Eosinophilic count interval ($\times 10^9$), mean (SD)	0.00–3.70	0.00–1.20	0.00–3.80	0.01–1.44			
Average eosinophilic percentage (%), mean (SD)	6.74 (5.21)	3.87 (3.24)	4.90 (5.76)	2.54 (2.06)	< 0.001***	0.876	< 0.001***
Range of percentage eosinophils (%), mean (SD)	0.20–36.80	1.00–22.10	0.10–29.70	0.30–13.40			
Mean PLT ($\times 10^9$), mean (SD)	295.7 (62.93)	239.86 (59.49)	203.48 (59.43)	213.4 (48.2)	< 0.001***	< 0.001***	0.293
PLT range ($\times 10^9$), mean (SD)	166–540	108–415	66–356	79–342			
Mean PCT (%), mean (SD)	0.25 (0.06)	0.23 (0.06)	0.20 (0.06)	0.21 (0.04)	< 0.001***	0.002**	0.115
MPV (fL), mean (SD)	8.68 (1.17)	9.40 (1.40)	9.85 (1.36)	9.89 (0.93)	< 0.001***	0.011*	0.45
Average basophil percentage (%), mean (SD)	0.51 (0.23)	0.52 (0.26)	0.33 (0.30)	0.30 (0.22)	< 0.001***	< 0.001***	0.1
Average monocyte count ($\times 10^9$), mean (SD)	0.54 (0.18)	0.49 (0.19)	0.61 (0.20)	0.35 (0.10)	0.021*	< 0.001***	< 0.001***
Average monocyte percentage (%), mean (SD)	6.96 (1.80)	7.39 (1.81)	8.52 (2.28)	5.62 (1.27)	< 0.001***	< 0.001***	< 0.001***

Notes: Statistical significance was set at $P < 0.05$ (two-tailed). *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

Abbreviations: CAD, childhood atopic drmatitis; AAD, adulthood atopic drmatitis; EAD, elderly atopic drmatitis; EHC, elderly healthy control; vs, versus; PLT, platelet count; PCT, plateletcrit; MPV, mean platelet volume.

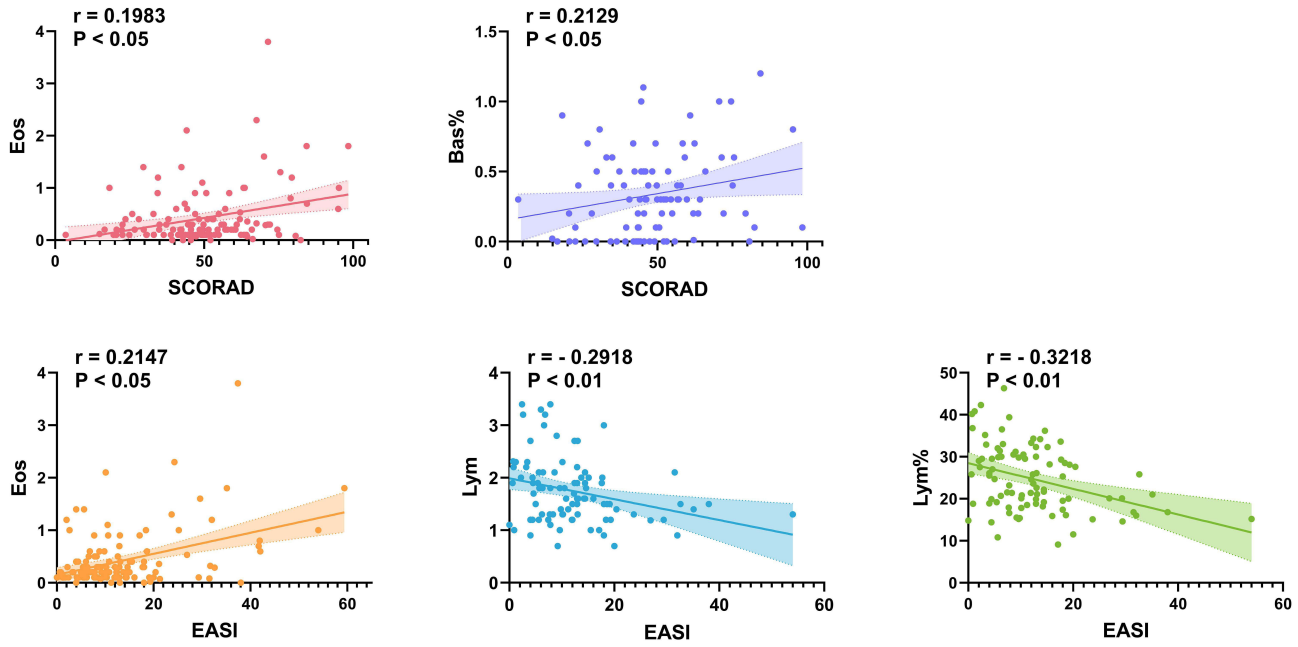

Figure 2 Correlation analysis of SCORAD/EASI score with laboratory indicators in elderly AD patients.
Abbreviations: Eos, eosinophilic count ($\times 10^9$); Bas%, basophil percentage (%); Lym, lymphocyte count ($\times 10^9$); Lym%, lymphocyte percentage (%); SCORAD, Scoring Atopic Dermatitis Index; EASI, Eczema Area and Severity Index.

group ($p < 0.001$, $p < 0.05$, respectively), demonstrating a declining trend with aging. Also, there was a noticeable trend of decline in PLT as well as in PCT with aging among AD patients (Table 4). In contrast, the MPV was significantly elevated in the elderly AD group compared to the pediatric and the adult AD groups ($p < 0.001$, $p < 0.05$, respectively), with a trend of increase with aging. Additionally, the eosinophil count and percentage were lower in both the adult ($p < 0.001$, for all comparisons) and elderly groups ($p < 0.001$, for all comparisons) than those in the pediatric AD group. Basophil percentage was reduced in elderly AD compared with both pediatric and adult AD ($p < 0.001$, for all comparisons).

Correlation Analysis of Disease Severity and Indicators in the Elderly AD

The correlation analysis in elderly AD showed that both SCORAD and EASI were positively correlated with eosinophil count ($p < 0.05$), whereas EASI was inversely related to lymphocyte count and percentage ($p < 0.01$, Figure 2). SCORAD also correlated with basophil percentage ($p < 0.05$, Figure 2). No significant correlations were found between monocyte count and percentage and disease severity scores (data not shown). These correlations underscored the potential evaluative value of these markers in the context of elderly AD.

Discussion

With population aging, the prevalence of AD among the elderly has surged over the past decade. The symptoms including itching, skin lesions, pain, and infections, lead to a reduced quality of life and increased disease burden, posing public health challenges.[12] Consequently, elderly AD has attracted increasing research attention. Limited data indicate that the clinical characteristics of elderly AD differ significantly from those in childhood and adults AD, posing unique challenges in diagnosis and treatment. Moreover, current diagnostic criteria for AD are mainly based on the clinical characteristics of childhood and adult patients, which may be inadequate for AD in the elderly.[10] For instance, elevated serum total IgE levels and increased eosinophil counts, which are common in younger patients with AD, are not typical in elderly AD patients. Thus, delineating elderly AD clinical features is important.

As a new subtype, elderly AD exhibits distinct features from younger AD patients. This study enrolled 200 elderly AD patients and analyzed their clinical manifestations and laboratory findings. Skin lesions were widespread,

predominantly on trunk and extensor side of the limbs with notable scalp, face, and acral involvement. The extensive distribution pattern necessitated site-specific topical formulations and early systemic therapy. Over 80% of the elderly patients had moderate-to-severe AD, along with intense pruritus, significant quality of life impairment, and worse management outcomes. Very late onset accounted for 75%, contrasting with the proportion of onset in childhood (4%) and adult onset (21%). Because late-onset AD often mimics other conditions, its predominance mandates thorough evaluation to exclude cutaneous T-cell lymphoma, geriatric pruritus, and scabies. The cohort showed a male predominance, with a male-to-female ratio of 2.03:1. We speculate that the altered lipid metabolism of sebaceous glands, reduced sebum secretion, and lower androgen levels in elderly male AD patients may contribute to this disparity.[13] Clinicians should consider testosterone assessment in refractory cases and evaluate gender-specific treatment response.

Our research identified a family history of allergic diseases, limited sun exposure, and frequent bathing as the most common risk factors for elderly AD. Genetically, AD is associated with genes encoding epidermal and barrier proteins, as well as genes regulating the immune system.[14] A retrospective study on the impact of sun exposure on AD skin symptoms suggested that it is beneficial for most patients.[15] While there is no consensus on the frequency of bathing, bathing can hydrate the skin and remove dust, scales, and allergens, which may be beneficial for patients with AD. However, water evaporation from the skin post-bathing can lead to increased transepidermal water loss.[16] Thus, patient education and lifestyle adherence are essential in elderly AD.

In our cohort, 47.1% of elderly AD cases were endogenous, a proportion higher than in younger age groups, highlighting the role of intrinsic pathways in elderly AD. Gender analysis revealed men tended toward exogenous AD and women toward endogenous AD, consistent with literature showing female predominance in endogenous AD.[17] In a research group of 30 elderly AD patients, 20.0% had atopic comorbidities (rhinitis 13.3%; asthma and conjunctivitis 6.6% each), significantly lower than younger populations.[18] Different from previous report,[18] our data indicated a noticeably higher proportion of elderly AD patients with comorbid allergic rhinitis and asthma. This discrepancy may be attributed to sample size, regional and population differences.

Compared with healthy elderly controls, elderly AD patients displayed elevated eosinophil and monocyte counts and reduced lymphocyte counts. Disease severity correlated positively with the count of eosinophils and negatively correlated with the count of lymphocytes, consistent with a Mendelian randomization study identifying a decreased lymphocyte count as a risk factor for AD.[19] Furthermore, comparative analysis across different age groups of patients revealed that elderly AD patients exhibited lower lymphocyte counts than pediatric and adult patients. The age-related decline in lymphocytes we observed is consistent with the immunosenescence reported in previous study.[20]

Notably, the count and percentage of monocytes in elderly AD patients were significantly higher than those in adults and pediatric patients. Stratified analysis by gender and AD phenotype showed monocyte counts and percentages were higher in male patients than females, and higher in exogenous AD patients than endogenous AD patients. Prior studies demonstrated that increased IgE receptor and IL-4Rα expression on monocytes from exogenous AD facilitates IL-4-mediated FoxQ1 induction, migration stimulation, and proinflammatory enhancement.[21,22] In patients with atopic eczema/dermatitis syndrome (AEDS), monocyte subset fluctuations correlated with disease severity: the $CD14^{+}CD64^{-}CD16^{+}$ subset increased during exacerbation while $CD14^{+}CD64^{+}CD16^{-}$ increased during remission.[23] Moreover, a birth cohort study found cord blood $CD14^{+}$ monocytes secreting high IL-1β/IL-6/TNF-α reduce IL-2 expression, suppressing regulatory T cells activation and shifting differentiation toward a non-classical Th2 phenotype.[24] Furthermore, monocyte-derived Oncostatin M (OSM) may mediate chronic pruritus in elderly AD via OSM receptor (OSMR) on pruritus-selective Nppb neurons.[25] These data establish monocyte-macrophage axis as a potential mediator of AD in elderly patients, underscoring its value as a biomarker, therapeutic target and research priority.

Basophil percentages were lower in elderly AD than in younger groups, however, they correlated positively with SCORAD ($p < 0.05$) but not with EASI. In AD, basophils are known to secrete IL-4, leukotriene C4, which interact with subcutaneous nerve endings to mediate both the persistence of chronic pruritus and the onset of acute itch episodes.[26] Our data thus suggest that basophils continue to play a significant role in mediating itch severity in elderly AD patients.

Additionally, we observed that MPV was significantly higher in elderly AD patients than in younger AD patients, whereas no difference was observed between elderly AD patients and age-matched healthy controls. MPV is widely

recognized as a marker of platelet activation and is influenced by multiple factors, including aging and cardiovascular disease.[27] In allergic disorders, MPV remains unchanged between symptomatic and asymptomatic phases in patients with allergic rhinitis alone, but is significantly elevated during symptomatic periods in individuals with both asthma and allergic rhinitis.[28] Collectively, these findings underscore the complexity of MPV as a biomarker, and further investigations are warranted to elucidate its precise role in AD.

There are certain limitations in our study. As a hospital-based, single-center study, the generalizability of our findings is constrained, and subsequent multicenter investigations with larger sample sizes are needed.

Conclusion

Elderly AD is a distinct, male-predominant subtype characterized by late-onset, endogenous disease, greater severity and worse management outcomes. The severity of elderly AD was negatively correlated with lymphocyte count and percentage and positively correlated with the eosinophil count. We pinpointed the monocyte-macrophage axis as a candidate target for precision management in elderly AD.

Abbreviations

AD, atopic dermatitis; CCAD, Chinese criteria for AD; SCORAD, Scoring Atopic Dermatitis; IL, interleukin; TARC, Thymus activation regulates chemokines; TSLP, Thymic stromal lymphocytin; Th, T helper; IgE, immunoglobulin E; SQS, sleep quality; IGA, Investigator Global Assessment; EASI, Eczema Area and Severity Index; NRS, Numerical Rating Scale; DLQI, Dermatology Life Quality Index; ADCT, Atopic Dermatitis Control Tool; SE, standard error; MPV, mean platelet volume; PCT, plateletcrit; MR, Mendelian randomization; AEDS, atopic eczema/dermatitis syndrome; CD, Cluster of Differentation; OSM, Oncostatin M; OSMR, Oncostatin M receptor.

Ethics Approval and Informed Consent

Approval of the research protocol by an Institutional Reviewer Board: This study protocol complies with the Declaration of Helsinki and was approved by the ethics committee of the Hospital for Skin Diseases, Institute of Dermatology, Chinese Academy of Medical Sciences & Peking Union Medical College (2022-KY-069), and written informed consent was obtained from all participants or their legal guardians. Written informed consent for publication of clinical images (Figure 1) was obtained from the patient. Animal Studies: N/A.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; All authors gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The author(s) report no conflicts of interest in this work.

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