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Original Article

2023 Consensus Korean Diagnostic Criteria for Atopic Dermatitis

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ABSTRACT

Background: In 2006, the Korean Atopic Dermatitis Association (KADA) working group released the diagnostic criteria for Korean atopic dermatitis (AD). Recently, more simplified, and practical AD diagnostic criteria have been proposed.
Objective: Based on updated criteria and experience, we studied to develop and share a consensus on diagnostic criteria for AD in Koreans.
Materials and Methods: For the diagnostic criteria, a questionnaire was constructed by searching the English-language literature in MEDLINE and the Cochrane Database of Systematic Reviews. A modified Delphi method composed of 3 rounds of email questionnaires was adopted for the consensus process. Fifty-four KADA council members participated in the 3 rounds of votes and expert consensus recommendations were established.

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Results: Diagnostic criteria for AD include pruritus, eczema with age-specific pattern, and chronic or relapsing history. Diagnostic aids for AD encompass xerosis, immunoglobulin E reactivity, hand–foot eczema, periorbital changes, periauricular changes, perioral changes, nipple eczema, perifollicular accentuation, and personal or family history of atopy.
Conclusion: This study streamlined and updated the diagnostic criteria for AD in Korea, making them more practicable for use in real-world clinical field.

Keywords: Atopic dermatitis; Dermatitis; Diagnosis; Guideline; Korea

INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory skin disorder characterized by intense itching and recurrent eczema[1]. Different prevalence rates have been reported worldwide as the diagnosis of AD is based on a heterogeneous clinical presentation which varies with age and race[2]. There have been various diagnostic criteria such as Hanifin-Rajka (HR) criteria, the earliest and highly renowned criteria, International Study of Asthma and Allergies in Childhood (ISAAC) criteria, and United Kingdom (UK) Working Party criteria which is a modified criteria suitable for epidemiologic studies[3-6]. Based on these criteria, consensus and guidelines used in diagnosing AD in clinical practice have been reported by various groups of AD and allergy specialists worldwide so far.

Recently more streamlined diagnostic criteria for AD have been suggested by some expert groups from various countries that take into account the practice. For example, American Academy of Dermatology (AAD) working group has provided guidelines for diagnosis and management[7]. The Diagnostic guideline is organized into four categories of essential features, important features, associated features, and exclusionary conditions. According to the criteria, a diagnosis of AD requires essential features such as pruritus, eczema with typical morphology, and age-specific pattern, along with a history of chronic or relapsing course. An expert working group from Japanese Dermatological Association (JDA) has also suggested diagnostic criteria for AD, including pruritus, typical morphology, and distribution with chronic or chronically relapsing course[8]. The final diagnosis of AD requires the presence of all three features as above. Features and items that are considered minor criteria are not essential for the diagnosis of AD, but they are relevant findings that may help aid the diagnosis of AD.

The diagnostic criteria for Korean AD has been developed in 2006 by Atopic Dermatitis Research Group (ADRG) of Korean Atopic Dermatitis Association (KADA) composed of four major features and thirteen minor features that represent characteristic morphology of Korean patients with AD based on HR criteria[9]. Diagnosis of AD requires at least 2 of the 4 major features and 4 of the 13 minor features. However, the association of each minor feature with AD has not yet been clarified and the prevalence varies depending on the study populations and the criteria referenced. In addition, the global trend toward more concise and practical diagnostic criteria for AD as mentioned earlier has created an unmet demand for attempts to rationalize current diagnostic criteria of Korean AD patients. In this context, KADA has developed updated diagnostic criteria for AD.

MATERIALS AND METHODS

A six-member task force formed to develop Korean diagnostic guideline for AD conducted a systematic review of the literature. The literature review identified items that needed to be revised or newly added to the diagnostic criteria for AD developed by the Korean ADRG in 2006. The task force team members organized the guideline development process and established new items for diagnostic criteria and diagnostic aids. Fifty-four council members from KADA participated in this study as panelists and provided input on the new diagnostic guideline.

Literature review

MEDLINE, from 1990 to July 2022, and Cochrane Database of Systematic Reviews, from 2000 to July 2022, were searched for English-language literature to identify evidence of best practices to develop clinical guidelines[10]. The search strategy combined titles and keywords, including “atopic eczema” or “atopic dermatitis” and “screening” or “evaluation” or “diagnosis.” Diagnostic criteria were selected as the questionnaire domains.

Consensus process

A modified Delphi method comprising three rounds of email questionnaires was adopted for the consensus process. In round 1, panelists were asked to provide their opinions on the need to streamline current Korean diagnostic criteria for AD. In round 2, panelists were asked to provide their opinions on whether they agreed that the following each item should be in the diagnostic criteria: 1) pruritus, 2) eczema with age-specific pattern, 3) chronic

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or relapsing history[11], 4) symmetric distribution, and 5) family or personal history of atopy. In round 3, the panel was asked to give their opinions on whether they agreed or disagreed with the inclusion of minor features in the existing Korean diagnostic criteria for AD, as well as features suggested by the HR criteria or other criteria, as diagnostic aids. The items required for panelists to answer were as follows: 1) xerosis, 2) immunoglobulin (Ig) E reactivity, 3) atypical vascular response, 4) hand–foot eczema, 5) scalp eczema, 6) periorbital changes, 7) periauricular changes, 8) perioral changes, 9) nipple eczema, 10) pityriasis alba, 11) perifollicular accentuation, 12) keratosis pilaris, 13) hyperlinear palms, 14) ichthyosis, 15) itch when sweating, 16) tendency toward cutaneous infection, 17) early-age onset, 18) anterior neck folds, 19) intolerance to wool and lipid solvents, 20) food intolerance, 21) course influenced by environmental or emotional factors, and 22) lichen amyloidosis. The panelists were asked to provide their opinion for each item above as 1) "agree" or "disagree" and 2) free comments. The consensus was defined as ≥70% of participants agreeing with a survey statement. An item agreed upon by ≥50% and <70% of participants was further discussed in the following meeting organized by KADA's task force team members. An item that did not meet 70% of participants agreeing was classified as "consensus-out" and excluded from the updated diagnostic criteria of AD in Korean.

RESULTS

Of the 54 panel members, 45 participated in the first round of the survey (83% response rate), and 43 (95.6%) agreed that the current diagnostic criteria of AD by the KADA ADRG should be streamlined and revised in a concise and more practical manner. The level of agreement with each diagnostic criterion suggested in rounds 2 and 3 is presented in **Table 1**. The final KADA consensus on the diagnostic criteria of AD is shown in **Table 2**.

DISCUSSION

Diagnostic criteria

1) Pruritus

Most patients with AD suffer from itching. Itchiness is regarded as the foremost symptom in patients with AD and is included in nearly all well-known diagnostic criteria sets, such as the HR criteria, UK working group criteria, AAD criteria, and JDA criteria[12]. In a study investigating practice parameters of AD conducted by a joint task force of the American Academy of Allergy, Asthma, and Immunology and the American College of Allergy, Asthma, and Immunology, pruritus, scratching, and chronic, relapsing, or both eczematous lesions are major hallmarks of AD[13]. In a retrospective single-center study that included 5,000 Korean patients with AD, pruritus was the characteristic symptom observed in every patient with AD[14]. Pruritus is often described as the most troublesome symptom of AD, and atopic itch is one of the main factors that lowers the quality of life of patients with AD worldwide[11,15]. In a

Table 1. The level of agreement on each item of the diagnostic criteria of AD

Diagnostic criteria (all 3 below are required for diagnosis of AD)	Agreement (%)
1. Pruritus	94
2. Eczema with age-specific pattern	88
i. Face, neck and extensor involvement in infants	
ii. Current or previous flexural lesions in any age group	
3. Chronic or relapsing history	96
Diagnostic aids	
1. Xerosis	100
2. Immunoglobulin E reactivity	90
3. Atypical vascular response	41
4. Hand–foot eczema	93
5. Scalp eczema	46
6. Periorbital changes	90
7. Periauricular changes	85
8. Perioral changes	78
9. Nipple eczema	90
10. Pityriasis alba	61
11. Perifollicular accentuation	85
12. Keratosis pilaris	63
13. Hyperlinear palms	51
14. Ichthyosis	37
15. Itch when sweating	34
16. Tendency toward cutaneous infection	22
17. Early-age onset	10
18. Anterior neck folds	17
19. Intolerance to wool and lipid solvents	5
20. Food intolerance	20
21. Course influenced by environmental or emotional factors	17
22. Lichen amyloidosis	37
23. Family or personal history of atopy	82

AD: atopic dermatitis.

Table 2. KADA consensus on diagnostic criteria of atopic dermatitis

Diagnostic criteria (all 3 below are required for diagnosis of AD)
1. Pruritus
2. Eczema with age-specific pattern
i. Face, neck and extensor involvement in infants
ii. Current or previous flexural lesions in any age group
3. Chronic or relapsing history
Diagnostic aids
1. Xerosis
2. Immunoglobulin E reactivity
3. Hand–foot eczema
4. Periorbital changes
5. Periauricular changes
6. Perioral changes
7. Nipple eczema
8. Perifollicular accentuation
9. Family or personal history of atopy

KADA: Korean Atopic Dermatitis Association, AD: atopic dermatitis.

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study from Turkey that assessed sensitivity and specificity as well as positive/negative predictive value (PPV/NPV) for both the HR criteria and UK working group criteria, pruritus was highly sensitive for diagnosing AD. The sensitivity of "pruritus" in the HR criteria was 97%, its specificity was 34%, the PPV was 77%, and the NPV was 82%. Separately, the sensitivity of "itchy skin" in the UK criteria was 97%, its specificity was 36%, the PPV was 77%, and the NPV was 82%[16].

2) Eczema with age-specific pattern

Clinical features of AD vary in appearance, complicating diagnosis for some patients. However, AD has characteristic patterns of distribution, which differ according to age[13,17].

As per the HR criteria, the typical morphology and distribution of AD include facial and extensor involvement in infants and children, as well as flexural lichenification or linearity in adults. Akan et al.[16] reported that the sensitivity, specificity, PPV, and NPV for typical morphology and distribution in the HR criteria were 99%, 51%, 82%, and 94%, respectively.

In infants, AD typically manifests as acute eczema, presenting as diffuse erythematous patches and oozing papulovesicles, starting from the cheeks and spreading across the face. The extensor surfaces of extremities are frequently affected, while the diaper area is typically spared[18,19]. In childhood AD, skin lesions commonly appear on the flexor surfaces of extremities, such as the antecubital and popliteal fossae[17,18]. Oozing and crusting become less common, and visibly dry skin may start to appear in this age group. In the AAD criteria, facial, neck, and extensor lesions are prevalent among infants and children with AD, while flexural lesions typically spare the groin and axillary regions across all age groups[7]. According to the JDA criteria, lesions in infantile AD are documented on the scalp and face, frequently spreading to the trunk and limbs. In the childhood phase, the neck and flexural surfaces of the arms and legs are commonly affected[8].

In adults, the morphology and distribution of AD appear much more diverse according to various factors including disease duration, disease activity, and accessibility to scratching. Head, neck, hands, and feet as well as flexural area are considered to be greater predilection sites of involvement despite of heterogenous clinical presentation of adult AD. Lichenification is commonly presented in this age group. In addition, nipple eczema as well as chronic hand–foot eczema may appear as common manifestations in adults with a history of AD[13,20]. In the JDA criteria, AD lesions in adolescents and adults typically exhibit greater severity on the upper half of the body, such as the face, neck and trunk. In addition, symmetry is mentioned as one of the important features in adult AD in some studies[8,20,21].

Therefore, patients with AD have eczema with age-specific morphology and distribution defined as face, neck, and extensor involvement in infants and current or previous flexural lesions in any age group. Additional research is required to elucidate the features of adult AD and atypical presentations of AD in any age group which are not consistent with the characteristics mentioned above.

3) Chronic or relapsing history

In many previous investigations, AD has been defined as chronic inflammatory skin disorder which usually follows relapsing course[7,8]. Patients with AD commonly suffer from exacerbation and remission of AD coming and going over time. In HR criteria, chronic or chronically relapsing dermatitis has been included as major features. A sensitivity >90% concerning chronic or relapsing dermatitis for the diagnostic criteria of AD has been documented in previous investigations[16,22]. Although "chronic or relapsing history" has not been included in the diagnostic criteria for Korean AD developed by ADRG of KADA 2006, Kim et al.[23] reported that "chronic or relapsing history" showed 83% of sensitivity and 97% of specificity for the diagnosis of Korean AD. Meanwhile, in childhood AD, disease remission was observed in approximately 75% of patients before adolescence, while adult AD was observed later in the remaining 25%[24]. Other investigations suggested that chronic persisting course since early childhood has been observed in 30%–60% of patients with AD[25,26]. Further study is needed for the consensus in terms of chronicity which may refer to AD persistent over 6 months whereas 2 months in infant AD[8,11]. Based on the above, KADA suggests that chronic or relapsing history as the diagnostic criteria of AD.

Diagnostic aids

1) Xerosis

Dry skin is one of the most commonly observed skin manifestations in AD patients across regions and age groups[27]. Impaired skin barrier function, one of the main pathomechanisms of AD, might have a significant impact on xerosis. Filaggrin deficiency and a reduced level of natural moisturizing factor associated with type 2 inflammation were demonstrated to be associated with xerosis in patients with AD[28]. Since its initial inclusion as a minor feature in the HR diagnostic criteria in 1980, xerosis has been mentioned as a clinical feature in almost every national diagnostic criteria set published to date. The diagnostic criteria for Korean AD established by the KADA ADRG included xerosis as one of the minor criteria[9], and analysis of clinical presentations of Korean AD patients by Chu et al.[14] revealed that 87% of patients had xerosis. A study of Korean school-age and adolescent AD patients reported that xerosis was more frequently observed in the infancy-onset group compared to the preschool- and childhood-onset groups[29]. Dry skin as one of the diagnostic features of AD can be similarly emphasized in elderly patients. A questionnaire-based study conducted in the United States reported a sensitivity of 81.5%, specificity of 46.9%, PPV of 33.9, and NPV of 88.4% for dry skin in

patients with AD[30]. While AD may present other features with age, dryness is a classic symptom associated with skin barrier dysfunction at any age. In this context, dryness is a key diagnostic aid[31].

2) IgE reactivity

The HR criteria, which were developed in the 1980s, included the requirement for both elevated IgE level and positive skin test results as minor criteria for AD diagnosis[3]. Hanifin and Rajka[3] reported that 80% of AD patients manifest type I hypersensitivity. However, the presence of a positive skin prick test does not necessarily indicate the presence of AD, as it can also be positive in individuals without AD. Currently, type 1 hypersensitivity test have been replaced by the serum IgE test for specific antigens because the skin prick test is not only an invasive, time-consuming, and possible provocation of allergic reactions, but also requires infrastructure and expertise to complete. The clinical classification of patients with AD based on the presence of high positive results of specific IgE antibodies to aeroallergens demonstrates a sensitivity and specificity of 62.6% and 79.1%, respectively. The PPV and NPV for this classification are 61.0% and 80.0%, respectively[32].

The laboratory finding most frequently linked to AD is an increased total and/or allergen-specific serum IgE level[33]. However, it is important to note that this feature is not always present in affected individuals, with approximately 20% of AD patients having normal IgE level lower than the total serum of 100 IU/mL[33]. The reference range of "high" serum IgE is not clearly defined, and this varies with age and ethnicity[34]. In some cases, individuals may develop elevated IgE level later in the disease course, and recent research has suggested that elevated IgE might be a secondary outcome related to skin barrier defects and epicutaneous sensitization[33]. The total IgE level may vary depending on the severity of the disease, yet it's not consistently reliable. Severe AD patients have normal level, and elevated IgE level can also occur in various nonatopic conditions, including parasitic infections, some cancers, and autoimmune diseases[7]. Therefore, some studies have acknowledged that serum IgE level is often elevated but rarely helpful in diagnosis of AD[35,36]. Furthermore, elevated allergen specific IgE level is not specific to AD since it also can be found in a significant portion of the general population[37]. Some patients may exhibit immediate hypersensitivity reactions, while others may not.

At present, a reliable biomarker for differentiating AD from other conditions is lacking. Nevertheless, IgE reactivity is commonly correlated with AD in laboratory assessments and is employed as a diagnostic aids in clinical studies for the condition[17,38-40].

3) Hand–foot eczema

While there is no direct association between AD and hand–foot eczema, AD patients may be more prone to develop hand–foot eczema than those without AD. This may be because AD often involves dry and sensitive skin, which can make the hands and feet more susceptible to irritants and allergens that can trigger hand–foot eczema. There appears to be a correlation between AD and hand–foot eczema, with some studies suggest that people with AD are more likely to have hand-foot eczema compared to those without AD[16,41]. According to a meta-analysis study, AD is linked with a higher occurrence of hand eczema, with odds ratio (95% confidence interval) of 2.35 (1.47–3.76) for point prevalence, 4.29 (3.13–5.88) for 1-year prevalence, and 4.06 (2.72–6.06) for lifetime prevalence[42]. The HR criteria for AD include a "tendency toward non-specific hand and foot dermatitis" as a minor criterion, which further supports this association[3]. In studies conducted on Korean populations, the frequency of hand–foot eczema in individuals with AD has been reported to vary between approximately 20%–40%, although there may be differences depending on the study[43,44]. Although there appears to be a correlation between AD and hand–foot eczema, the exact nature of this association and the relative importance of this criterion in diagnosing AD require further research.

4) Periorbital changes

In the HR criteria, minor features involve Dennie–Morgan infraorbital fold and orbital darkening[3]. The Dennie–Morgan infraorbital fold was observed in >70% of AD patients as a single fold, but a double fold has also been observed in a small percentage. It was recently described as ocular and periorbital changes in the section of associated features of AAD criteria and has been cited in recent reports[7]. There was a paper published that additionally described eyelid involvement[17]. Gu et al.[45] conducted a criteria validity study that considered all of the following: orbital dermatitis, infraorbital fold, periorbital pigmentation, periorbital darkening, wrinkles, and darkening around the eyes in the past year. In a study from northern India, infra-orbital darkening yielded a sensitivity of 52.5%, specificity of 85.4%, PPV of 88.3%, and NPV of 46.1%, while infra-orbital folds showed a sensitivity of 90.1%, specificity of 68.8%, PPV of 85.9%, and NPV of 76.7%[22]. In a study of pediatric patients with AD in Korea, a hospital-based questionnaire of eye eczema revealed a sensitivity of 48.8%, specificity of 78.7%, PPV of 88.2%, and NPV of 32.2%[46]. Dennie-Morgan orbital folds demonstrate a higher prevalence in pediatric populations when compared to adults. Conversely, additional orbital conditions like orbital darkening, anterior subcapsular cataract, recurrent conjunctivitis, and keratoconus are less frequently observed in both pediatric and adult demographics[47]. Periorbital eczema and hyperpigmentation were observed in 47%–52% of patients with AD in Korea[14,48]. For a more comprehensive and unified terminology, we suggest periorbital changes as diagnostic aids.

Meanwhile, recurrent conjunctivitis, keratoconus, and anterior subcapsular cataracts have been described as minor features of

ophthalmic complications in the HR criteria[3]. In addition, allergic rhinitis/rhinoconjunctivitis is described as part of the assessment for clinical associations of AD in the AAD criteria[7].

5) Periauricular changes

The associated features of the AAD criteria include periauricular lesions, which are not included in the HR criteria[3,7]. Earlobe rhagades, which are fissures located at the base of the earlobes, retro-auricular fissuring, or affected localization (ears) have been described as symptoms of AD[35,49]. There have been few statistical studies on the findings of periauricular changes, although Chen et al.[30] confirmed a rash on the head and neck to have a sensitivity of 44.4%, specificity of 91.4%, PPV of 63.2%, and NPV of 83.2%. Periauricular eczema has been observed in 26%–56% of patients with AD[14,43,50]. For more comprehensive and unified terminology, we suggest using periauricular changes as diagnostic aids.

6) Perioral changes

Cheilitis, which refers to inflammation of the lips, is frequently observed in AD patients and is considered one of the minor criteria in the HR criteria[3]. Cheilitis can lead to notable discomfort and hinder daily activities, including eating, speaking, and smiling. Studies have shown that cheilitis occurs in up to 40% of patients with AD and may be more common in those with severe disease[48,51]. While some studies have found no notable variances in the prevalence of cheilitis among patients with AD, others have reported it as a finding with high specificity but low sensitivity for AD diagnosis[16,22,52]. In studies conducted on Korean AD patients, there were conflicting results regarding the association between AD and cheilitis[48,53]. The frequency of cheilitis reported in Korea varies widely, ranging from <10% to 72%[53,54]. In this study, cheilitis was included in the diagnostic aids, but it is suggested to instead use the more inclusive term "perioral change."

7) Nipple eczema

Several studies have reported an association between AD and nipple eczema. The prevalence of nipple eczema in AD patients varies widely among studies, with some reporting rates as high as 12%–23%[43,55]. However, certain studies have reported conflicting results, and the exact relationship between the two conditions remains to be determined[16,22]. Studies conducted in Korea have provided varying results regarding the correlation between AD and nipple eczema, with some reporting a significant difference and others reporting no difference[48,53]. The reported frequency of nipple eczema in Korea ranges from <10% to 20.7%[23,48,53]. Further studies are needed to better understand the connection between AD and nipple eczema.

8) Perifollicular accentuation

The HR criteria include perifollicular accentuation in the associated features of AAD[3,7]. Dutta et al.[52] noted that perifollicular accentuation, unlike keratosis pilaris, is accompanied by itching, occurs mainly on the trunk, and shows similar prevalence rates in children and adults. Lahouel et al.[56] found that perifollicular accentuation was notably more prevalent in patients with AD compared to normal controls. De et al.[22] reported a sensitivity of 41.6%, specificity of 85.4%, PPV of 85.7%, and NPV of 41%. In Korea, perifollicular accentuation is prevalent in 57%–72% of patients diagnosed with AD. According to existing reports, perifollicular accentuation is frequently noted in Koreans with AD and tends to be more pronounced in individuals with darker skin[48,54]. Therefore, perifollicular accentuation is included as one of the diagnostic aids for AD.

9) Personal or family history of atopy

AD patients may present with a personal and/or family history of atopy, including asthma, allergic rhinitis, and AD. These patients are suspected to have a predisposition to IgE-mediated allergy[8]. Based on a literature review, a personal or family history of atopy is a key factor for AD diagnosis. This observation has been noted in a substantial portion of AD patients across numerous prior studies. The percentages of AD patients with personal and/or family histories of atopy have been reported to be 43%–85% and 30%–78% in previous studies, respectively[29,50,57,58]. Chu et al.[14] determined that 63% of the patients with AD in a single tertiary hospital in Korea had an personal or family history of atopy. Another Korean study reported personal and family histories of atopy in 35% and 44% of patients with AD, respectively[59]. In particular, a significant association has been observed between a personal or family history of atopy and childhood or early-onset AD[60,61]. However, because patients with AD exhibit diverse phenotypes, allergy presence is not consistently obligatory for AD diagnosis. Additionally, the sensitivity and specificity of a personal or family history of atopy as a diagnostic criterion for AD vary across studies[22,56]. Therefore, inclusion of a history of atopy, either personal or familial, is suggested as diagnostic aids.

Criteria excluded from minor features of previous diagnostic criteria for Korean AD

1) Atypical vascular response

Atypical vascular responses are characterized by abnormal or unusual reactions of blood vessels in the skin, such as facial pallor, white dermographism, and delayed blanch response. These responses have been defined as features associated with AD by the AAD[7]. While most clinical studies have considered white dermographism as a minor criterion for diagnosing AD, several Indian studies have found that Indian AD patients do not exhibit white dermographism[52,62-64]. An atypical vascular response is also not included in the Japanese diagnostic criteria for AD[8]. These indicate the possibility of ethnic differences in atypical vascular responses.

2) Pityriasis alba

Pityriasis alba mainly affects children and appears as pink/pale scaly patches[27,65]. Patients with a history of AD experience greater rates of pityriasis alba compared to the general population[66]. In studies of Korean patients with AD, the prevalence of pityriasis alba varied widely, ranging from 2.9%–64.6%[53,59,67,68].

3) Keratosis pilaris

Keratosis pilaris is a frequently encountered follicular condition in children, and its prevalence varies widely, ranging from 0.75%–34.4%[69]. People who have skin scaling and dryness, whether or not they have been diagnosed with ichthyosis vulgaris or AD, are more likely to have keratosis pilaris[70]. The presence of keratosis pilaris has been found to be linked to mutations in filaggrin, particularly the R501X and 2282del4[71]. In one study, keratosis pilaris showed a sensitivity of 21.8%, specificity of 97.9%, PPV of 95.7%, and NPV of 37.3%[22]. In a Korean study, this finding was observed in 35.4% of AD patients and 22% of non-AD patients. In line with this, the study authors suggest it as a non-specific finding[43]. Therefore, we propose to distinguish and include perifollicular accentuation and keratosis pilaris as diagnostic aids. Finally, keratosis pilaris as well as pityriasis alba, which had agreement rates between 50%–70%, were the final exclusions from the diagnostic aids category.

4) Hyperlinear palms

Palmar hyperlinearity is characterized by the presence of more than five prominent lines, each longer than 1 cm, extending across the palm in patients[52]. Hyperlinear palms were observed in some cases of AD and have been associated with filaggrin gene mutations. The finding is regarded as a non-specific feature in the diagnosis of AD[13,72,73].

5) Itch when sweating

Sweating has been described as a risk factor that may aggravate atopic itching and overall AD symptoms[44,74]. Results of studies on the connection between "itching when sweating" and AD are heterogeneous[14,46,55,56].

6) Tendency toward cutaneous infection

It is well known that patients with AD are prone to developing cutaneous infections such as *Staphylococcus aureus*, herpes simplex, and *Malassezia furfur*[48]. Proinflammatory cytokines associated with type 2 inflammation, barrier dysfunction, and decreased antimicrobial defense in patients with AD may elevate the likelihood of developing cutaneous infections[42]. Cutaneous infection has been described as a complication rather than a diagnostic criterion of AD[75,76].

7) Scalp scales

Scalp scales have been mentioned as a more common finding in Asians and have been reported mainly in association with young children[27,76,77]. However, the "scalp scale" item did not show a significant difference in frequency between children diagnosed with AD and those without, indicating a potential lack of significance in AD in Koreans[23]. The scalp scale is not included in the HR criteria for AD, nor is it included in the AAD diagnostic criteria.

Differential diagnosis

The diagnosis of AD relies on criteria that include the various clinical aspects mentioned in the previous parts, but often requires differentiation from other skin conditions or disorders. Other eczematous dermatoses, such as irritant/allergic contact dermatitis, seborrheic dermatitis, xerotic eczema, and psoriasiform dermatoses should be prioritized for differentiation. However, before diagnosing AD, it is often necessary to rule out certain infectious skin conditions like scabies. In addition, in rare cases that do not respond well to appropriate treatment, a skin biopsy might be required to rule out early-stage cutaneous T cell lymphoma from the diagnosis, and blood tests to differentiate some connective tissue diseases may also be helpful. Although less common, some immunodeficiency disorders, nutritional deficiencies, and metabolic syndromes may need to be evaluated in neonates and infants with a clinical presentation of eczematous rashes that mimic the clinical presentation of AD.

Since clinical features of AD are heterogenous according to the various factors such as genetic predisposition, ethnicity, and age, the diagnosis of AD based on clinical presentation is still challenging. Population based large scale studies should be performed in the future to propose and validate more advanced diagnostic criteria with higher levels of evidence Nevertheless, this study has strengths in that it updates the diagnostic criteria for Korean AD and streamlines them for practical application.

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CONFLICTS OF INTEREST

The authors have nothing to disclose.

DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

REFERENCES

1. Bieber T. Atopic dermatitis. N Engl J Med 2008;358:1483-1494. PUBMED | CROSSREF
2. Lee JH, Son SW, Cho SH. A comprehensive review of the treatment of atopic eczema. Allergy Asthma Immunol Res 2016;8:181-190. PUBMED | CROSSREF
3. Hanifin JM, Rajka G. Diagnostic features of atopic dermatitis. Acta Derm Venereol Suppl (Stockh) 1980;92:44-47. CROSSREF
4. Haileamlak A, Lewis SA, Britton J, Venn AJ, Woldemariam D, Hubbard R, et al. Validation of the International Study of Asthma and Allergies in Children (ISAAC) and U.K. criteria for atopic eczema in Ethiopian children. Br J Dermatol 2005;152:735-741. PUBMED | CROSSREF
5. Williams HC, Burney PG, Pembroke AC, Hay RJ. The U.K. Working Party's diagnostic criteria for atopic dermatitis. III. Independent hospital validation. Br J Dermatol 1994;131:406-416. PUBMED | CROSSREF
6. Lan CC, Lee CH, Lu YW, Lin CL, Chiu HH, Chou TC, et al. Prevalence of adult atopic dermatitis among nursing staff in a Taiwanese medical center: a pilot study on validation of diagnostic questionnaires. J Am Acad Dermatol 2009;61:806-812. PUBMED | CROSSREF
7. Eichenfield LF, Tom WL, Chamlin SL, Feldman SR, Hanifin JM, Simpson EL, et al. Guidelines of care for the management of atopic dermatitis: Section 1. Diagnosis and assessment of atopic dermatitis. J Am Acad Dermatol 2014;70:338-351. PUBMED | CROSSREF
8. Katoh N, Ohya Y, Ikeda M, Ebihara T, Katayama I, Saeki H, et al. Japanese guidelines for atopic dermatitis 2020. Allergol Int 2020;69:356-369. PUBMED | CROSSREF
9. Park YL, Kim HD, Kim KH, Kim MN, Kim JW, Ro YS, et al. Report from ADRG: A study on the diagnostic criteria of Korean atopic dermatitis. Korean J Dermatol 2006;44:659-663.
10. Kim HJ, Bang CH, Kim HO, Lee DH, Ko JY, Park EJ, et al. 2020 Korean consensus guidelines for diagnosis and treatment of chronic hand eczema. Ann Dermatol 2021;33:351-360. PUBMED | CROSSREF
11. Yao TC, Wang IJ, Sun HL, Ou LS, Yu HH, Wang L, et al. Taiwan guidelines for the diagnosis and management of pediatric atopic dermatitis: consensus statement of the Taiwan Academy of Pediatric Allergy, Asthma and Immunology. J Microbiol Immunol Infect 2022;55:561-572. PUBMED | CROSSREF
12. Vakharia PP, Chopra R, Silverberg JI. Systematic review of diagnostic criteria used in atopic dermatitis randomized controlled trials. Am J Clin Dermatol 2018;19:15-22. PUBMED | CROSSREF
13. Schneider L, Tilles S, Lio P, Boguniewicz M, Beck L, LeBovidge J, et al. Atopic dermatitis: a practice parameter update 2012. J Allergy Clin Immunol 2013;131:295-299.e1-27. PUBMED | CROSSREF
14. Chu H, Shin JU, Park CO, Lee H, Lee J, Lee KH. Clinical diversity of atopic dermatitis: a review of 5,000 patients at a single institute. Allergy Asthma Immunol Res 2017;9:158-168. PUBMED | CROSSREF
15. Weisshaar E, Diepgen TL, Bruckner T, Fartasch M, Kupfer J, Lob-Corzilius T, et al. Itch intensity evaluated in the German Atopic Dermatitis Intervention Study (GADIS): correlations with quality of life, coping behaviour and SCORAD severity in 823 children. Acta Derm Venereol 2008;88:234-239. PUBMED | CROSSREF
16. Akan A, Dibek-Mısırlıoğlu E, Civelek E, Vezir E, Kocabaş CN. Diagnosis of atopic dermatitis in children: comparison of the Hanifin-Rajka and the United Kingdom Working Party criteria. Allergol Immunopathol (Madr) 2020;48:175-181. PUBMED | CROSSREF
17. Janmohamed SR, Grosber M, Eichenfield LF, Ring J, Gutermuth J. Medical algorithm: diagnosis of atopic dermatitis in early childhood (part I). Allergy 2021;76:403-406. PUBMED | CROSSREF
18. Johnson KM, Will BM, Johnson DW. Diagnosis and management of atopic dermatitis. JAAPA 2021;34:32-36. PUBMED | CROSSREF
19. Fishbein AB, Silverberg JI, Wilson EJ, Ong PY. Update on atopic dermatitis: diagnosis, severity assessment, and treatment selection. J Allergy Clin Immunol Pract 2020;8:91-101. PUBMED | CROSSREF
20. Maliyar K, Sibbald C, Pope E, Gary Sibbald R. Diagnosis and management of atopic dermatitis: a review. Adv Skin Wound Care 2018;31:538-550. PUBMED | CROSSREF
21. Cheng R, Guo Y, Huang L, Hao F, Gao X, Bieber T, et al. Current status in diagnosis of atopic dermatitis in China. Allergy 2017;72:1277-1278. PUBMED | CROSSREF
22. De D, Kanwar AJ, Handa S. Comparative efficacy of Hanifin and Rajka's criteria and the UK working party's diagnostic criteria in diagnosis of atopic dermatitis in a hospital setting in North India. J Eur Acad Dermatol Venereol 2006;20:853-859. PUBMED | CROSSREF
23. Kim JY, Lim HJ, Kim HY, Lee WK, Kim BS, Lee WJ, et al. Difference in the prevalence rate according to diagnostic criteria in atopic dermatitis: prevalence rate of atopic dermatitis according to Hanifin-Rajka, Japanese, Korean diagnostic criteria and characteristics of three different diagnostic criteria. Korean J Dermatol 2010;48:649-656.

24. Thomsen SF. Atopic dermatitis: natural history, diagnosis, and treatment. ISRN Allergy 2014;2014:354250. PUBMED | CROSSREF
25. Garmhausen D, Hagemann T, Bieber T, Dimitriou I, Fimmers R, Diepgen T, et al. Characterization of different courses of atopic dermatitis in adolescent and adult patients. Allergy 2013;68:498-506. PUBMED | CROSSREF
26. Kissling S, Wüthrich B. Follow-up of atopic dermatitis after early childhood. Hautarzt 1993;44:569-573. PUBMED
27. Yew YW, Thyssen JP, Silverberg JI. A systematic review and meta-analysis of the regional and age-related differences in atopic dermatitis clinical characteristics. J Am Acad Dermatol 2019;80:390-401. PUBMED | CROSSREF
28. Beck LA, Cork MJ, Amagai M, De Benedetto A, Kabashima K, Hamilton JD, et al. Type 2 inflammation contributes to skin barrier dysfunction in atopic dermatitis. JID Innov 2022;2:100131. PUBMED | CROSSREF
29. Jeon YH, Ahn K, Kim J, Shin M, Hong SJ, Lee SY, et al. Clinical characteristics of atopic dermatitis in Korean school-aged children and adolescents according to onset age and severity. J Korean Med Sci 2022;37:e30. PUBMED | CROSSREF
30. Chen CA, Lin L, Tsibris HC, Li WQ, Li TY, Qureshi AA. Pilot testing and validation of an atopic dermatitis screening and evaluation questionnaire. Int J Dermatol 2016;55:e399-e403. PUBMED | CROSSREF
31. Williamson S, Merritt J, De Benedetto A. Atopic dermatitis in the elderly: a review of clinical and pathophysiological hallmarks. Br J Dermatol 2020;182:47-54. PUBMED | CROSSREF
32. Jeziorkowska R, Rożalski M, Skowroński K, Samochocki Z. Can evaluation of specific immunoglobulin E serum concentrations of antibodies to aeroallergens in atopic dermatitis patients replace skin prick tests method in clinical practice? Postepy Dermatol Alergol 2019;36:478-484. PUBMED | CROSSREF
33. Kabashima K. New concept of the pathogenesis of atopic dermatitis: interplay among the barrier, allergy, and pruritus as a trinity. J Dermatol Sci 2013;70:3-11. PUBMED | CROSSREF
34. Kim HY, Choi J, Ahn K, Hahm MI, Lee SY, Kim WK, et al. Reference Values and utility of serum total immunoglobulin E for predicting atopy and allergic diseases in Korean schoolchildren. J Korean Med Sci 2017;32:803-809. PUBMED | CROSSREF
35. Patruno C, Amerio P, Chiricozzi A, Costanzo A, Cristaudo A, Cusano F, et al. Optimizing a clinical guidance for diagnosis of atopic dermatitis in adults: joint recommendations of the Italian Society of Dermatology and Venereology (SIDeMaST), Italian Association of Hospital Dermatologists (ADOI), and Italian Society of Allergological, Occupational and Environmental Dermatology (SIDAPA). G Ital Dermatol Venereol 2020;155:1-7. PUBMED | CROSSREF
36. Yetman RJ, Parks D; University of Texas-Houston Health Science Center, USA. Diagnosis and management of atopic dermatitis. J Pediatr Health Care 2002;16:143-145. PUBMED | CROSSREF
37. Arbes SJ Jr, Gergen PJ, Elliott L, Zeldin DC. Prevalences of positive skin test responses to 10 common allergens in the US population: results from the third National Health and Nutrition Examination Survey. J Allergy Clin Immunol 2005;116:377-383. PUBMED | CROSSREF
38. Reynolds M, Gorelick J, Bruno M. Atopic dermatitis: a review of current diagnostic criteria and a proposed update to management. J Drugs Dermatol 2020;19:244-248. PUBMED | CROSSREF
39. Sidbury R, Kodama S. Atopic dermatitis guidelines: diagnosis, systemic therapy, and adjunctive care. Clin Dermatol 2018;36:648-652. PUBMED | CROSSREF
40. Eichenfield LF, Ahluwalia J, Waldman A, Borok J, Udkoff J, Boguniewicz M. Current guidelines for the evaluation and management of atopic dermatitis: a comparison of the Joint Task Force Practice Parameter and American Academy of Dermatology guidelines. J Allergy Clin Immunol 2017;139:S49-S57. PUBMED | CROSSREF
41. Cheng R, Zhang H, Zong W, Tang J, Han X, Zhang L, et al. Development and validation of new diagnostic criteria for atopic dermatitis in children of China. J Eur Acad Dermatol Venereol 2020;34:542-548. PUBMED | CROSSREF
42. Ruff SMD, Engebretsen KA, Zachariae C, Johansen JD, Silverberg JI, Egeberg A, et al. The association between atopic dermatitis and hand eczema: a systematic review and meta-analysis. Br J Dermatol 2018;178:879-888. PUBMED | CROSSREF
43. Park YM, Byun DG, Kim JW. Evaluation of minor clinical features of adolescence and adult atopic dermatitis in Korea. Korean J Dermatol 1994;32:1046-1053.
44. Kwon JA, Roh KY, Koh BK, Kim JW. Clinical characteristics of adolescence and adult atopic dermatitis in Korea. Korean J Dermatol 2004;42:949-954.
45. Gu H, Chen XS, Chen K, Yan Y, Jing H, Chen XQ, et al. Evaluation of diagnostic criteria for atopic dermatitis: validity of the criteria of Williams et al. in a hospital-based setting. Br J Dermatol 2001;145:428-433. PUBMED | CROSSREF
46. Lee SC, Bae JM, Lee HJ, Kim HJ, Kim BS, Li K, et al. Introduction of the Reliable Estimation of Atopic dermatitis in ChildHood: novel, diagnostic criteria for childhood atopic dermatitis. Allergy Asthma Immunol Res 2016;8:230-238. PUBMED | CROSSREF
47. Ramírez-Marín HA, Silverberg JI. Differences between pediatric and adult atopic dermatitis. Pediatr Dermatol 2022;39:345-353. PUBMED | CROSSREF
48. Park YM, Byun DG, Kim JW. Evaluation of minor clinical features of childhood atopic dermatitis in Korea. Korean J Dermatol 1994;32:886-895.
49. Vestergaard C, Deleuran M. Advances in the diagnosis and therapeutic management of atopic dermatitis. Drugs 2014;74:757-769. PUBMED | CROSSREF
50. Liu P, Zhao Y, Mu ZL, Lu QJ, Zhang L, Yao X, et al. Clinical features of adult/adolescent atopic dermatitis and Chinese criteria for atopic dermatitis. Chin Med J (Engl) 2016;129:757-762. PUBMED | CROSSREF
51. Choi YS, You CE, Park MY, Son SJ, Whang KU. A study on clinical features and laboratory findings according to the severity of atopic dermatitis. Korean J Dermatol 2006;44:824-829.
52. Dutta A, De A, Das S, Banerjee S, Kar C, Dhar S. A cross-sectional evaluation of the usefulness of the minor features of Hanifin and Rajka diagnostic criteria for the diagnosis of atopic dermatitis in the pediatric population. Indian J Dermatol 2021;66:583-590. PUBMED | CROSSREF
53. Lim HJ, Yu DS, Kim JW. A diagnostic questionnaire for the epidemiologic studies of childhood and adult atopic dermatitis in Korea. Korean J Dermatol 2008;46:1495-1499.
54. Lee SC, Byun DG, Lee WC, Kim JW. The prevalence and some minor clinical features of atopic dermatitis. Korean J Dermatol 1995;33:1-7.
55. Pugliarello S, Cozzi A, Gisondi P, Girolomoni G. Phenotypes of atopic dermatitis. J Dtsch Dermatol Ges 2011;9:12-20. PUBMED | CROSSREF
56. Lahouel M, Lahouel I, Belhadjali H, Ben Hammouda M, Youssef M, Zili J. A comparative case-control study of diagnostic criteria for atopic dermatitis and proposal of new diagnostic criteria from Tunisia. Int J Dermatol 2020;59:962-968. PUBMED | CROSSREF
57. Kulthanan K, Samutrapong P, Jiamton S, Tuchinda P. Adult-onset atopic dermatitis: a cross-sectional study of natural history and clinical manifestation. Asian Pac J Allergy Immunol 2007;25:207-214. PUBMED

58. Kumar MK, Singh PK, Patel PK. Clinico-immunological profile and their correlation with severity of atopic dermatitis in Eastern Indian children. J Nat Sci Biol Med 2014;5:95-100. PUBMED | CROSSREF

59. Lee HI, Han TY, Seo SJ, Kim DW, Kim MN, Kim MB, et al. Dermatologic diseases associated with atopic dermatitis in Koreans: multicenter study. Korean J Dermatol 2010;48:191-197.

60. Suaini NHA, Yap GC, Bui DPT, Loo EXL, Goh AEN, Teoh OH, et al. Atopic dermatitis trajectories to age 8 years in the GUSTO cohort. Clin Exp Allergy 2021;51:1195-1206. PUBMED | CROSSREF

61. Kim BJ, Wang HY, Lee H, Lee SY, Hong SJ, Choi EH. Clinical characteristics and genetic variations in early-onset atopic dermatitis patients. Ann Dermatol 2019;31:286-293. PUBMED | CROSSREF

62. Kanwar AJ, Dhar S, Kaur S. Evaluation of minor clinical features of atopic dermatitis. Pediatr Dermatol 1991;8:114-116. PUBMED | CROSSREF

63. Nagaraja , Kanwar AJ, Dhar S, Singh S. Frequency and significance of minor clinical features in various age-related subgroups of atopic dermatitis in children. Pediatr Dermatol 1996;13:10-13. PUBMED | CROSSREF

64. Parthasarathy N, Palit A, Inamadar AC, Adya KA. A study to estimate the frequency of Hanifin and Rajka's minor criteria in children for diagnosis of atopic dermatitis in a tertiary care center in South India. Indian J Paediatr Dermatol 2020;21:31-35. CROSSREF

65. Silverberg JI, Vakharia PP, Chopra R, Sacotte R, Patel N, Immaneni S, et al. Phenotypical differences of childhood- and adult-onset atopic dermatitis. J Allergy Clin Immunol Pract 2018;6:1306-1312. PUBMED | CROSSREF

66. Miazek N, Michalek I, Pawlowska-Kisiel M, Olszewska M, Rudnicka L. Pityriasis alba--common disease, enigmatic entity: up-to-date review of the literature. Pediatr Dermatol 2015;32:786-791. PUBMED | CROSSREF

67. Lee SC, Byun DG, Lee WC, Kim JW. The prevalence and some minor clinical features of atopic dermatitis in the first grade school children of Puchon city of Kyonggi-do. Korean J Dermatol 1995;32:1046-1053.

68. Ahn YS, Kim JS, Yu HJ. Clinical features of atopic dermatitis in urban and rural areas. Korean J Dermatol 2007;45:1004-1012.

69. Wang JF, Orlow SJ. Keratosis pilaris and its subtypes: associations, new molecular and pharmacologic etiologies, and therapeutic options. Am J Clin Dermatol 2018;19:733-757. PUBMED | CROSSREF

70. Mevorah B, Marazzi A, Frenk E. The prevalence of accentuated palmoplantar markings and keratosis pilaris in atopic dermatitis, autosomal dominant ichthyosis and control dermatological patients. Br J Dermatol 1985;112:679-685. PUBMED | CROSSREF

71. Sandilands A, O'Regan GM, Liao H, Zhao Y, Terron-Kwiatkowski A, Watson RM, et al. Prevalent and rare mutations in the gene encoding filaggrin cause ichthyosis vulgaris and predispose individuals to atopic dermatitis. J Invest Dermatol 2006;126:1770-1775. PUBMED | CROSSREF

72. Eichenfield LF, Stein Gold LF. Practical strategies for the diagnosis and assessment of atopic dermatitis. Semin Cutan Med Surg 2017;36:S36-S38. PUBMED | CROSSREF

73. Kim KH, Chung JH, Park KC. Clinical evaluation of minor clinical features of atopic dermatitis. Ann Dermatol 1993;5:9-12. CROSSREF

74. Chong SJ, Kim KH, Kim DW, Kim SJ, Kim IJ, Kim CW, et al. Report from ADRG: a study on the clinical manifestations of childhood atopic dermatitis in Korea. Korean J Dermatol 2005;43:1497-1509.

75. de Bruin Weller MS, Rockmann H, Knulst AC, Bruijnzeel-Koomen CA. Evaluation of the adult patient with atopic dermatitis. Clin Exp Allergy 2013;43:279-291. PUBMED | CROSSREF

76. Deleuran M, Vestergaard C. Clinical heterogeneity and differential diagnosis of atopic dermatitis. Br J Dermatol 2014;170 Suppl 1:2-6. PUBMED | CROSSREF

77. Narla S, Silverberg JI. Dermatology for the internist: optimal diagnosis and management of atopic dermatitis. Ann Med 2021;53:2165-2177. PUBMED | CROSSREF