



Typical and atypical clinical appearance of atopic dermatitis

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Abstract Atopic dermatitis is a complex, systemic inflammatory disorder associated with a variety of clinical features. The original criteria of Hanifin and Rajka include major criteria and a list of about two dozen minor criteria however, even the minor criteria do not include some features of atopic dermatitis noted less commonly but still seen with some frequency. This contribution first reviews the common clinical appearance of atopic dermatitis in infancy, childhood, and adulthood, as well as the less typical appearances, including lichenoid atopic dermatitis; juvenile plantar dermatosis; nummular-type atopic dermatitis; follicular atopic dermatitis; alopecia of atopic dermatitis; eczema coxsackium; and psoriasiform, perineal, and lip lick's dermatitis. The clinician will be able to recognize and treat rarer forms of atopic dermatitis and incorporate this into their daily practice.

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Introduction

Atopic dermatitis is generally defined by the presence of a relapsing, itchy dermatitis in typical distribution, generally associated with dry skin and a tendency toward atopy (atopic dermatitis, asthma, and food and environmental allergies) in the patient and family members. One set of criteria for atopic dermatitis was developed by Hanifin and Rajka,¹ and thereafter practical modifications have been developed by dermatology organizations for more rapid diagnosis.^{2–5} The Hanifin and Rajka criteria seem to be more helpful in younger children, and the Williams criteria may be more useful in children older than age 4 years.^{2,5}

Typical appearance of atopic dermatitis

The criteria of Hanifin and Rajka are summarized in Table 1. Specific appearance by age is reviewed next.

Infancy

In infancy, erythematous papules and plaques develop on the cheeks (Figure 1), sparing the nose (termed the headlight sign for the bright nose, which is clear) and involving the extensor surfaces of the extremities. Intertriginous maceration can be noted when atopic dermatitis overlaps with infantile seborrheic dermatitis.⁵

Childhood

In childhood (usually by age 2 years) atopic dermatitis is less commonly noted on the cheeks and becomes more targeted on the folds of the skin, including the eyelids, neck,

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Table 1 A summary of the Hanifin and Rajka criteria for atopic dermatitis**Major criteria (must have 3)***Pruritus**Dermatitis affecting flexural surfaces in adults or face and extensor surfaces in infants**Chronic or relapsing dermatitis**Personal or family history of cutaneous or respiratory allergy***Minor criteria (must have 3)**

Xerosis

Ichthyosis vulgaris

Palmar hyperlinearity

Keratosis pilaris

Positive SPT

Elevated serum IgE

Early age of onset

Tendency toward cutaneous infections

Impaired cell-mediated immunity

Hand eczema

Foot eczema

Nipple eczema

Cheilitis

Recurrent conjunctivitis

Dennie-Morgan infraorbital folds

Keratoconus

Anterior subcapsular cataracts

Orbital darkening

Facial pallor

Facial erythema

Pityriasis alba

Anterior neck folds

Itch when sweating

Intolerance of wool

Intolerance to lipid solvents

Perifollicular accentuation

Skin reactions from ingested food

Skin reactions from food contact

Environmental factors

Emotional factors

White dermographism, nonlesional

White dermographism, lesional

Delayed blanch

IgE, immunoglobulin E; *SPT*, skin prick test.

antecubital space, wrists, popliteal, ankles, and buttock regions. Eczematous plaques may clinically be pruritic without visible lesions until scratching occurs (“the itch that rashes”) or may have erythema, papillation, oozing, or lichenification, the latter with long-standing lesions.²

Adulthood

By adolescence extending into adulthood, hands and feet become a concerning focus for atopic dermatitis. A recent Asian study⁶ noted that for AD patients older than 12 years, 58.2% had elevated immunoglobulin E (IgE), eosinophilia,

and/or elevated allergen-specific IgE. The authors propose the following as a set of screening guideline criteria for adolescent and adult atopic dermatitis:

Must have:

- 1) Symmetric eczema (dermatitis) for more than 6 months*
- 2) Plus one or more of the following:

Personal+ and/or family history ++ of atopic diseases

Elevated total serum IgE level and/or positive allergen-specific IgE and/or eosinophilia

*More than 6 months: Persistent or recurrent eczema/dermatitis for more than 6 months; +Personal history of atopic diseases: Allergic rhinitis and/or allergic asthma and/or allergic conjunctivitis; ++Family history of atopic diseases: Eczema/AD and/or allergic rhinitis and/or allergic asthma and/or allergic conjunctivitis in first-, second- or third-degree relatives.⁶

Individuals with atopic dermatitis will have more hand and foot dermatitis (24.7%)⁶ and more chronic glove dermatitis or occupational hand dermatitis.⁷ Sensitivity to fragrance persists and may complicate choice of daily personal care items.⁸ Eyelid dermatitis increases with time as well.^{4,5,9}

Atypical features of atopic dermatitis

Although the atypical features of atopic patients are less common, they may certainly be quite common in specific patient subsets and may be the pattern *de rigueur* in specific individuals with recurrences and pruritus being universally noted in all variants irrespective of race, ethnicity, and skin tone.

Lichenoid atopic dermatitis

Lichenoid atopic dermatitis is distinguished from lichenification by the presence of pruritic flat-topped, nonviolaceous but erythematous papules often along the extensor extremities, both upper and lower.¹⁰ Lichenoid atopic dermatitis is a variant noted in “heavily-pigmented”¹⁰ patients, including African-American¹⁰ and Latino/Hispanic patients,¹¹ and may require a biopsy to be distinguished from lichen planus.¹⁰ It may be beneficial to do patch testing for contact allergy when this is noted. Topical therapy may be used, including topical corticosteroids¹⁰ and topical calcineurin inhibitors,¹² keeping in mind that the latter may be used for occluded skin. Phototherapy can be helpful, including 308-nm laser (anecdotal success of the author), and narrowband ultraviolet B has been described to provide relief in most forms of atopic dermatitis.^{12–14}

Juvenile plantar dermatosis

Although many children may have foot dermatitis as a minor criterion of Hanifin and Rajka,¹ juvenile plantar dermatosis



Fig. 1 An infant with excoriated, oozing dermatitis of the cheeks.

has a distinctive appearance and often a biopsy indicating spongiotic dermatitis.¹⁵ Juvenile plantar dermatosis is typified by the presence of extremely pruritic, shiny, erythematous plaques over the soles and plantar surface of the toes (especially the first toes)^{12,15} (Figure 2). The onset is often in grade school and may last through middle school. The presence of hyperhidrosis or usage of occlusive footwear, such as plastic shoes, may exacerbate disease or trigger flares, accounting for the presence of disease largely in the summertime.¹⁶ Use of emollients and mid- to high-potency topical steroids or topical calcineurin inhibitors may be required to reduce inflammation.^{12,15,16} Patch testing may be helpful in identifying a relevant allergen.^{15,17} Instructions including natural fiber socks and shoes may reduce disease severity.

Nummular-type atopic dermatitis

Nummular-type atopic dermatitis, sometimes termed nummular eczema, has been linked to intrinsic atopic dermatitis in adults Asian patients.¹⁸ Nummular dermatitis clinically appears as annular or nummular plaques that are red with oozing, excoriations, and studded pustules over the extensor extremities, including wrists and ankles, and often occurs in patients of color where hyperpigmentation may be noted (Figure 2).^{11,12} More rarely it will be noted over the face, hands, and feet.¹⁹ Nummular dermatitis in childhood can be triggered by a nidus including molluscum²⁰ or allergic contact dermatitis.²¹ To be considered nummular-type atopic dermatitis, this condition needs to be noted in the setting of more typical atopic dermatitis features. In particular, allergic contact dermatitis to topical antibiotics, preservatives, and humectants added to topical therapies should be considered. Patch testing may identify a relevant allergen in 46% of cases.²²

Follicular atopic dermatitis

Follicular atopic dermatitis, or follicular eczema, can be noted in all ethnic and racial groupings but is most common in children of African-American, Hispanic, and Asian ancestry.^{11,12,23,24} In adult Asian patients, follicular dermatitis has



Fig. 2 Nummular dermatitis over the shoulders in an African-American teenage girl with known atopic dermatitis.

been linked to intrinsic-type atopic dermatitis (also called atopiform dermatitis), which has been noted in 12.5% of patients versus 87.5% of patients who have extrinsic atopic dermatitis.¹⁸ Perifollicular accentuation is one of the minor criteria of Hanifin and Rajka.¹ Clinically, parents report complaints of severe pruritus in the absence of eczematous changes; however, in reality the child has follicular prominence of the entire chest, back, abdomen, and proximal extremities bilaterally with a total body surface area that is quite severe¹² (Figures 3 and 4). Biopsy results indicate spongiosis in and around the hair follicle.²⁴ Mid- to high-potency topical corticosteroids are needed for 2 to 4 weeks, and application in a soak-and-slasher technique may address the large surface area better than other types of application¹²; furthermore, sedating antihistamines are often required to address sleep disturbance.¹²

Alopecia associated with atopic dermatitis

Alopecia is commonly noted in children with atopic dermatitis in the setting of Netherton syndrome due to the fragility of the bamboo hairs (trichorrhexis invaginata); however, alopecia can be found with atopic dermatitis even in children who do not have hair shaft abnormalities and has been linked to atopic dermatitis in epidemiologic studies.²⁵ This is often at the margins of the scalp and occurs in the setting of scalp atopic dermatitis or other dermatoses that are being excoriated with concurrent xerosis of the hair shaft, not an uncommon feature of childhood. In the author's clinical practice, most of the patients with this type of disease appearance are African-American or black preteen and teenage girls with severe atopic dermatitis; however, younger children may suffer from alopecia related to active atopic dermatitis as well. Due to the difficulty of clearing atopic dermatitis of the scalp and the fact that



Fig. 3 Follicular dermatitis over the shoulders in a patient with generalized dermatitis.



Fig. 4 Pityriasis alba in the child pictured in Figure 3, showing that typical and atypical features can overlap in children with atopic dermatitis.

most topical corticosteroid scalp preparations are alcohol based and therefore exacerbate scalp xerosis, alcohol-free preparations or intralesional corticosteroid injections, with similar concentration to those used in alopecia areata, may be required.

Eczema coxsackium

Eczema coxsackium is a term recently coined for atopic dermatitis flares noted with and overlapping with Coxsackie virus infections (eg, hand-foot-and-mouth disease).²⁶ In the United States since 2011 there have been reports of severe skin disease associated with Coxsackie A6 infections, with less intense oral and pharyngeal involvement. Eczema coxsackium is noted in children with AD who develop Coxsackie infections²⁷ and is typified by eczematous plaques studded with pustules and erosions in classic sites of childhood dermatitis, including antecubital and popliteal fossae, as well as over the extremities. Additionally, patients will experience a widespread vesiculobullous eruption.²⁸ Palmoplantar purpuric papules will be noted,²⁹ and acral disease is more common before age 2 years.²⁹ Supportive therapy may be beneficial.

Psoriasiform atopic dermatitis

Psoriasiform atopic dermatitis is sometimes considered to be an overlap of atopic dermatitis and psoriasis, which can be noted in 5% of children, or it may be psoriasiform contact dermatitis in the setting of atopic dermatitis (often diagnosed by biopsying treatment-resistant AD). When noted, psoriasiform involvement often occurs in the scalp and diaper area, and the patient may have family history.³⁰ Psoriasiform atopic dermatitis occurs more commonly diagnosed in Asian children and adults. Psoriasiform dermatitis, like atopic dermatitis, may be associated with reduced ceramide production in the skin.³¹ Recently, basic science research has indicated that such patients actually have T helper type 17 and type 2 signaling

that contributes to the presence of both diseases.³² In clinical practice, these patients are highly treatment resistant to topical therapies and may require phototherapy (narrowband ultraviolet B), 308-nm laser, or the addition of agents systemically to address the psoriasis. Because there is a joint axis of interleukin 23 and T helper type 17 cells, agents such as ustekinumab would be projected to be successful in adult cases.

Perianal bacterial dermatitis

Perianal bacterial dermatitis refers to the presence of atopic dermatitis in the buttocks and perianal area sites, where a diaper would cover (Figure 5). Children may start to develop this eruption after potty training due to a combination of xerosis, irritation from residual stool, irritation from aggressive washing, and exposure to *Streptococcus* and *Staphylococcus* in the school or group setting.³³ Adult cases have been reported. Cases are usually associated with group B *Streptococcus* in



Fig. 5 Perianal and perineal dermatitis in a child with atopic dermatitis.

adulthood rather than in group A *Streptococcus* or *Staphylococcus aureus*, as noted in childhood.^{33–35} The area appears as erythematous plaques in the perianal and/or surrounding buttocks and inner aspects of the thighs. Maceration, erosions, and excoriations can be noted. Although this is not as beefy red as is often noted in perianal streptococcal infections, a culture is needed. In the setting of anal streptococcal infection, systemic therapy is usually required. When *S aureus* is noted, it is often a colonization of dermatitis. In this setting, application of topical mid-potency corticosteroids, topical mupirocin 2%, and bleach baths for a few months may both clear the site and prevent recurrences.³³

Lip lick's dermatitis

Perioral lesions can be seen when atopic dermatitis presents in the lips (cheilitis is a minor criterion of Hanifin and Rajka) and surrounding skin. The latter is complicated by lip licking, which produces a well-marginated plaque with dermatitis and lichenification both on the lips and on the surrounding skin. Patients are often unaware of the habit, which develops when they feel their lips are dry.^{12,36} A mid-potency topical corticosteroid two to three times a day for a few weeks and liberal emollient application with petrolatum can speed clearance.^{12,36} In patients of African-American or black ancestry, postinflammatory pigmentary alteration may persist after lesional clearance. Chronic, unremitting atopic dermatitis or lip lick's dermatitis can be associated with food allergies and contact dermatitis.³⁷ Patch testing and appropriate referral for food allergy testing may be needed.

Bee keeper distribution

Bee keeper distribution of atopic dermatitis is the presence of atopic dermatitis on the head and neck extending to the V of the chest and back, a distribution consistent with aeroallergens, such as dust mites,⁹ and allergy to *Malassezia* species³⁸ that colonize the skin of the scalp, face, neck, and upper portion of the chest and back and are associated with head and neck atopic dermatitis more commonly noted in boys.³⁹ Exploration of the allergy status to aeroallergens such as dust with appropriate dust avoidance in the proven allergic setting may be needed. Concurrent therapy for seborrheic dermatitis with an antifungal or sporicidal shampoo may enhance clearance when added to standard atopic dermatitis therapy.⁴⁰

Conclusions

Atopic dermatitis is not just a constellation of skin findings but also a reaction pattern to allergens. Different people and different stimuli may produce less common clinical appearances, and concentration on seeking out comorbidities such as allergies, psoriasis, and allergic contact dermatitis may aid in lesion clearance in specific patients.

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