

Prevalence and Morphology of Hand Eczema in Patients with Atopic Dermatitis

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Background: Patients with hand eczema frequently have a history of atopic dermatitis or atopy. No specific morphologic pattern of hand eczema helps distinguish atopic hand eczema from other etiologies. There are few studies of hand eczema prevalence and morphology in a well-defined population of patients with atopic dermatitis.

Methods: We evaluated 777 consecutive patients with atopic dermatitis (diagnosed by standard criteria) for hand involvement. An additional 100 patients had further evaluations, including evaluation of the historical and morphologic characteristics of their hand eczema.

Results: The prevalence of hand involvement in patients with active atopic dermatitis was 58.9% (458 of 777 patients). Nail dystrophy was present in 16% (124 of 777) of patients. There was a significant trend toward an increasing prevalence of hand involvement with increasing age. Hand eczema tended to involve primarily the dorsal hand surfaces and the volar wrist.

Conclusions: The hands are frequently involved in patients with active atopic dermatitis and present unique physical, social, and therapeutic challenges for patients. During the evaluation of patients presenting with hand eczema, the involvement of dorsal hand surfaces and the volar wrist may suggest atopic dermatitis as a contributing etiologic factor.

HAND ECZEMA continues to be a significant health problem in the United States, where its prevalence ranges from 2.0 to 8.9%.¹ A history of atopic dermatitis confers an increased risk for the development of hand eczema. The prevalence of hand eczema in patients with a history of atopic dermatitis has been reported to be 2- to 10-fold higher than that found in nonatopic patients.² Several attempts have been made to identify a distinct morphologic pattern that could help differentiate atopic hand eczema from disorders with other etiologies, such as contact dermatitis or dyshidrosis.³⁻⁹ Most studies of atopic hand eczema have involved adults who presented with hand eczema and who had a history of atopic dermatitis in childhood. Few studies have examined the prevalence or morphology of hand eczema in patients with active atopic dermatitis. Furthermore, many studies have had poorly defined patient populations.

Our aim was to determine the prevalence of hand eczema in a large cohort of patients with well-defined atopic dermatitis and to describe the clinical features and morphologic patterns. We included a younger cohort to minimize the effect environmental factors might have in influencing the hand eczema phenotype.

Methods

To determine the prevalence of hand eczema, from 1980 to 1998 we investigated 950 consecutive patients referred to Oregon Health & Science University who met the standard criteria for atopic dermatitis.¹⁰ During the initial visits, data were gathered with a standardized evaluation form designed to aid in the diagnosis and assessment of atopic dermatitis (AD), and 777 forms were completed sufficiently for this study. The evaluation form prompted the examiner to record details of the history of the skin disease, the presence of respiratory complaints, a family history, and a detailed physical examination. All examinations and evaluation forms were reviewed or completed by the authors. Hand eczema was defined as active dermatitis on any hand surface.

Further investigation of clinical features and hand eczema morphology was carried out prospectively on an

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Table 1. Prevalence of Hand Eczema in Patients with Active Atopic Dermatitis

Age at Evaluation (yr)	Number of Patients (n = 777)	Patients with Hand Eczema (%)
0–2	126	43.7*
3–12	133	54.1*
> 12	518	63.9*
Total	777	58.9

*Differences are statistically significant ($p < .001$).

additional group of consecutive patients ($n = 100$) who had concurrent hand eczema and active typical AD lesions on the trunk or extremities during the period of 2003 to 2005. Patients with suspected contact allergy were excluded from this study. Patient data were recorded on a standard intake form with added areas for the specific details of the history and morphology of the hand eczema. The form prompted the evaluator to mark the presence or absence of dermatitis on the following areas: dorsal fingers, lateral fingers, palmar fingers, dorsal hand, palmar hand, dorsal wrist, volar wrist, nails (dystrophy), web spaces, and vesicles on any surface. Exacerbating factors were elicited with an open-ended question and were later categorized for reporting. Chi-square tests were used to compare prevalence and morphologic patterns between age groups.

Results

Prevalence of Hand Eczema

The majority of patients ($> 90\%$, $n = 777$) were Caucasian, reflecting the relative ethnic homogeneity of the Pacific Northwest area of the United States. The ratio of females to males was 1.4:1. The mean and median ages of onset of the signs and symptoms of AD were 4.3 years and less than 1 year, respectively. The prevalence of hand eczema when combining all age groups was 58.9%. There was a significant

Table 2. Age Distribution of Hand Eczema Patients Used for Morphologic Analysis

Age at Evaluation (yr)	Percentage of Patients (n = 100)
0–2	21
3–12	30
> 18	49

Table 3. Reported Exacerbating Factors of Hand Eczema in Patients with Atopic Dermatitis

Exacerbating Factor	Percentage of Patients (n = 100)
Water exposure	43.1
Occupation	13.8
Household irritants	8.6
Emotional stress	8.6
Handling of food	6.9
Other	19.0

trend toward an increasing prevalence of hand involvement with increasing age of evaluation (Table 1).

Morphology of Hand Eczema

The patients' ages at the time of evaluation in this additional group ($n = 100$) ranged from 6 months to 75 years. The age distribution of this subset is shown in Table 2. The mean and median ages at AD onset were 3.8 years and less than 1 year, respectively. The majority of patients (65%) developed hand dermatitis within 1 year of AD onset, and 80% developed hand dermatitis within the first 5 years. Exacerbating factors of hand dermatitis were reported by 43% of patients; exposure to water was the most common exacerbating factor. Table 3 summarizes the exacerbating factors.

In all age groups, hand eczema tended to involve primarily the dorsal hand surfaces and the volar wrist. Nail dystrophy was present in 16% of patients and reflects the frequent periungual inflammation seen in cases of AD hand eczema. We found no statistical differences in the distribution of hand lesions among age groups. The hand

Table 4. Morphologic Pattern of Hand Eczema in Patients with Atopic Dermatitis

Location of Eczema	Percentage of Patients with Involvement (n = 100)
Dorsal hand	89
Dorsal fingers	73
Dorsal wrist	56
Volar wrist	58
Lateral fingers	42
Web spaces	39
Palm	31
Volar fingers	30
Nails	16
Vesicles	4.3

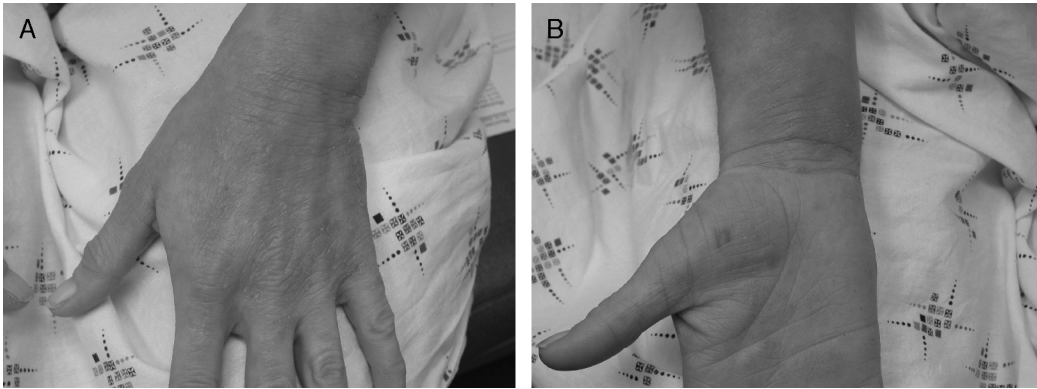


Figure 1. A, Typical dorsal hand, finger, and wrist involvement of hand eczema in an adult patient with atopic dermatitis. B, Characteristic volar wrist involvement in the same patient, with erythema, scale, and lichenification.

eczema morphologic pattern for all ages combined is shown in Table 4. Vesicular lesions of the palms and the sides of fingers were found in approximately 4.3% of the patients by direct examination but 11.4% by history. Examples of typical hand eczema patterns in patients with active atopic dermatitis are shown in Figures 1 and 2.

Discussion

We have determined the prevalence of hand involvement in a large group of patients with active atopic dermatitis and have identified a distinctive pattern of atopic hand eczema. The prevalence of hand eczema for all age groups was 58.9%; the highest prevalence was found in patients older than 12 years. The trend toward an increasing prevalence of hand involvement in older age groups likely represents an increase in water exposure and occupational insults, with

the subsequent development of coexisting irritant dermatitis. This presumed increase in irritant hand dermatitis did not seem to alter the morphology of the hand eczemas in the older age groups, however. In our youngest group, 43.7% had hand involvement, a percentage that is higher than that recently reported by Bohme and colleagues, who found hand involvement in 28% of 2-year-old children with AD.¹¹ The high prevalence in our group of pediatric patients likely reflects a population of patients with more severe dermatitis at our tertiary referral center whereas Bohme and colleagues' study was population based. Our findings are consistent with those of previous work by Cronin and colleagues, who found 68% of patients with AD to have hand involvement.¹² Together these data highlight the frequent involvement of the hands in AD cases and reinforce Rajka's comment from his 1989 book on atopic dermatitis, which states, "Special attention has to be

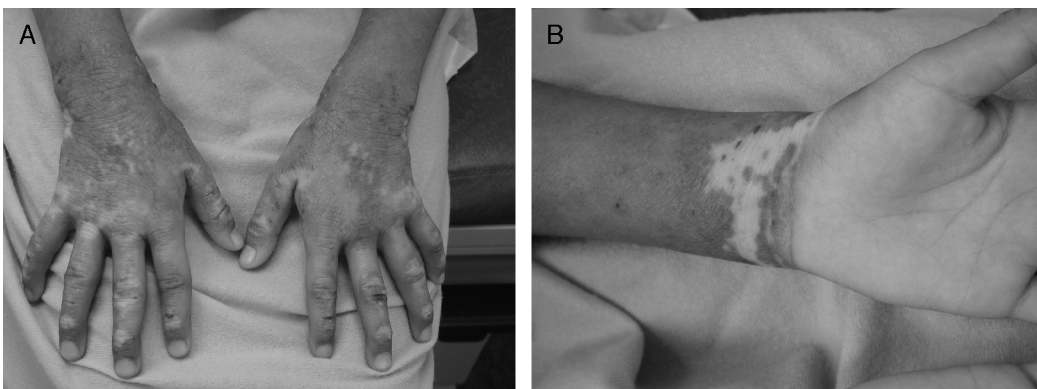


Figure 2. A, Characteristic dorsal hand involvement in a pediatric patient with atopic dermatitis. B, Volar wrist involvement of atopic hand eczema in the same patient. Note post-inflammatory vitiligo-like changes.

Table 5. Previous Studies of Hand Eczema Patterns in Patients with Only a History of Atopic Dermatitis

<i>Lead Study Author, Year</i>	<i>No. of Patients with Population Characteristics</i>	<i>Ages (yr)</i>	<i>AD Diagnostic Criteria</i>	<i>Hand Eczema Pattern</i>
Cronin, 1985	263 with HE only and history of AD	Not specified	Patient or first-degree relative with eczema, hay fever, or asthma	No specific pattern
Svensson, 1988	29 with HE only and history of AD	> 19	Clinical scoring system (18)	Hypothenar involvement more common in patients with AD
Rystedt, 1985	327 with HE and history of AD	22–44	Hanifin-Rajka criteria	85% fingers, 25% palms, 2% palms only
Akyol, 1997	55 with HE and history of atopy	Not specified	“Atopic history”	40% fingers, 40% palms, 20% dorsal hands
Duarte, 1998	58 with HE and history of AD	> 13	None stated	8% dorsal region, 27% dorsal fingers, 62% palms

AD = atopic dermatitis; HE = hand eczema.

paid to involvement of the hands, which are of such great importance, especially in the execution of many occupations and in social life.”¹³

Hand involvement in patients with atopic dermatitis appears to be not only common but also quite morphologically distinctive, and most patients' eczema involves the dorsal hands and fingers as well as the volar wrist. Because of our well-defined patient population and the presence of active disease on areas other than the hands, this pattern may be a more accurate representation of pure atopic hand eczema than what has been described in previous studies of hand eczema morphology. Most previous studies evaluated hand eczema patients only after the initial AD had become quiescent, with hand eczema emerging in adulthood (Table 5). Furthermore, most studies have not used stringent diagnostic criteria for AD, which may explain the lack of uniform results from these studies.

Some studies have reported dorsal hand and finger involvement to be suggestive of atopic hand eczema whereas

other studies fail to show a specific clinical pattern for atopic hand eczema.^{3,4} Our findings confirm previous reports of dorsal hand surfaces being primarily involved when active AD is present (Table 6). Forsbeck and colleagues reported that the fingers and the dorsal hands are the most common sites involved.¹⁴ Agrup also found dorsal hand involvement in more than 50% of her atopic patients; however, this was not specific to AD in her study because nummular and allergic contact dermatitis also prominently affected the dorsal hands.⁴ Rajka found that the dorsal hand, the fingertips, and the wrist were common locations for atopic hand eczema, a result similar to our findings.¹³ Menne and Maibach also noted that the dorsal hand and the fingers are the most commonly involved areas in atopic hand eczema.¹⁵

The evaluation of a patient with hand eczema is complex, necessitating thorough investigation into a patient's medical and work history. The physical examination and ancillary laboratory and patch tests are useful to tease

Table 6. Previous Studies of Hand Eczema Patterns in Patients with Active Atopic Dermatitis

<i>Lead Study Author, Year</i>	<i>No. of Patients with Population Characteristics</i>	<i>Ages (yr)</i>	<i>AD Diagnostic Criteria</i>	<i>Hand Eczema Pattern</i>
Agrup, 1969	85 with HE and active AD	Majority, 10–20	General experience	55% dorsal hands
Forsbeck, 1983	77 with HE and active AD	> 20	Hanifin-Rajka criteria	91% fingers, 50% dorsal hands, 38% palms
Bonven, 1991	29 with severe AD (unclear how many with HE)	15–41	None stated	Dorsal hands and fingers (dominant pattern)
Simpson, 2005	100 patients with HE and active AD	0.5–75	Hanifin-Rajka criteria	89% dorsal hands, 58% volar wrist

AD = atopic dermatitis; HE = hand eczema.

out underlying etiologies. In adult patients who present with hand eczema and have only a history of AD, no specific morphologic patterns have been consistently identified in previous studies. Our data suggest that hand eczema involving the dorsal hand and the fingers, combined with volar wrist involvement, may help identify patients in whom underlying atopic dermatitis is a likely contributing factor. These morphologic clues, combined with thorough medical, family, occupational, and contactant histories, should facilitate a more accurate diagnosis of atopic hand dermatitis.

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