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Clinical manifestations of pediatric psoriasis: Results of a multi-center study in the United States

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Abstract

Background/Objectives—The clinical features of pediatric psoriasis warrant further attention. A national study was completed to determine the prevalence of scalp and nail involvement, and history of guttate psoriasis at onset, according to age, sex, and disease severity.

Materials and Methods—181 children, ages 5 to 17 years, with plaque psoriasis were enrolled in a multi-center, cross-sectional study. Subjects/guardians were asked about a history of scalp and nail involvement and whether the initial presentation was guttate. Peak psoriasis severity was assessed and defined historically as mild psoriasis (MP) or severe psoriasis (SP) according to Physician Global Assessment and Body Surface Area measures.

Results—79.0% (n=143) of subjects reported a history of scalp involvement and 39.2% (n=71) described a history of nail involvement. Boys were less likely than girls to report a history of scalp involvement (OR= 0.40 (0.19-0.84)), but were more likely to have had nail involvement (OR=3.01 (1.62-5.60)). Scalp and nail involvement was not related to psoriasis severity. In contrast, SP subjects (35.9%) more often reported a history of guttate lesions than did MP subjects (21.8%) (p=0.017). Antecedent streptococcal infection was more common in children with guttate vs. plaque psoriasis at onset (p=0.02), but did not correlate with severity.

Conclusions—Gender-related differences in scalp and nail involvement suggest koebnerization. Preceding streptococcal infection predicts guttate morphology but not severity, and initial guttate morphology is associated with eventual greater severity of disease More aggressive monitoring and management should be considered for guttate psoriasis, given its later association with more severe disease.

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Keywords

Pediatrics; psoriasis; nail; scalp; guttate psoriasis; psoriatic arthritis

Introduction

Psoriasis is a chronic, inflammatory skin condition that most commonly presents as the plaque subtype in adults and children (1-3). Few epidemiological studies have been performed in children with psoriasis (4-10) and these investigations have been regional. Furthermore, these studies have found nail involvement to occur in 17-29% (5, 9, 10) and scalp involvement to be present in 18-50% of pediatric psoriasis patients (5, 8-10) A history of preceding infection and presentation with guttate morphology are features more commonly seen in pediatric patients than adults with psoriasis (4, 7), although the reported percentage of children who initially show guttate psoriasis varies from 6.4% (3) to 44% (6). While studies in adults have correlated severity and history of arthritis with scalp and nail involvement, similar investigations have never been completed in children. A multi-center, cross-sectional study was completed to further define the prevalence of associated features of pediatric plaque psoriasis in the United States according to peak disease severity.

Materials and Methods

Children with plaque psoriasis were recruited from among all children who presented to 8 geographically diverse U.S. Dermatology clinics during the study time frame. Children ages 5-17 years with a ≥6 month history of plaque psoriasis, confirmed by a dermatologist, were eligible for enrollment. The study protocol was reviewed and approved by each site's institutional review board (IRB) prior to the completion of any study procedures. Informed consent was obtained from subjects/guardians according to IRB policy at each location. A history of nail and scalp psoriasis and rheumatologist-diagnosed psoriatic arthritis was elicited from subjects. Subjects were also questioned about a family history of psoriasis, preceding streptococcal infection and initial presentation with a guttate morphology.

Children were classified by their severity at its worst as mild (MP) or severe (SP) psoriasis based on historical and, if available, medical record information to determine Physician Global Assessment (PGA)(11) and affected Body Surface Area (BSA). PGA was scored as 0 (none) to 5 (severe). In assessing BSA, each patient's palm represented 1% of total BSA; <5% BSA was designated as mild, 5-10% moderate, and >10% severe (12). PGA of 4-5 was designated as severe psoriasis (SP), and PGA of 1-2 mild psoriasis (MP). A “moderate” score of PGA 3 was designated MP if the BSA was ≤10% and SP if the BSA was >10%. Descriptive statistics are presented as counts and percentages for categorical variables, mean and standard deviations for continuous data, and medians and interquartile range for psoriasis duration. ANOVA or Student's t-test was used for comparisons with $p<0.05$ considered significant. All analyses were run in SASv9.2, Cary, NC.

Results

Between June 2009 and December 2011, 181 children with plaque psoriasis were enrolled; no patient with psoriasis refused to enter the study. Of the subjects enrolled, 78 (43.1%) had mild psoriasis (MP) and 103 (56.9%) had severe psoriasis (SP) (Table 1). The female:male ratio of subjects was 1.48:1. SP subjects were similar to MP subjects in sex, age, and race/ethnicity. Subjects with SP more often required treatment with systemic medications (35.9%) or phototherapy (22.1 %) than did subjects with MP (17.9% and 7.7%, respectively) (both $p < 0.001$).

Scalp involvement occurred at some point in time in 143 subjects (79.0%) and nail involvement was reported in 71 subjects (39.2%). Scalp involvement was described less often in boys than in girls (70% vs. 85%; OR= 0.40 (0.19-0.84)) and was not associated with age (p = 0.655). In contrast, boys more often reported a history of nail involvement than did girls (55% vs. 29%; OR=3.01 (1.62- 5.60)). Nail involvement was not related to age (p = 0.729). While a greater proportion of subjects with SP (43.7%) than MP (33.3%) had a history of nail involvement, this difference was not statistically significant (p=0.300). Similarly, scalp involvement was documented in more subjects with SP (82.5%) than MP (74.4%), but the difference was not significant (p=0.086). Scalp involvement was not associated with nail involvement (p=0.057); scalp psoriasis was described in 72% of subjects with nail involvement, while 84% without nail involvement also had scalp involvement. Psoriatic arthritis was reported overall in 10.5% of subjects, including 12.7% of the children with nail involvement and 9.1% without nail changes (p=0.442). The risk of having arthritis was not related to age, sex, or the severity of the cutaneous psoriasis.

In our cohort, guttate morphology was reported by history in almost 30% of patients and occurred more often at the onset in subjects with SP (35.9%) than in subjects with MP (21.8%) (p=0.017). A precipitating streptococcal infection was noted by 22.1% of all patients, half of whom presented with guttate psoriasis, making streptococcal infection a more common antecedent of guttate vs. plaque psoriasis (p=0.02). However, a precipitating streptococcal infection was not more common in SP (23.3%) than in MP (20.5%) patients (p=0.683). Onset as guttate psoriasis did not have a predilection for age (p=0.345) or sex (p=0.058).

A family history of psoriasis was noted in 51.4% of all children, with affected members being 1st degree relatives (parents or siblings) in 59.8% of those cases. Having a history of psoriasis in either the entire family or in an immediate family member did not correlate with age of onset, severity, sex, subject age, nail or scalp involvement. Guttate psoriasis at onset was more often observed in children with a positive family history (37.6%) than without a family history of psoriasis (21.6%; p<0.018), but was not seen more often when restricted to the immediate family (p=0.217).

Discussion

Using a multi-center study design, we evaluated several specific clinical features in children across the United States according to age, sex and severity. This study is the first to examine the relationship between nail/scalp involvement and patient sex in the pediatric population. In contrast to others, we limited our study to school-aged children (5 years and above) carrying a diagnosis of plaque psoriasis for at least 6 months.

In our cohort, the percentages of patients with a history of nail or scalp psoriasis exceeded those of previous studies (4, 5, 7, 10). Girls reported scalp involvement significantly more often than boys, while boys had nail psoriasis significantly more often than girls. These differences may reflect the Koebner phenomenon in these special sites and suggest the need to tailor treatment according to gender. Regardless, the high frequency of nail and scalp involvement and the emotional and physical impact this may impart emphasizes the need to routinely examine and specifically treat these areas. Recent studies in adults have shown a correlation between nail involvement and severity of skin involvement (13, 14). In our pediatric series, involvement of the nails did not correlate significantly with psoriasis severity or age.

A relationship between nail involvement and psoriatic arthritis in adults has been suggested (13, 15-17) and has been proposed to result from concurrent enthesopathy of the distal

interphalangeal joint and nail matrix (18). Nevertheless, a recent study of 180 adult patients with psoriasis, of whom 30.6% had psoriatic arthritis, did not find a correlation between arthritis and nail changes (19). While nail involvement did not correlate with psoriatic arthritis in our pediatric study, it should be noted that only 10.5% of our patients had psoriatic arthritis, limiting the power of our analysis.

The development of plaque psoriasis in children is often preceded by guttate psoriasis (20, 21), and 29.8% of our cohort had guttate psoriasis at onset. In our study, no correlation was found between guttate psoriasis at onset and the occurrence of nail or scalp disease, subject sex, or age. However, an initial presentation with guttate morphology was the only factor reliably seen more often in SP than in MP subjects, and also was associated with a positive family history of psoriasis. A limitation of the present study is that the reported features of psoriasis and severity designation relied on historical information and, when possible, medical records, leading to the risk of recall bias. In addition, we also did not gather information to further delineate the course of the guttate psoriasis, such as the aggressiveness of treatment or clearance prior to the onset of plaque-type psoriasis. Further studies should address whether the prognosis is worse for children who present with guttate morphology and whether more aggressive initial therapy may be warranted for those with guttate psoriasis. Our finding that a precipitating streptococcal infection is often observed in children with guttate psoriasis but is not more common in eventual SP subjects compared with MP subjects concurs with the discovery by Ko *et al.* that preceding upper respiratory infection and a high anti-streptolysin O titer were more common in subjects with eventual resolution of guttate psoriasis and not in subjects with progression to plaque psoriasis (21). Long-term prospective cohort studies are essential to determine the percentage and features of children with guttate psoriasis at onset who do not progress to plaque involvement and to further determine the natural history of children with guttate psoriasis initially who develop persistent plaque-type psoriasis.

Conclusion

There are notable gender-related differences in scalp and nail involvement in children with psoriasis that further suggest the importance of koebnerization. Preceding streptococcal infection predicts guttate morphology but not severity. Initial guttate morphology is associated with eventual severity of disease, suggesting that early, aggressive treatment of guttate psoriasis may mitigate the eventual severity of psoriasis in children.

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Table 1

Demographic and Clinical Characteristics of U.S. Children with Psoriasis

Demographic	**All children with psoriasis**	**Mild Psoriatic (MP)**	**Severe Psoriatic (SP)**	**p value for MP vs. SP**	**Males**	**Females**	**p value for male vs. female**
N	181	78	103		73	108	
Age, yr. mean (SD)	12.6 (3.6)	12.3 (3.6)	12.8 (3.6)	0.267	12.5 (3.5)	12.6 (3.7)	0.902
Age, yr. median (min, max)	13 (5, 18)	13 (5, 18)	13 (5, 18)		13 (6, 18)	13 (5, 18)	
Male, No. (%)	73 (40.3)	27 (34.6)	46 (44.7)	0.152	-	-	-
Duration of psoriasis, years, median (interquartile range)	5 (2,9)	4 (2,8)	5 (2,9)	0.261	5 (3, 8)	5 (2, 9)	0.531
Race, No. (%)				0.996			0.418
White (non-Hispanic)	110 (60.8)	49 (62.8)	61 (59.2)		48 (65.8)	62 (57.4)	
Asian	22 (12.2)	9 (11.5)	13 (12.6)		11 (15.1)	11 (10.2)	
Hispanic or Latino	33 (18.2)	14 (18.0)	19 (18.5)		9 (12.3)	24 (22.2)	
Black, AA	9 (5.0)	3 (3.9)	6 (5.8)		3 (4.1)	6 (5.6)	
Other	7 (3.9)	3 (3.9)	4 (3.9)		2 (2.7)	5 (4.6)	
Family History of Psoriasis, No. (%)	93 (51.4)	35 (44.9)	58 (56.3)	0.127	41 (56.2)	52 (48.2)	0.290
Clinical Characteristics, No. (%)							
Preceding streptococcus	40 (22.1)	16 (20.5)	24 (23.3)	0.683	18 (24.7)	22 (20.4)	0.465
History of guttate lesions	54 (29.8)	17 (21.8)	37 (35.9)	**0.017**	16 (21.9)	38 (35.2)	0.058
Nail involvement	71 (39.2)	26 (33.3)	45 (43.7)	0.300	40(54.8)	31(28.7)	**0.001**
Scalp involvement	143 (79.0)	58 (74.4)	85 (82.5)	0.086	51(69.9)	92(85.2)	**0.013**
Psoriatic arthritis	19 (10.5)	7 (9.0)	12 (11.7)	0.515	5 (6.9)	14 (13.0)	0.188
Phototherapy[a]	40 (22.1)	6 (7.7)	34 (33.0)	**<0.001**	20 (28.6)	20 (18.9)	0.133
Systemic medications[a]	65 (35.9)	14 (17.9)	51 (49.5)	**<0.001**	30 (42.9)	35 (33.0)	0.186

MP= mild psoriasis; N=number; P=psoriasis; SD=standard deviation; SP=severe psoriasis

[a] Some patients had used both phototherapy and systemic immunosuppressant medications