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Excess Adiposity Precedes Pediatric Psoriasis

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As for adult psoriasis, pediatric psoriasis has recently been associated with obesity, increased waist circumference percentiles and waist-to-height ratios, and metabolic laboratory abnormalities¹⁻³ (Supplemental Table 1). Although obesity could theoretically result from the functional limitations and psychosocial impact of psoriasis, adult females self-reported that obesity developed before psoriasis⁴ and high BMI in adolescent girls preceded psoriasis hospitalization in adults⁵. Whether obesity precedes pediatric psoriasis or psoriasis leads to childhood obesity has not been addressed. In a pilot study with a new cohort, we addressed the temporal association of pediatric psoriasis and increased adiposity in 27 overweight and obese psoriatic children.

Methods (see Supplemental Methods)

BMI percentiles (BMI-pctile) of overweight (85th BMI-pctile <95th) and obese (BMI-pctile ≥ 95th) psoriatic children at 3 pediatric dermatology referral centers were determined at onset of psoriasis, 1 and 2 years before (required for inclusion) and, if available, 1 and 2 years after psoriasis onset.

Results

Of 37 serially-examined and enrolled psoriatic children with excess adiposity, 27 had sufficient datasets from pediatricians to meet inclusion criteria (Table 1); incomplete data reflected lack of an annual check, transfer of pediatrician, and/or lack of pediatrician

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Dr(s). **Becker and Paller** had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Dr. **Paller**; *Analysis and interpretation of data:* Drs. Paller and Becker, and Ms. Bing Bing (Sarah) Weitner, M.S.; *Drafting of the manuscript:* Drs. Becker, Tom, Benjamin, Paller, and Ms. Eshagh; *Critical revision of the manuscript for important intellectual content:* Drs. Becker, Tom, Benjamin, Paller, and Ms. Eshagh; *Statistical analysis:* **Drs. Becker and Paller**; *Obtained funding:* No external funding source; *Administrative, technical, or material support:* **Drs. Paller, Tom, and Benjamin**; *Study supervision:* **Dr. Paller**.

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cooperation. Mean BMI-*ptile* at enrollment was 96.5th, with 29.6% overweight and 70.4% obese. Involved body surface area was greater in obese children (50.0% with BSA>20%, n=9) than in overweight children (16.7% with BSA>20%, n=1) (p=0.001). Overall, 92.6% (25/27) were overweight or obese at onset, and one and two years before onset of psoriasis (Table 1). One (n=24) and 2 (n=22) years after onset, 91.7% and 100%, respectively, were overweight or obese. One of the two patients not overweight/obese at onset showed a steep BMI-*ptile* gain within 1 year after onset (56th to 83rd) and was overweight two years after onset (90th *ptile*); the other increased from 75th (onset) to 94th *ptile* at year and then 95th *ptile* 2 years after onset. Timing of onset of psoriasis vs. excess adiposity did not correlate with being overweight versus obese, birthweight, scalp or nail involvement, history of arthritis, or family history of psoriasis or hyperlipidemia. However, children with a familial obesity developed psoriasis earlier than those without (mean 7.0 vs. 10.3 years at onset, respectively; p=0.02). After psoriasis onset, two subjects showed a decline in BMI-*ptile*, one from 90th to 85th *ptile* and the other from 97th to 94th *ptile*.

Discussion

In our pilot study, being overweight or obese preceded psoriasis by >2 years in 93% of psoriatic children. While chronically elevated circulating pro-inflammatory cytokines (e.g., IL-6 and TNF- α) and adipokines characterize both obesity⁶ and psoriasis, the reason for the delayed psoriasis onset (mean, 4.6 years) remains unclear. We also demonstrate that psoriatic children with increased adiposity have a high percentage of immediate family members with obesity (48%) and psoriasis (41%), which occurs in 34% and 30%, respectively, of children overall with psoriasis¹. Weight loss programs are more successful in children 6-12 years old than adolescents and when healthy diet and physical activity become a family activity. We recommend early lifestyle counseling of psoriasis families (especially with obesity). Whether weight control reduces pediatric psoriasis severity also deserves investigation.

This pilot study was limited by being retrospective. A prospective, collaborative study between local pediatricians and pediatric dermatologists (e.g., the Pediatric Dermatology Research Alliance) is warranted to further address the temporal relationship of psoriasis and obesity. Given the >2 year latency between obesity and psoriasis onset and uncommon occurrence of pediatric psoriasis (<1% of children and <40% having excess adiposity¹), a cohort of >10,000 children in a 5-year longitudinal analysis would be required to capture 27 overweight/obese psoriatic children.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Subject demographic and clinical data (n=27)

Females, no. (%)	14 (56)
Current age (mean yrs. \pm SD), (range)	12.9 \pm 3.3, (4-17)
Birth weight (mean kilograms \pm SD), (range)	3.4 \pm 0.7 (2.5-5.4)
Disease severity	
Mild disease, no. (%)	13 (48.1)
Moderate disease, no. (%)	4 (14.8)
Severe disease, no. (%)	10 (40.7)
Systemic immunosuppressant use, no. (%)	8 (29.6)
Phototherapy, no. (%)	4 (14.8)
Age of onset of psoriasis (mean yrs. \pm SD), (range)	8.7 \pm 3.1, (2-14)
Age of onset of obesity (mean yrs. \pm SD), (range)	4.1 \pm 2.3, (2-12)
Duration of psoriasis (mean yrs. \pm SD), (range)	4.3 \pm 3.1, (0.2-11)
Personal history of psoriasis	
Onset as guttate psoriasis, no. (%)	6 (22.0)
Psoriatic arthritis, no. (%)	2 (7.4)
Scalp involvement, no. (%)	23 (88.9)
Nail involvement, no. (%)	8 (29.6)
Family history	
Psoriasis, no. (%)	11 (40.7)
Obesity, no. (%)	13 (48.1)
Hyperlipidemia, no. (%)	13 (48.1)
BMI percentile, mean \pm SD/ median (n=27)	
2 years prior to psoriasis onset	94.9 \pm 7.7/ 98
1 year prior to psoriasis onset	94.8 \pm 9.2/ 98
At the time of psoriasis onset	95.3 \pm 6.4/ 99
BMI percentile, mean \pm SD/ median (n=25)	
1 year after psoriasis onset	95.5 \pm 5.4/ 97
2 years after psoriasis onset	96.3 \pm 3.6/ 97
Percentage overweight/percentage obese (total) (n=27)	
2 years prior to psoriasis onset	25.9%/ 66.7% (92.6%)
1 year prior to psoriasis onset	25.9%/ 66.7% (92.6%)
Onset of psoriasis	25.9%/ 66.7% (92.6%)
Percentage overweight/percentage obese (total) (n=25)	
1 year after onset	33.3%/ 58.3% (91.6%)
2 years after onset	22.7%/ 77.3% (100%)