

Retrospective Analysis of the Relationship Between Infantile Seborrheic Dermatitis and Atopic Dermatitis

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Abstract: A growing number of dermatologists dispute the existence of infantile seborrheic dermatitis (ISD) as an independent clinical entity. Therefore the aim of the present study was to estimate the epidemiologic features of ISD in a defined population of Greek children, assess its course, and identify associations, if any, with other common dermatoses of childhood. Children from the region of Athens who were examined and diagnosed with typical clinical features of ISD between 1997 and 2011 were included in the study. The relevant data were collected retrospectively from their medical records using a standardized form. Eighty-seven children were enrolled (50 boys, 37 girls; mean age 3.1 mos at the time of ISD diagnosis). The main body areas affected were the scalp and face for the majority of the children (78/87), whereas the trunk and limbs were less frequently involved (9/87). In all cases, erythema and scaling of affected patients were mild to moderate. Forty-nine of the 87 children were followed up over a period of 5 years. Thirty children in this group developed features of atopic dermatitis (AD) at a later stage, according to the UK diagnostic criteria of AD, and 23 of these children were diagnosed with AD, at an average time interval of 6.4 months from ISD onset, and seven presented with clinical features of AD at the time of ISD diagnosis. The remaining 19 children in the follow-up group progressed without developing any other chronic skin disease, and all recovered within 6 months of its onset. Thirty-eight had no further follow-up after their initial ISD diagnosis. In spite of the lack of information on the disease course for the last group, assuming they all recovered, the prevalence of AD (34.4%) in our ISD sample was significantly higher than the prevalence of AD (10.7%) in the general population for the same age group, as shown in a previous study performed in the municipality of Athens ($p < 0.001$). A significant number of children were found to develop AD shortly after their ISD diagnosis. This finding demonstrates a strong association in the clinical course between the two diseases or indicates that the two

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diseases may be in the same clinical spectrum. Further epidemiologic studies must be conducted to assess the significance of this finding.

Infantile seborrheic dermatitis (ISD) is a common pediatric inflammatory dermatosis of unknown origin that refers mostly to a self-limiting erythematous, scaly, or crusting eruption. ISD occurs primarily in the so-called seborrheic areas, namely the scalp, face, postauricular, presternal, and intertriginous areas (1,2). The prevalence of the disease is 3% to 5% of the general population, with a slight male predominance and two age peaks: infant and adult (3). ISD appears at between 2 and 10 weeks of age, peaks in incidence at 3 months of age, and usually resolves spontaneously by 12 months of age (4,5).

The etiology of ISD is not completely understood, but hormonal changes, fungal infections, particularly the *Malassezia* species, nutritional deficits, and neurogenic factors have all been associated with this condition (6).

There is a significant overlap of the clinical features of ISD, atopic dermatitis (AD), and psoriasis in infancy, and it can be difficult to differentiate among them, particularly during the initial disease stages, based solely on the clinical manifestations, as there is not a characteristic pathognomonic sign or laboratory test to establish the correct diagnosis (7). Therefore dermatologists have increasingly debated whether it should be considered a separate clinical entity or a transient condition evolving into other well-described forms of pediatric papulosquamous skin diseases such as AD or psoriasis (8).

The aim of the present study was to estimate the epidemiologic features of ISD in a defined population of Greek children, describe the clinical manifestations of this condition, assess the course, and identify associations, if any, with other common dermatoses of childhood.

MATERIALS AND METHODS

A standardized form was completed retrospectively with patient information and clinical details. These patients were located in the Athens region. Eighty-seven children who were examined and diagnosed with typical clinical features of ISD between 1997 and 2011 were included in the study. These children had skin lesions with a morphologic pattern of ISD manifestations at the time of the initial diagnosis (9). In particular, all infants' clinical features fully

met the Beare and Rook (10) diagnostic criteria for ISD, namely, early onset (before 6 mos of age); erythema with scales or crusts in the eyebrows, scalp, diaper, and flexural areas; and the absence of pruritus. We were able to review and reassess the course of ISD in this group of infants because most of them were seen on a number of occasions after their initial ISD diagnosis for evaluation of the progress of their ISD or other skin conditions that developed.

The same physician diagnosed and further reviewed these children, providing a high degree of reliability in the diagnosis and reassessing their future progress. A definite diagnosis of AD was made only if the patients satisfied the UK working party diagnostic criteria for AD (11). A positive family history of atopy was recorded when one or more first- or second-degree relatives had asthma, eczema, or allergic rhinitis. The chi-square test was used to determine the presence of significant differences between groups, where $p < 0.05$ was considered statistically significant.

RESULTS

We included 50 boys and 37 girls with a mean age of 3.1 months at the time of ISD diagnosis. A family history of atopy was documented in 29 children (33.3%). The main sites of ISD involvement were the scalp or face in 78 of the children. The face or the scalp as the only site of involvement was found in 42 children, the diaper area or the flexures of the limbs alone was found in 9, and 36 presented with mixed skin lesions covering the scalp, trunk, and limbs (Table 1).

Erythema and scaling of affected patients were mild to moderate. Forty-nine children (56.3%) were followed up and reviewed over 4.8 ± 1.3 years. These children sought medical attention because their symptoms persisted or deteriorated or for various other skin conditions (e.g., pigmented nevi assessment, skin infections, urticaria), so we had the opportunity to reevaluate their initial ISD diagnosis and follow its course. Thirty children (34.4%) in our sample later developed AD features according to the UK working party diagnostic criteria for AD; 23 of these were diagnosed with AD an average of 6.4 months after ISD onset, whereas 7 presented with clinical features

TABLE 1. ISD Sample Data

Patient no.	Sex	Age at first visit (mos)	Follow-up (yrs)	Site of lesions	Family atopy history	Outcome
1	Male	2	5	Scalp and face	Mother/asthma	AD
2	Male	6	6	Face and trunk		Improvement
3	Female	3	6.5	Face		AD
4	Male	2.5	4.8	Scalp	Older brother/eczema	Improvement
5	Female	2.5	None	Face and neck		
6	Male	3	None	Scalp and face		
7	Male	2.5	4.5	Scalp	Father/allergic rhinitis	Improvement
8	Male	3	None	Scalp		
9	Female	4	None	Scalp and trunk		
10	Male	3	None	Scalp		
11	Male	4	5.5	Diaper	Mother and grandmother/asthma	AD
12	Male	1.5	None	Scalp and face	Mother/eczema	
13	Male	2	5	Neck and limbs	Father/allergic rhinitis	AD
14	Female	3	6.5	Face	Mother and allergic rhinitis	AD
15	Female	2	4.2	Trunk and limbs		AD
16	Female	3	None	Scalp		
17	Male	1.5	5.5	Face and trunk	Father and mother/allergic rhinitis	AD
18	Male	2	4.8	Face		AD
19	Male	6	6.5	Scalp and limbs		AD + ISD
20	Male	5	7	Face and trunk	Father/asthma	AD + ISD
21	Female	2	None	Face		
22	Male	3	4.5	Scalp and face		AD
23	Male	5.5	None	Scalp and neck		
24	Female	4	4.8	Neck and limbs	Mother/eczema	AD
25	Male	4	7	Scalp		AD
26	Male	2	None	Face		
27	Male	1.5	4	Scalp, face, and limbs	Older sister/asthma	Improvement
28	Female	5	4.2	Scalp		Improvement
29	Female	3.5	4.5	Limbs and trunk		AD
30	Female	6	6.5	Face and limbs		AD + ISD
31	Female	5	5.5	Scalp and face		Improvement
32	Male	5.5	None	Scalp, face, and neck		
33	Male	1.5	4.2	Neck and limbs	Grandfather/eczema	Improvement
34	Female	5	None	Face and trunk		
35	Female	3	5	Scalp and trunk	Father and mother/allergic rhinitis	AD + ISD
36	Male	4	None	Scalp and neck		
37	Female	3	3.5	Scalp	Father/asthma	AD
38	Male	2	None	Face and trunk	Father/eczema	
39	Female	2.5	None	Face		
40	Male	5	4	Scalp		AD
41	Female	2	4.5	Neck and limbs	Father and mother/asthma	Improvement
42	Male	3	0.75	Face and neck	Mother/eczema	Improvement
43	Male	3.5	6	Scalp		AD
44	Male	1	None	Face		
45	Male	4.5	3.8	Scalp and face		Improvement
46	Male	3	5.5	Scalp		Improvement
47	Female	3	None	Limbs		
48	Female	2.5	None	Face and trunk	Mother/allergic rhinitis	
49	Female	4	None	Scalp, neck, and limbs		
50	Male	3.5	5	Scalp and limbs		AD + ISD
51	Male	4.5	None	Face and limbs		
52	Female	1.5	None	Scalp		
53	Male	4	6.5	Scalp and trunk		AD
54	Male	2.5	4.2	Scalp and face		Improvement
55	Male	4	None	Diaper		
56	Female	4.5	6	Face	Father/allergic rhinitis; brother/asthma	AD
57	Male	3	4.5	Scalp and face	Father and mother/eczema	AD
58	Male	1.5	5	Face	Father/allergic rhinitis	AD
59	Male	2.5	None	V		
60	Female	6	3.5	V		Improvement
61	Female	4.5	None	Scalp and face	Mother/asthma and allergic rhinitis	
62	Female	3	None	Scalp and limbs		
63	Male	1.5	4.5	Face and trunk		AD

TABLE 1. *Continued*

Patient no.	Sex	Age at first visit (mos)	Follow-up (yrs)	Site of lesions	Family atopy history	Outcome
64	Male	2.5	None	Scalp, face, and trunk		
65	Female	1.5	None	Scalp and limbs		
66	Female	2.5	None	Scalp and limbs		
67	Female	2	None	Scalp		
68	Male	5	6	Scalp and limbs	Mother/eczema	AD
69	Male	1.5	None	Scalp and face		
70	Female	2	4.5	Scalp and face	Mother/allergic rhinitis	AD
71	Female	3.5	None	Scalp	Mother/asthma	
72	Male	4	None	Scalp, face, and trunk		
73	Female	2	4.2	Scalp and face		Improvement
74	Male	2	None	Scalp and face	Mother/asthma	
75	Female	2	4.8	Face		Improvement
76	Male	1.5	3.5	Scalp and trunk		Improvement
77	Male	4	None	Scalp and face		
78	Male	5	None	Scalp and trunk		
79	Female	2	4.5	Scalp and face	Father/eczema	Improvement
80	Female	1.5	None	Scalp and trunk		
81	Female	1	None	Face and trunk		
82	Male	1.5	3.5	Face		Improvement
83	Male	3.5	None	Scalp and trunk		
84	Female	5	6.2	Face and trunk	Father/allergic rhinitis	AD + ISD
85	Male	4	0.67	Scalp and trunk		Improvement
86	Male	3.5	5.5	Face and trunk		AD + ISD
87	Female	1	3.5	Scalp and limbs	Older brother/eczema	AD

of AD at the same time as the ISD diagnosis. The remaining 19 children, who had been closely followed up for their ISD, progressed without developing any other chronic skin disease, and they all recovered from ISD within 6 months of its onset. None of the children developed psoriasis. Although 38 children in our study had no follow-up after their initial diagnosis, the prevalence of AD (34.4%) in our ISD sample was still significantly higher than the prevalence of AD in the general population for the same age group in the same region (10.7%, $p < 0.001$) (12).

DISCUSSION

The relationship between ISD and AD is controversial. Some authors have proposed using the term ISD as an umbrella encompassing unrelated diseases (13). Other authors consider ISD to be a clinical variant that precedes the development of AD. This group seems to believe that ISD coexists from the early stages of its manifestation or slowly evolves with time into other, more common forms of skin diseases such as AD when the production of sebum decreases and the scratch reflex of infants matures (14).

This has been the object of several previous studies that have retrospectively or prospectively attempted to establish a causative link between the two clinical entities or categorized them as different variants along

the same clinical spectrum. The common sites of involvement with regard to the initial clinical presentation, the onset of symptoms early in life, and the lack of pruritus in very young children with ISD and AD raise diagnostic obstacles in the differential diagnosis of these conditions.

In our study, the eruption of ISD started for the majority of children on the vertex of the scalp and the central areas of the face, namely the eyebrows and nasolabial folds. The diaper area as the only site of eruption was found in only two children. Although involvement of only the diaper area is regarded as a characteristic feature favoring the diagnosis of psoriasisiform ISD (15), only a minority of the infants in our study presented with this feature. We considered the diagnosis of diaper psoriasis for these two patients when symptoms first presented, but the negative family history was not supportive of our initial clinical diagnosis. The first patient developed AD after 5.5 years and the second patient was never followed up to determine what his disease eventually developed into.

Our study also indicated a remarkably short period of time (on average, 6.4 mos) for the 23 children diagnosed with ISD who later developed AD. This finding could be of great predictive value in studying the course of ISD and its potential associations with AD. No other research has highlighted this link.

Additionally, we diagnosed seven children with early clinical features of ISD and AD that could not be clearly identified as either condition. The fact that the distinction between ISD and AD was not clear for this group shows the strong association or coexistence of the two diseases.

A family history of atopy in our ISD sample was found to be positive in 29 children (33%), which was significantly higher than the general population (12%) and close to the percentage reported for children with AD, as shown in previous reports (16). This finding demonstrates the strong association between ISD and AD and supports their common origin as many dermatologists claim.

A review of the existing literature shows that there are some conflicting conclusions regarding the natural course of ISD. Mimouni et al (17), after a long follow-up period in children with ISD, found that only a small percentage of them later developed other skin conditions. This study included 88 children; 10 years after their initial assessment only 7 had seborrheic dermatitis, 1 had psoriasis, and 5 developed only AD (5.6%). In contrast, Podmore et al (16) followed infants diagnosed with ISD for 10 to 14 years and found that 19% of them eventually developed features of AD. Menni et al (18), after 7 years of follow-up in 72 children with ISD, found that 11 (15%) developed AD. Neville and Finn (19) identified a series of patients in which a higher percentage of children with ISD was found to later develop AD than in the previous studies; 40 patients were followed for a 5- to 13-year period, and 15 (40%) developed AD.

In agreement with Neville and Finn, our findings indicated that a significant number of children (34.4%) who were initially diagnosed with ISD eventually developed AD features. The prevalence of AD estimated in our sample was statistically significantly greater than that in the general pediatric population of the same region and age group, as shown in a previous study of Kakourou et al (12) in the Athens region (34.4% vs 10.7%, $p < 0.001$).

Moreover, 49 (56.3%) children were followed up over 4.8 years, which allowed reliable conclusions about the course of their disease. Therefore, because of the large number of children in our study and the 4.8-year follow-up, reliable clinical observations on the course of ISD were possible and a significant association between ISD and ASD was shown.

Additionally, if one takes into consideration that 38 children in our study had no follow-up or were young enough to present AD features at the time we conducted our study, it is likely that the 34.4%

prevalence could be greater, establishing a stronger association between the diseases than indicated.

Seven children presented with clinical features of ISD and AD at the time of the initial diagnosis, making the distinction between the two entities difficult. Furthermore, a significant number of children diagnosed with ISD, which was remarkably higher than in the general population, developed AD features in a short period of time. None of the children developed psoriasis during follow-up, although they might develop it later. Our study also shows that it is sometimes difficult to diagnose ISD in the early stages because it shares clinical features with other well-described eczematous infantile skin diseases, so a "wait-and-see" policy should be applied until a clearer clinical picture develops.

In conclusion, major epidemiologic studies should be prospectively planned and conducted to allow definite conclusions regarding the existence, course, and associations of ISD.

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