The use of scorad index in clinical assessment of atopic dermatitis in children

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Abstract

Atopic dermatitis (AD) is a chronic inflammatory disease of the skin that occurs in persons of all ages but is more common in children. To determine the use of scorad index in clinical assessment of atopic dermatitis in childen, a descriptive study carried on pediatric patients visiting asthma and allergy center and department of dermatology in Tikrit Teaching Hospital from March 2007 to August 2007. At enrolment, they all underwent; full history, clinical examination, blood sampling; Total WBC count, eosinophil cells count (100), total serum IgE level (32) were determined. This study includes (100) patients with AD; 58 cases (58%) males and 42 cases (42%) females. Most of the patients get the AD in the first year of life, 62 cases (62%). The family history is positive in, 84 cases (84%). Most of the patients develop mild AD, 52 cases (52%). There was significant association between severity of AD according to scorad index (S.I) and type of infant feeding, the mean severity score (S.S) for the breast feeding (B.F) children were (21.48+4.96), while the mean S.S for the formula fed (F.F) children were (35.70+9.79). There was significant association between the age of onset of patients and type of infant feeding, the mean age of onset for the breast fed patients were (22+16.21), while the mean age of onset for the formula fed patients were (12.3+12.86).). There was significant association between severity of AD and the family history, the mean S.S for the AD patients with strong positive family history was (37.3+ 11.84), while the mean S.S of AD patients with negative family history was (22.6 + 5.12). There was significant association between the hematological parameter of disease activity (total serum IgE, eosinophil count) and clinical activity(severity) of the disease measured by scorad index. Conclusion the study highly recommends the use of scorad index in clinical assessment of children with topic dermatitis.

Introduction :

Atopic dermatitis (AD) is a chronic inflammatory skin disease that occurs with a peak onset in infancy and the majority of cases presenting in the first few years of life.(1) The condition is characterized by intense pruritus and a course marked by exacerbations and remissions.(2) AD is an itchy, relapsing and recurring skin disease which predominantly affects infants and children. The rash of AD is not in itself particularly distinctive. It consists of red elevated, scaly, and often excoriated and oozing plaques (3)It is a familial and chronic disease and its symptoms can increase or disappear over time. There is no cure for it, but its symptoms can be managed with various treatments.(4)

The pathogenesis of the disease is still not clear. Current speculation rests on the presence of immunologic maturational defect involving T-suppressor cells that allows for relatively unopposed IgE synthesis. Genetic and environmental factors induce a complex series of cellular interactions leading to the symptoms and signs of AD (5,6) Hanifin and Rajka proposed major and minor criteria based on their clinical experience.To diagnosis of AD we must have 3 or more of these major features plus three or more of minor feature.(7)

1. The major features are:1. Pruritus. 2. Typical morphology and distribution: A. Flexural Lichenification or linearity in adults. B. Facial and extensor involvement in infant and children. 3. Chronic or

chronically relapsing dermatitis. 4. Personal or family history of atopy (asthma, allergic rhinitis, AD).

2.The minor features are:

1.Xerosis.
2.Ichthyosis/ Palmer hyper linearity/ Keratosis pilaris.
3.Immediate (type I) skin test reactivity.
4.Elevated serum IgE.
5.Early age of onset.
6.Tendency toward coetaneous infection/ impaired cell-mediated immunity.
7.Tendency toward nonspecific hand or foot dermatitis.
8.Nippleeczema.
9.Cheilitis.
10.Recurrent conjunctivitis.
11.Dennie-Morgan infraorbital fold.
12. Keratoconus .
13.Anterior sub capsular cataracts.
14.Orbital darkening.
15.Facial pallor/facial erythema.
16.Pityriasis alba.
17.Anterior neck folds.
18.Itch when sweating.
19.Intolerance to wool and lipid solvents.
20.Perifollicular accentuation.
21.Food allergy.
22.Course influenced by environmental / emotional factors.
23.White dermographism / delayed blanch. Atopic dermatitis diagnostic criteria in infancy (8)

1. The Major features are: Pruritic dermatitis.Typical facial or extensor eczematous or lichenified dermatitis. Family history of atopy (asthma, allergic rhinitis, AD).

2.The Minor features are:Xerosis/Ichthyosis/hyper linear palms.Perfollicular accentuation. Chronic scalp scaling.The scorad index: Clinical evaluation (9)

AD is a chronically developing dermatitis currently treated symptomatically. The improvement in therapeutic care requires objective evaluation of the severity of Cutaneous lesions at a given time.(9)

1.Extent criteria: (A)The rule of 9 before the age of 2 year (appendix 2), The rule of 9 in adults and older children (appendix 3), Grading in practice: It is advisable to draw lesion spread directly on the evaluation sheet and then perform the calculation.

2.Intensity criteria assessed clinically : (B) Erythema : stage 1 / stage 2 / stage 3 Edema / papulation : stage 1 / stage 2 / stage 3 , Oozing / crusting : stage 1 / stage 2 / stage 3 , Excoriation : stage 1 / stage 2 / stage 3 , Lichenification : stage 1 / stag0e 2 / stage 3 , Xerosis : stage 1 / stage 2 / stage 3

3.Subjective symptoms: (C) The two most representative items concerning the quality of life of patients are : Pruritus : 0-10, Insomnia : 0-10

4.Total score : SCORAD calculation: A/5 + 7.B/2 + C, A = SPREAD.../100, B = INTENSITY.../18, C = SUBJECTIVE SYMPTOMS.../20, Mild < 25 < moderate < 50 < sever

Based on 88 cases from 5 centers, criteria were weighted using the mathematical model of main component analysis. It was thus determined that intensity represents around 60 %, spread 20 % and subjective signs 20 % of the total score.(10)

Increase number of eosinophils and the total IgE level in blood are frequently present in a variety of allergic condition especially in atopic disorder.(3)

Patients and methods

A descriptive study which was carried on pediatric patients visiting department of Dermatology and Allergy Center in Tikrit Teaching Hospital from March 2007 to August 2007. This study included 100 patients with atopic dermatitis of both sexes. All the patients met the diagnostic criteria for atopic dermatitis, as defined by Hanifin and Rajka(7). None of these patients had received antihistamines, or systemic or topical corticosteroids during the period of 3 weeks before clinical evaluation. Each patient is assessed by full history and physical examination . The data was obtained through a questionnaire for each child included the following information: age , age of onset of the disease, gender, feeding history, sleep disturbance, exacerbation and remission, aggravating and reliving factors personal or family history of atopic diseases ,early feeding method ,history of recurrent development of one or more of the condition present in the lest of diagnostic criteria of atopic dermatitis.

Each patient is examined for: General examination (chest, face, color, eyes, nose, neck, hands, foots) . Local examination includes the skin lesions site, size, types; xerosis, erythema, edema, papulation, oozing, crusting, excoriation, ichenifecation.

The severity of atopic dermatitis was measured by using the Scorad index. AD was considered mild, moderate, and severe forms in which the Scorad index was less than 25, between 25 and 5 0and more than 50 respectively.(9)

The diagnosis of atopic dermatitis depends on history and clinical examination and supported by differential white blood cell (WBC) cells count, eosinophil cell count and total serum IgE level. The inclusion criteria:1.Age of the child less than 18 years.2. The child must have 3 or more major features plus 3 or more minor features.(7)

Investigations: Each patient included in the study sent for:

1. Total White blood cells count. It is normally ranged 4-11x 109/L. 2.White blood cells differential count with eosinophil count. Considered eosinophil cell count of more than 450 cell/ µL as pathological. 3. Total serum IgE level: Total serum IgE was determined by enzyme linked immunosorbant assay kit (Biomagreb). The total serum IgE microplates ELISA kit is two sites enzyme linked immunosorbant assay for quantitive determination of total serum IgE level. Total serum IgE level were determined in 32 sera of AD patients. considered a serum value of more than 200 IU /ml as appositive for high total serum IgE level. The result were arranged in figures and tables and given as mean ± SD. Values and data were analyzed using SPSS version (11). The difference between the study's groups were tested by using (ANOVA, Chi- square). P < 0.05 was considered as statistically significant.

RESULTS

The total number of the cases included in the study were 100 cases. most of the patients were males, 58 cases (58%) while the rest, 42 case (42%) were females as shown in figure (1). Most of the patients get the AD in the first year of life, 62 cases (62%) while, 38 cases (38%) get the disease after that as shown in Fig.(2). This study reveal that, 42 cases (42%) were B.F while, 42 cases (42%) were formula fed and, 16 cases (16%) were mixed type of feeding as shown in Table (1) . Most of the patients had positive (positive, strong positive) family history, 84 cases (84%) while, 16 cases (16%) with negative family history as shown in Table (2). Most of the patients, 52 cases (52%) had mild disease, 38 cases (38%) had moderate disease and, 10 cases (10%) had severe disease as shown in Table (3).

The mean S.S for the B.F patients were (21.48+4.96), the mean S.S for the mixed type of feeding were (33.34+12.92) while the mean S.S for the formula fed patients were (35.7 +9.7) as shown in Table (4). p value =0.000 (significant).

The mean age of onset of B.F patients were (22+16.21) months and the mean age of onset for the mixed fed patients were (18.4+ 11.84) months while the mean the mean age of onset for the formula fed patient were (12.3+12.86) months as shown in Table (5). P value=0.009 (significant).
The mean S.S for patients with strong positive family history were (37.3+ 11.84), the mean S.S for patients with positive family history were (24.31+6.13) while for the negative family history were (22.56 + 5.12) as shown in Table (6). P value = < 0.001(significant) .The mean IgE level for the mild cases were (240.5+179.4) IU/ml, the mean IgE level for the moderate cases were (508.8+259.7) IU/ml while the mean IgE level for the severe cases were (839.1+307.3) IU/ml as shown in Table (7). P value< 0.001
The mean eosinophil count for the mild cases were (390.38+184.69) cell/µL, the mean eosinophil count for the moderate cases were (646.05+248.30) cell /µL, while the mean eosinophil count for the severe cases were (860+157.97) cell /µL as shown in Table (8). P value< 0.001.

Discussion

Atopic dermatitis is a distressing inflammatory skin disease affecting large number of children worldwide, with its variable clinical presentations and course

(12) This study shows that most of the patients were males, . This goes with Adriana that shows 41.3% of AD patients were females and 58.7% were males. (96) It is well known fact that both sex are affected, but in adults the disease is more common in females, while in children, atopic dermatitis is more in males.(13) Male gender, and family history of atopy, were associated with increased risk of AD in the first 6 months of life. These findings suggest that the genetic and perinatal influences are important for this difference in both genders.(14) There is no clear reason for this deference; in that it is more common in males in childhood while it is more common in females in adulthood. Yet, in adulthood, this is may be due to repeated exposure of the females to irritant house hold materials.

Most of the study cases develop AD in the first year of life . This goes with another study by Wurthrich(15) who shows that 60% of patients develop AD within the first year of life and 85% by age of 5 year. Approximately, 50% of patients develop symptoms in the first year of life. Another 30% develop symptoms between the ages of 1 and 5 years.(16) This may be due to reason that the family of an AD child consult the doctor early in the disease especially in families with positive history of allergy or AD so that they aware of the early symptoms and signs of the disease and to the fact that the infant who genetically has the disease, starts to have symptoms of AD once they exposed to the aggravating environmental factors and this may occur early in life.

Family history of atopy were positive in most of the cases . Strong positive family history were present in 43% of the total patients. This is agrees with what found by Blumenthal(17) who shows that most of the cases with AD have positive family history. This may be due to the fact that AD is an inherited disease that runs in families but there is no clear way of inheritance and this explains why clinically normal parents may have affected children, which excludes simple dominant inheritance. On the other hand, in other families both parents may be affected but the children are normal excluding a simple recessive trait.(18)

Most of the study cases had mild disease. This goes with most of the population-based studies that report that most of the AD populations have mild disease.(19,20) This may be due to that most of the patients present early in the disease so that they start treatment early and take the precautions measures to prevent any acute exacerbation or make the attack milder.

Regarding the mean severity score according to feeding history, the mean S.S for the B.F patients were (21.49+4.97), the mean S.S for the mixed fed patients were (33.34+12.92) while the mean S.S for the formula fed patients were (35.70+ 9.79). These results are going with another study by Host(101) which shows that B.F has the ability to modifying the diseases severity. Typically, (BF) can decrease the severity of AD, but can not prevent its occurrence. It is widely recommended for the first 4–6 months. Human colostrums/milk facilitates maturation of the gut and provides passive protection against infectious agents and antigens.(21) Saarinen reports also that the intensity of the manifestations of atopy were softened in children who were B.F for the first 6 months compared with children who were not B.F or who were B.F but for shorter periods of time (up to 2 months).(22)

Exclusive B.F is a protective factor for development of AD if compared with conventional cow's milk formula.(23) This protective effect may be related to the fact that allergic conditions in children are often related to food sensitivity, and B.F helps to ensure the right amount of healthy bacteria in the gut; something that will help improve digestion and reduce the risk of undigested food leaking through the gut wall.(24,25)

The mean age of onset of B.F patients were higher than that for the mixed fed patients , this goes with Ponsonby(26) who shows that B.F patients had a later onset of disease than those patients who were formula fed who have an earlier onset of the disease. Breast feeding seems to have a preventive effect on the early development of allergic disease that is; asthma, AD, and suspected allergic rhinitis, up to 2 years of age. This protective effect was also evident for multiple allergic disease.(27) This delay in onset of AD may be due to the delay of the exposure of the child to cows milk

allergens or due to the possible protective effect of the breast milk against AD.

According to S.I by which we can assess the relation of the S.S with the family history, most of the study patients with negative family history get mild AD, while most of the patients with strong positive family history get moderate AD. All the severe cases of AD have strong family history. With regard to the mean S.S according to family history, the mean S.S for patients with strong positive family history were (37.3+ 11.84) while for the negative family history were (22. 6 + 5.12). This agree with other study by Elda that shows that the family history of AD was found to be the strongest risk factor for AD.(23)

Egyptian study done by Enayat founded that Arg551 allele acts as an atopy susceptibility gene, as the allele frequency for Arg551 allele was 45% in AD group compared with 10% in the control group.(28) This is due to the fact that atopic dermatitis is a genetic disease and the fact that it is multifactorial, inheritance characterized by increase risk of the disease with the number of the patients in the family

With regard to the mean total serum IgE level according to severity of the disease , the mean IgE for the mild cases were lower than that for the moderate and sever cases . This goes with another studies by Jones that shows some positive relation between the severity of AD and the total serum IgE levels.(29)

Other studies,(30,31) have also reported a significant relation between atopic dermatitis severity and total serum IgE levels. On the other hand, Wolf (32) has found that 20% of the patients with severe atopic disease have normal or subnormal serum total IgE levels, and that the severity of the disease does not always correlate with total serum IgE level. These findings do not reduce the importance of this antibody in the onset of the illness. A possibility is suggested here that even low IgE concentrations are capable of playing a key role in the pathogenesis of the disease, and being directly responsible for its clinical manifestations.

Regarding the Mean eosinophil cell count according to severity, the mean eosinophil count for the mild cases were lower than that for the moderate and sever cases . Eosinophil level is roughly correlated with disease severity. Eosinophils are believed to be of major importance as effecter cells mediating the pathogenetically relevant late-phase reaction which is associated with a significant destruction of the surrounding tissue. Accordingly, a significant preactivation of peripheral blood eosinophils was detected in AD patients, leading to an enhanced susceptibility of these cells to distinct stimuli such as IL-5. Toxic proteins, such as (ECP), contained in the matrix and the core of secondary granules of eosinophils, may play an important role by propagating the allergic inflammatory process and by modulating the immune response.

Conclusions

The use of scorad index can be used successfult in assessing the severity of atopic dermatitis.

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Tab.(1) Sample distribution according to the feeding history.

feeding history	Frequency	Percent(%)
B.F	42	42%
mixed	16	16%
formula	42	42%
Total	100	100%

Tab.(2) Sample distribution according to the presence of family history.

family history	Frequency	Percent(%)
Positive	43	43%
Strong positive	41	41%
negative	16	16%
Total	100	100%

Tab.(3) Sample distribution according to the severity of the disease .

Severity	Frequency	Percent(%)
Mild	52	52%
Moderate	38	38%
Severe	10	10%
Total	100	100%

Table(4) The mean severity score according to feeding history.

Feeding history	severity score		
	N	Mean	Std. Deviation
B.F	42	21.48	4.96
mixed	16	33.34	12.9
formula	42	35.70	9.79
Total	100	29.35	11.0

P value =0.000 (significant) BF(breast feeding)

Tab(5). Sample distribution according to the mean age of onset and feeding history.

Feeding history	Age of onset		
	No.	Mean	Std. Deviation
B.F	42	22	16.2
Mixed	16	18.4	11.84
Formula	42	12.3	12.86
Total	100	17.35	14.79

Age of onset in months No.(number)

P value= 0.009(significant)

Table(6) The mean severity score according to family history of atopic diseases.

severity family history	No.	Mean	Std. Deviation
positive	43	24.31	6.13
Strong	41	37.29	11.84
negative	16	22.56	5.12
Total	100	29.36	11.01

. NO.(number) P value= <0.001(significant)

Tab.(7) The Mean total serum IgE level according to severity of the diseases .

severity	IgE level I.U		
	No.	Mean	Std. Deviation
mild	16	240.5	179.4
moderate	9	508.8	259.7
severe	7	839.1	307.4
Total	32	446.9	330.3

P value< 0.001 NO.(number)

Tab.(8) The Mean eosinophil cells count according to severity of the disease.

severity	Eosinophil cell count		
	No.	Mean	Std. Deviation
mild	52	390.38	184.69
moderate	38	646.05	248.30
sever	10	860	157.97
Total	100	534.5	263.19

P value< 0.001 NO.(number)