Content available at: iponlinejournal.com

IP Indian Journal of Clinical and Experimental Dermatology

Journal homepage: www.innovativepublication.com

Original Research Article

A study on clinical pattern and immunological aspect of atopic dermatitis

Preetham S[1,*], Raghavendra S Tophakhane[2], Shobha Nadgir[3]

[1]*Dept. of Dermatology, Venereology & Leprosy, ESI Post Graduate Institute of Medical Science and Research, Bengaluru, Karnataka, India*
[2]*Dept. of Dermatology, Venereology & Leprosy, Karnataka Institute of Medical Sciences, Hubli, Karnataka, India*
[3]*Dept. of Microbiology, Karnataka Institute of Medical Sciences, Bengaluru, Karnataka, India*

ARTICLE INFO

Article history:
Received 29-01-2020
Accepted 03-02-2020
Available online 21-04-2020

Keywords:
Atopic dermatitis
Eczema
IgE level
Atopy

ABSTRACT

Introduction: The main features of atopic dermatitis or eczema are skin barrier disturbance and immune dysregulation. Milder form of Atopic dermatitis (AD) is reported to occur in India. There is demonstrable association between Serum IgE and AD.
Aim: To find out the clinical pattern of AD cases and to determine Serum IgE levels.
Materials and Methods: A cross-sectional study done among 80 subjects (50 cases and 30 controls) in Department of Dermatology, Venereology and Leprosy (DVL) outpatient department (OPD) of KIMS, Hospital, Hubli, Karnataka. AD cases and controls were selected as per the Hanifin and Rajka's criteria and Serum IgE levels was as per the Clinical and Laboratory standards 2008.
Statistical analysis: Collected data was analysed for frequency, percentage, mean, standard deviation, Chisquare test and Karl- Pearsons Correlation coefficient.
Results: Twenty two (44%) cases had elevated IgE levels. The mean IgE in AD cases was 186.78±170.50IU and in controls were 24.7±19.3IU. The association between less than 2 years age and increase in IgE levels among AD cases was statistically significant ($p<0.0001$). Less than 2 years age group presented with lesions commonly on the face and extensors of extremities (83.4%), whereas children between 2-12 years and above mostly had lesions on flexor aspect of their extremities.
Conclusion: IgE levels were higher among younger children compared to older children and adults and the commonly involved areas are face and extensors in young children. So IgE levels may be helpful as a predictor of atopic dermatitis in less than 2 years age group.

1. Introduction

The prevalence of allergic diseases is increasing globally, with about 30% to 40% of the world population affected by one or more allergic conditions.[1,2] India too has seen a rising trend in atopic dermatitis in last 4 decades.[3,4] Many factors like sociodemographic, diet, environmental pollution and climatic change has been attributed to this rise.[4–7] The severity of lesions are more in those who have developed the disease early in life.[5–7] Serum IgE levels varies with age, gender and geographic location.6 Studies in India on AD of children and adults and its relation to IgE is very less. Hence it was necessary to conduct a study on IgE levels in our Indian population.[4,7–9]

The objectives of this study are:

1. To find out the clinical pattern of the atopic dermatitis
2. To determine the IgE levels in study subjects.

2. Materials and Methods

This hospital based cross-sectional study was conducted in the Department of Dermatology, Venereology & Leprosy (DVL), KIMS, Hubli, Karnataka. A total number of 80 subjects were studied of which 50 were cases and 30 controls. Cases and controls were identified as

* *Corresponding author*.
E-mail address: preetham.1975s@gmail.com (Preetham S).

https://doi.org/10.18231/j.ijced.2020.006

per the Hanifin and Rajka's criteria.[10] Muco-cutaneous examination was done as per routine examination protocol. Matching of cases and controls was done. Blinding of the investigators involved in haematological testing was done to prevent bias. Three ml of EDTA blood was used for complete hemogram, absolute eosinophil count and 2 ml blood was allowed to stand for 30 minutes, centrifuged for 10 minutes and serum sample was used for estimation of IgE by ELISA method by THERMO FISHER SCIENTIFIC INVITROGEN IgE Human ELISA kit. Serum IgE levels was as per the Clinical and Laboratory standards 2008.[9] Data was collected on age, gender, family history and clinical examination for morphological pattern, number and site of the skin lesions. Laboratory examination was done for routine blood test, absolute eosinophil count and Serum IgE.

2.1. Statistical Analysis

Collected data was analysed for frequency, percentage, mean, standard deviation, Chisquare test and Karl- Pearsons Correlation coefficient.

3. Results

Table 1 Shows the age and gender distribution of cases and controls. The mean age of cases is 9.10±10.95 years and for controls is 8.93±10.1 years. There is no statistical difference in gender and age distribution between cases and control group. (Cases - X 2= 0.0374, p=0.98, Controls - X 2= 0.0037, p =0.95). Atopic dermatitis cases were mostly males (66%) in this study.

Out of the 50 AD cases, 43(86%) were known cases and 7(14%) were newly diagnosed during the course of this study. Family history of atopy was found in 24(48%) of the AD cases. Four (8%) of AD cases had given personal history of asthma, whereas 13(26%) of them had a family history of asthma, 6(12%) asthma, allergic rhinitis and atopic dermatitis, 3(6%) and 2(4%) had a family history of only atopic dermatitis and allergic rhinitis respectively. All the cases had pruritus and typical site of presentation. All the 50 AD cases exhibited xerosis, 43(86%) secondary bacterial infection of which 30(69.8%) cutaneous infections and 13(30.2%) with both cutaneous and upper respiratory tract infection, 38(76%) eczema, 10(20%) excoriation and 18(36%) had lichenification. None had follicular eczema. Dennie-morgan folds were seen in 31(62%) cases, Pityriasis alba in 23(46%) cases, facial pallor in 21(42%) cases, facial erythema in 12(24%) cases, non-specific hand/foot dermatitis in 9(18%) cases, periauricular fissures in 7(14%) cases, Hertoghe's sign in 5(10%) cases and anterior neck folds in 3(6%) cases. None had cataract or keratoconus. A seasonal exacerbation of atopic lesions was observed in 40(80%) cases and 36(90%) of the cases occurred in winter and 4(10%) in summer.

It was found that children below 2 years commonly presented with lesions on face 15 (88.2%) and 3(17.7%) exclusively presented with extensor involvement. In children of 2-12 years of age group 6(31.6%) presented with flexural lesions alone and 4(21%) had both flexors and extensors involvement.

In those greater than 12 years of age, 6(42.9 %) had flexural involvement, 5(35.7%) extensors involvement and 3(21%) with both flexor and extensor involvement. The haematological parameters of the AD cases revealed that 21(42%) had anaemia, 27(54%) had leukocytosis and absolute eosinophil count was higher in 37(74%) of the cases.

Table 2 Shows comparison between age, gender and number of skin lesions with level of IgE. Study found that 22 (44%) of the cases had elevated IgE. The mean IgE for cases was 186.8±170.5 IU and IgE level for control group was 24.7±19.3IU. The comparison of IgE levels between the case and the control showed that the IgE levels were 7 times higher among the cases (OR=7.07, 1.9-26.4, CI 95%). Majority of the AD cases (88.2%) who are less than 2 years age had elevated IgE. Gender and number of skin lesions and IgE levels did not differ significantly ($p>0.05$). In this study we found a significant association between the age group 2-12 years and elevated IgE levels (Chisquare value= 22.8, $p<0.0001$). There was no significant correlation between numbers of areas involved and Serum IgE level (r=0.09, p=0.518).

4. Discussion

In this study majority of the AD cases were males (66%). Another study found that AD has more male preponderance.[4,10] In this study 7(14%) of new AD cases were diagnosed. Recent studies have reported a rise in prevalence of AD. They attributed it to urbanization and improved quality of life. Also urban areas report more cases than rural areas.[4,10] In this study 48% had family history of atopy. Four (8%) of the AD cases had personal history of asthma. Other studies have found personal history and family history of AD was found in 54% and 65% respectively.[4,10] Milica Sofranac found that Children in 3-18 years age group had allergic rhinitis along with AD (30.3%) and others had allergic rhinitis with asthma (99.3%). The degree of correlation between allergic rhinitis and asthma was higher than that between allergic rhinitis and atopic dermatitis.[11]

In the present study, xerosis was reported in 100%, eczema in 76% and excoriation in 20% of cases. These study findings were supported by study done by Yazganoglu and Ozkaya.[12]

In the present study, in less than 2 years of age group, 15(88.3%) cases reported with skin lesions on face and 3(17.7%) on extensors. In 2 to 12 years of age group, 6(31.6%) cases observed skin lesion on flexures and in >12

Table 1: Demographic data of the study subjects

Variables		No	%	Mean	p value*
Age (in years) Cases (n=50)	>2	17	34	9.10±10.95	0.98
	2-12	19	38		
	>12	14	28		
Age (in years) Controls (n=30)	>2	10	33.3	8.93±10.1	
	2-12	11	36.6		
	>12	9	30		
Gender (cases) (n=50)	Males	33	66		0.95
	Female	17	34		
Gender (cases) (n=30)	Males	20	66.7		
	Female	10	33.3		

*Chi Square statistics p-value not significant.

Table 2: Comparisonof variables with IgE in atopic dermatitis cases (n=50)

Variables		Elevated IgE (n=22)		Normal IgE (n=28)		p<0.05*
		No	%	No	%	
Gender	Male (n=33)	15	45.5	18	54.5	0.77
	Female (n=17)	7	41.2	10	58.8	
Age	<2 (n= 17)	15	88.2	2	11.8	22.53
	2-12 (n=19)	2	10.5	17	89.5	
	>12 (n=14)	5	35.7	9	64.3	
No of Sites with atopic lesions	1	3	13.6	7	25	0.268
	2	14	63.6	10	35.7	
	3	4	18.2	8	28.6	
	4	1	4.54	3	10.7	

*Chi-squared test (= highly significant at p=0.000013)

years of age group, 6(42.9%) cases reported on flexures. This is in concurrence with study conducted by Yazganoglu and Ozkaya.[12]

Secondary bacterial infection was found in 43 (86%) of which 30 (69.8%) had cutaneous infections and 13(30.2%) had both cutaneous and upper respiratory tract infection. People with AD are at risk of occupational contact dermatitis. Those who have long standing AD have severe atopy and mental health co-morbidities which affect their social well being and quality of life.[13–15] People with eczema are particularly susceptible to bacterial, viral, and fungal skin infections. Ninety percent of the skin lesion cultures are positive for S. aureus skin infections and 30% are prone for overt symptoms like localized swelling, pain and discharge and system symptoms like fever, chills and fatigue.[1415,16] Studies done in India show that AD occurs in relatively milder form among Indians compared to western population.[4,10]

None had ocular issues in this study. However, another study reported 18(41.9%) patients had only lid involvement, 16 (37.2%) had only conjunctival involvement and 9(20.9%) had both conjunctival and lid involvement.[16]

In this study seasonal exacerbation was reported in 40 (80%) cases of which most occurred during winter (80%) which is similar to the study by Kim et al.[17] who reported worsening of skin symptoms in spring, winter, and autumn than in summer. In terms of monthly patterns, the skin symptoms were the worst in April.[18]

In the present study, anemia was reported in 21(42%). It is in concordance with study conducted by Kiyon Rhew and Jung Mi Oh.[19]Atopic disease has been shown to be associated with several different co-morbid conditions, many of which are known to increase the risk for anemia.[20] White blood cell count was increased in 54% cases and AEC was increased in 74% cases. This is in accordance with study done by Ying Jiang and Wencong Ma.[21]

In our study, serum IgE levels were increased in 22(44%) of cases. The mean serum IgE for cases was 7 times higher than that of the controls (OR= 7.07, 1.9-26.4, CI 95%). Majority of those less than 2 years age (88.2%) had elevated IgE compared to the older age groups. Although, increased Serum IgE is not a major diagnostic criteria, combined positive clinical presentation and increased serum IgE can be of diagnostic value especially in less than 2 years age group as per findings of our study. In this study we found a significant association between the age group 2-12 years and elevated IgE levels ($\chi 2$= 22.8, p<0.0001). Also there was no correlation between numbers of areas involved and Serum IgE level (r=0.09, p=0.518). But a dependence of severity of AD with IgE was found in another study.[22]

Studies have shown that elevated levels of serum total IgE is strongly associated with atopic disease. Few studies have reported that IgE levels was higher in patients with severe allergy.[22,23]

5. Conclusion

The present study results allude to typical facial and extensor involvement in infants and flexural involvement in children and adults. Serum IgE may be a useful indicator for the diagnosis of AD particularly in less than 2 years age group as per the study finding. Further large prospective studies are necessary to confirm our study findings.

6. Acknowledgement

We would like to thank Dr. Nataraj C Hiremath, Dr. K Hanumanthayya and Dr. Raghunatha S for their valuable guidance and inspiration.

7. Conflict of interest

None.

8. Source of funding

None

References

1. Martins TB, Bandhauer ME, Bunker AM, Roberts WL, Hill HR. New childhood and adult reference intervals for total IgE. *Journal of Allergy and Clinical Immunology*. 2014;133(2):589–591. Available from: https://dx.doi.org/10.1016/j.jaci.2013.08.037. doi:10.1016/j.jaci.2013.08.037.
2. Williams H, Stewart A, Mutius EV, W C, Hr A. International Study of Asthma and Allergies in Childhood (ISAAC) Phase One and Three Study Groups, Is eczema really on the increase worldwide? *J Allergy Clin Immunol*. 2008;121:947–954.
3. Karthikeyan K, Thappa DM, Jeevankumar B. Pattern of pediatric dermatoses in a referral center in South India. *Indian Pediatr*. 2004;41:373–380.
4. Dhar S. Atopic dermatitis: Indian scenario. *Indian J Dermatol Venereol Leprol*. 1999;65(6):253–260.
5. Capristo C, Romei I, Boner AL. Environmental prevention in atopic eczema dermatitis syndrome (AEDS) and asthma: avoidance of indoor allergens. *Allergy*. 2004;59(s78):53–60.
6. Kimata H. Cessation of passive smoking reduces allergic responses and plasma neurotrophin. *European Journal of Clinical Investigation*. 2004;34(2):165–166. Available from: https://dx.doi.org/10.1111/j.1365-2362.2004.01297.x. doi:10.1111/j.1365-2362.2004.01297.x.
7. Arruda LK, Solé D, Baena-Cagnani CE, Naspitz CK. Risk factors for asthma and atopy. *Current Opinion in Allergy and Clinical Immunology*. 2005;5(2):153–159. Available from: https://dx.doi.org/10.1097/01.all.0000162308.89857.6c. doi:10.1097/01.all.0000162308.89857.6c.
8. Silverberg JI. Atopic Dermatitis in Adults. *Med Clin North Am*. 2020;104(1):157–176.
9. Levin AM, Mathias RA, Huang L, Roth LA, Daley D, et al. A metaanalysis of genome-wide association studies for serum total IgE in diverse study populations. *J Allergy Clin Immunol*. 2013;131:1176–1184.
10. Sarkar R, Kanwar AJ. Clinico-epidemiological profile and factors affecting severity of atopic dermatitis in north Indian children. *Indian J Dermatol*. 2004;49:117–122.
11. Šofranac M. Correlation between Allergic Rhinitis, Asthma, and Atopic Dermatitis in Children. *Pediatrics*. 2008;202(2):S91.
12. Yazganoglu K, Ozkaya E. Non-typical morphology and localization in Turkish atopic dermatitis patients with onset before the age of 18 years. *Indian J Dermatol, Venereol, Leprol*. 2011;77:23–27.
13. Mortz CG, Andersen KE, Dellgren C, Barington T, Bindslev-Jensen C. Atopic dermatitis from adolescence to adulthood in the TOACS cohort: prevalence, persistence and comorbidities. *Allergy*. 2015;70(7):836–845. Available from: https://dx.doi.org/10.1111/all.12619. doi:10.1111/all.12619.
14. Research, Eczema. NIAID National Institute of Allergic and Infectious Diseases. Last Reviewed; 2017.
15. Atopic Dermatitis Research Network (ADRN). National Jewish Health. National Institute of Allergy and Infectious Diseases (NIAID) (website. Available from: https://www.nationaljewish.org/researchscience/clinical-and-translational-research/adrn/research.
16. Handa S, Jain A, Kanwar A, Kaujalgi R. Ocular abnormalities in atopic dermatitis in Indian patients. *Indian J Dermatol, Venereol Leprol*. 2009;75(2):148–151.
17. Kim M, Kim YM, Lee JY, Yang HK, Kim H, Cho J. Seasonal variation and monthly patterns of skin symptoms in Korean children with atopic eczema/dermatitis syndrome. *Allergy Asthma Proc*. 2017;38(4):294–299.
18. Kanwar A, De D. Epidemiology and clinical features of atopic dermatitis in India. *Indian J Dermatol*. 2011;56(5):471–475.
19. Rhew K, Oh JM. Association between atopic disease and anemia in pediatrics: a cross-sectional study. *BMC Pediatr*. 2019;19(455):1–6.
20. Drury KE, Schaeffer M, Silverberg JI. Association Between Atopic Disease and Anemia in US Children. *JAMA Pediatr*. 2016;170(1):29–34.
21. Jiang Y, Ma W. Assessment of Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio in Atopic Dermatitis Patients. *Med Sci Monitor*. 2017;23:1340–1346.
22. Celakovska J, Bukač J, Ettler K, Ettlerova K, Krcmova I. Atopic dermatitis in adolescents and adults – the evaluation of association with other allergic diseases and parameters. *Food Agricultural Immunol*. 2017;28:933–948.
23. Kiiski V, Karlsson O, Remitz A, Reitamo S. High Serum Total IgE Predicts Poor Long-term Outcome in Atopic Dermatitis. *Acta Dermato Venereol*. 2015;95(8):943–947.

Author biography

Preetham S Assistant Professor

Raghavendra S Tophakhane Professor

Shobha Nadgir Professor

Cite this article: Preetham S , Tophakhane RS, Nadgir S. **A study on clinical pattern and immunological aspect of atopic dermatitis**. *IP Indian J Clin Exp Dermatol* 2020;6(1):21-24.