P-ISSN: 2664-3685
E-ISSN: 2664-3693
IJPG 2020; 3(2): 151-153
Received: 15-05-2020
Accepted: 18-06-2020

Shyam Deepak SR
Post Graduate, Department of Pediatrics, Rajah Muthiah Medical College, Chidambaram, Tamil Nadu, India

Ramamoorthy R
Assistant Professor, Department of Pediatrics, Rajah Muthiah Medical College, Chidambaram, Tamil Nadu, India

Harivasudevan S
Senior Resident, Department of Pediatrics, Rajah Muthiah Medical College, Chidambaram, Tamil Nadu, India

Chidambaranathan S
Associate Professor, Department of Pediatrics, Rajah Muthiah Medical College, Chidambaram, Tamil Nadu, India

Corresponding Author:
Chidambaranathan S
Associate Professor, Department of Pediatrics, Rajah Muthiah Medical College, Chidambaram, Tamil Nadu, India

A Study on Serum Immunoglooubin E levels as a marker in childhood asthma

Shyam Deepak SR, Ramamoorthy R, Harivasudevan S and Chidambaranathan S

DOI: https://doi.org/10.33545/26643685.2020.v3.i2c.109

Abstract
Background: Asthma is a chronic inflammatory of the lungs which causes bronchial hyperresponsiveness and reversible airway obstruction. The disease predominantly affects the children. Bronchial asthma is manifested in response to external trigger of allergens. The most important risk factor is atopy, which produces high amount of IgE, the aim of this study is to evaluate serum IgE levels as a marker for the disease activity and study the correlation with the severity of bronchial asthma.
Methods: A prospective study was conducted in peadiatrics department of the tertiary care hospital from March 2019 to February 2019. Children between 6-12yrs admitted with clinical features of asthma as per GINA guidelines was included in the study. IgE levels were taken at the time of the initial presentation.
Results: The study showed that all the participants 100% who presented with clinical features suggestive of asthma had high IgE levels irrespective of age, sex and severity of asthma. The mean IgE levels in females were more than males. As the severity of asthma increased the mean IgE levels also increased.
Conclusion: The study conclude that the IgE levels are independent of age and sex. IgE levels are directly proportional to severity of asthma.

Keywords: Bronchial asthma, IgE, severity, GINA

Introduction
Asthma is a chronic inflammatory condition of the lung which causes bronchial hyperresponsiveness with reversible airway obstruction [1]. The disease predominantly affects children and it has been hypothesised, as the age increases the insult to the bronchus is reduced. Very few adults clinically manifest with bronchial asthma. It has been estimated that over 300 million people are affected by bronchial asthma worldwide [2]. Incidence of asthma in India varies from 3.5% to 29.5% in different geographic area in India [3]. The global initiatives of asthma (GINA) guidelines indicates asthma as a chronic as a chronic airway inflammation, which is characterized by respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough accompanied with expiratory airflow limitation[4]. GINA guidelines classifies asthma severity into intermittent, mild persistent, moderate and severe asthma [4].
Bronchial asthma is multifactorial disease. Bronchial asthma ismanifested in response to external trigger of allergens. The most important risk factor for developing asthma is atopy, which has tendency to produce excessive amount of immunoglobulins E (IgE). Excessive amount of IgE initiates a hypersensitivity reaction which in turn initiate T Helper cell type2 (Th2) and other immune cells which produces pro-inflammatory cytokines and chemokines which mediates inflammation [4].
Among the cytokines IL5 increases the production and maturation of eosinophils and IL4 which promotes IgE production by B cells. IgE plays a central role in propagation of inflammatory cascade to produce allergic response [5, 6]. The presence of IgE in serum has been a tool for detecting the phenotype of allergy asthma. On this basis several studies have been done to evolve IgE targeted therapies and has shown marked improvement in controlling the severity of asthma exacerbation. The main aim of study is to see the association of serum Ig E with the severity of bronchial asthma in school going and early adolescences.

Methods

A prospective study was conducted in peadiatrics department of the tertiary care hospital from March 2019 to February 2020. Children between 6-12yrs admitted with clinical features of asthma as per GINA guidelines was included in the study [4]. Children with other pulmonary disease and congenital heart disease was excluded from the study. A detailed history and examination were carried out. Severity of asthma was assed based on GINA guidelines [4]. Serum IgE levels was collected at the time of initial presentation and estimated by chemiluminescent assay. IgE levels was classified according to biological reference intervals based on the age- 6-9years 0.0-90IU/ml, 10-12yrs 0.0-200IU/ml [7]. The obtained data was statically analysed.

Results

The study was carried out among 70 participants between 6 to12 years who presented with clinical features suggestive of Asthma. The participants were classified base on the severity of asthma and tabulated [4]. The study included 43 male and 27 female participants. Mild persistent asthma was predominant among 9 years of age (27.3%) followed by 6-7 years of age. Moderate asthma was predominant in 8 years of age (37.5%) followed by 12 years of age. Intermittent asthma was the predominant severity (52.8%) followed by mild persistent asthma (31.4), moderate asthma (11.4%) and severe asthma (4.2%). In the above study all the participants (100%) had increased levels of IgE. The mean IgE values were greater among males (508.5) compared to females (386.4) in the age of 6 years. From 7 years onwards, females showed higher mean IgE levels compared to males. At 12 years of age, males had higher IgE levels (1151) compared to females (619). The highest mean IgE levels was found among participants with severe asthma (2245.3 IU/L) followed by those with moderate asthma (1566.5 IU/L).

Table 1: Severity of asthma in the study participants

Age	Asthma			
	Intermittent	Mild persistent	Moderate	Severe
	N	N	N	N
6	9	4	0	0
7	10	4	1	0
8	7	2	3	0
9	3	6	0	1
10	6	1	1	1
11	1	4	1	1
12	1	1	2	0

Table 2: Mean IgE values among the study participants with respect to age and sex

Age	Mean IgE values		
	Males	Females	total
6	508.5 ± 214.3	386.4 ± 167.8	461.5 ± 200
7	473 ± 191.9	741.3 ± 370.	598.2 ± 310.3
8	776 ± 603.5	717.4 ± 616.8	751.6 ± 581.3
9	615.8 ± 210.4	957.2 ± 791.2	752.4 ± 514.1
10	642 ± 473.5	1471.5 ± 1293.3	826.3 ± 714.9
11	839 ± 578.4	1250 ± 869.8	1015.1 ± 683.8
12	1151 ± 455.4	619 ±0	1018 ± 457.2

Table 3: Mean IgE levels in comparison with the severity of asthma

Diagnosis	N	IgE levels(IU/ml)
Intermittent	37	414.2±156.9
Mild persistent	22	706.2±119.5
Moderate	8	1566.5±178.3
Severe	3	2245.3±143.1

Discussion

Many studies have been done to compare serum IgE level in asthmatic children and normal children. In this study the serum IgE levels were increased in 100% of the study participants irrespective of the age, gender and severity of the asthma. The mean value of serum IgE were in increasing trends among female participants with increasing age. There is a strong relationship between increased serum IgE levels and asthma prevalence [8]. Other studies have also shown significant increase in the serum IgE levels as the severity of asthma increased. In this study the highest mean IgE levels was found among participants with severe asthma (2245.3 IU/L) followed by those with moderate asthma (1566.5 IU/L). The mean serum IgE was low among intermittent asthma and as the severity increased the mean serum IgE levels also increased. Trivedi PP et al, also observed that the serum IgE values had a positive corelation with the severity if asthma [1]. Kovac *et al.*, observed that the serum IgE concentration was much higher in severe persistent asthma compared to other grades of asthma [9]. A study done by Sciuca *et al*., in children with recurrent wheeze, showed that raised levels of IgE was directly proportional to the increased risk of bronchial asthma in them [10].

Studies have shown that serum IgE levels are associated with the severity of asthma, risk and remodelling of the airways [1, 9]. Serum IgE also indicates about atopic status. Measurement of serum IgE levels can serve as a low-cost investigative tool to differentiate between allergic and nonallergic asthma which can be further confirmed by skin prick test or allergen specific serum IgE levels. As there is an association between serum IgE levels and the degree of airflow obstruction, serum IgE levels can provide useful information about the severity of asthma. Quantitative measurement of serum IgE levels when integrated with other clinical indicators can be used to predict development of asthma.

Conclusion

We studied the severity of asthma and serum IgE levels in school going and early adolescent children. The serum IgE levels were increased in all participants who presented to us irrespective of age, sex and severity of asthma. The study proved serum IgE levels was directly proportional to severity of asthma. Therefore the serum IgE level was a supportive indicator of severity of asthma.

References

1. Trivedi, Pinakin P, Ami Patel H. "Serum Immunoglobulin E and Absolute Eosinophil Count as Markers of Severity in Childhood Asthma." International Journal of Contemporary Pediatrics. 2020;7(2):413. doi:10.18203/2349-3291.ijcp 20200120.
2. Visser, Menno. "Bronchial Asthma: Diagnosis and Long-Term Treatment in Adults: Common Constellation." Deutsches Aerzteblatt Online, 2008. doi:10.3238/arztebl. 2008.0842a.
3. Paramesh H. "Epidemiology of Asthma in India." The Indian Journal of Pediatrics. 2002;69(4):309-312. doi:10.1007/bf02723216.
4. "Global Initiative for Asthma - Global Initiative for Asthma." *GINA*, 10 Nov. 2020, ginasthma.org/.
5. Froidure, Antoine *et al*. "Asthma Phenotypes and IgE Responses." European Respiratory Journal. 2015;47(1):304-319. doi:10.1183/13993003.01824-2014.
6. Matucci, Andrea *et al*. "Is IgE or Eosinophils the Key Player in Allergic Asthma Pathogenesis? Are We Asking the Right Question?" *Respiratory Research*, vol. 19, no. 1, 2018, doi:10.1186/s12931-018-0813-0.
7. Ogulur, Ismail. "Reference Values for Lymphocyte Subsets in Healthy Children and Adolescent; Jmf Marmara Center." 2017. doi:10.26226/morressier.594a7d46d462b8028d893794.
8. Environmental Health Perspectives. 2011;119(2c):41-48. doi:10.1289/ image.cehp. v119.i2c.
9. Kovač, Kornelija *et al*. "Correlation between Asthma Severity and Serum IgE in Asthmatic Children Sensitized to Dermatophagoides Pteronyssinus." Archives of Medical Research, 2007;38(1):99-105. doi:10.1016/j.arcmed.2006.07.007.
10. Sciuca, Svetlana. "Prognostic Importance of IgE for the Evolution of Recurrent Wheezing into the Bronchial Asthma in Children." World Allergy Organization Journal. & NA, 2007. doi:10.1097/01.wox.0000301645.56025.54.