Section: Respiratory Medicine

Original Research Article

STUDY OF IGE AS BIO-MARKER IN BRONCHIAL ASTHMA SOUTH KARNATAKA POPULATION

Received : 07/03/2023
Received in revised form : 07/04/2023
Accepted : 15/04/2023

Keywords:
IgE, Spirometry, turbimetric, immunoassay, FEV1

Corresponding Author:
Dr. Mahesh NS,
Email: mahesh.ns14@gmail.com

DOI: 10.47009/jamp.2023.5.3.65

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (3); 296-298

Mahesh NS[1]

[1]Associate Professor, Department of Respiratory Medicine, Akash Institute of Medical Sciences and research Centre, Devanahalli, Karnataka, India

Abstract

Background: Measurement of biomarkers has been incorporated into clinical research studies of asthma to characterise the population and associate the disease with environmental and therapeutic effects. The severity of asthma can be diagnosed by forced expiratory volume in one second (FEV1) from spirometry. **Materials and Methods:** 50 (fifty) bronchial asthma patients aged between 20 to 55 years old were studied. Haematological examination included ESR, CBC, AEC, sputum for AFB, chest- x ray, ECG Gram stains. Estimation of serum IgE was done by using Quantia IgE which is a turbid metric immunoassay for human use, and spirometry was performed. The results of spirometry were compared with various levels of IgE in different age groups. **Result:** The clinical manifestations were: 24 (48%) dyspnea, 16 (32%) coughs; and 10 (20%) wheezings. The classification of patients was: 7 (14%) had a 100-200 IgE level (IU/ml), 9 (18%) had 201 to 300, 12 (24%) had 301 to 400, 22 (44%) had a 401-500 IgE level, Age distribution was, 12 (362) were 21-30 years old, 9 (383) were 31-40 years old, 19 (368.2) were 41-50 years old, and 10 (389.8) were 51-55 years old. **Conclusion:** The present pragmatic study of IgE and spirometric studies will be helpful for clinicians to diagnose severity of bronchial asthma; he can treat such patients efficiently to avoid morbidity and mortality of such patients.

INTRODUCTION

Asthma is one of the most common chronic, non-communicable diseases in all age groups.[1] It is a fairly common condition caused by chronic inflammation of the lower respiratory tract. It features variable airway obstruction and bronchial hyper responsiveness.[2] Characterised by episodic or persistent symptoms of wheezing, dyspnea, and cough If an allergic trigger is suspected, an allergy diagnosis consisting of medical history and/or the definition of immunoglobin E (IgE) should be performed.[3]

IgE is a type of antibody produced by plasma cell located in lymph nodes draining the site of antigen entry or locally at the sites of allergic reactions, by plasma cells derived from the germinal centre developing within the inflamed tissue IgE is pathogenic in allergic diseases such as asthma, allergic rhinitis, atopic dermatitis, and allergies.[4]

The pathogenic role of IgE antibodies in triggering and maintaining allergic inflammation in response to allergens is due to the binding of multivalent allergens to allergen – specific IgE on sensitised effectors cells. These interactions trigger effectors for cell activation, resulting in the release of potent inflammatory mediators, recruitment of inflammatory cells, antigen presentation, and production of allergen – specific antibody responses. Hence, the presence of specific IgE antibodies can play an important role in identifying the relevant allergen and providing a guide to therapy. Hence, attempts are made to evaluate IgE in different age groups and both sexes.

MATERIALS AND METHODS

50 (fifty) patients regularly visited the Akash Institute of Medical Sciences and its research centre in Devanahalli, Karnataka, (562110) were studied.

Inclusive Criteria

Patients having symptoms of bronchial asthma, i.e., breathlessness. Coughing, chest tightness, and wheezing were included in the study.

Exclusion Criteria

Patients below the age of 18, smokers, COPD, and pulmonary tuberculosis (PT). Immune compromised patients were excluded from the study.

Method

A detailed history of each patient was noted (duration of asthma, frequency, severity of exacerbation, smoking history, family history, profession exposure to dust or smoke), and a chest-x ray, CBC, ESR, sputum for AFB, and grams stains

ISSN (O): 2687-5365; ISSN (P): 2753-6556

were done. A part of this spirometry, including reversibility testing, was performed (RMS Meds prior with transducer model number A00N 2003). FEV1 was recorded in each patient.

Serum IgE was estimated by using Quantine IgE, which is a turbimetric immunoassay for the estimation of immunoglobulin IgE in human serum.

The duration of the study was January-2022 to December-2022.

Statistical Analysis

Clinical manifestations, levels of IgE distribution, Distribution IgE on the basis of severity and Mean distribution were classified with percentage. The statistical analysis was done at SPSS software. The ratio of male and female was 2:1.

RESULTS

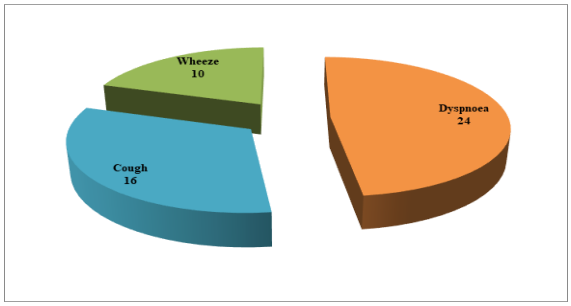

Figure 1: Clinical Manifestation of Bronchial asthma patients

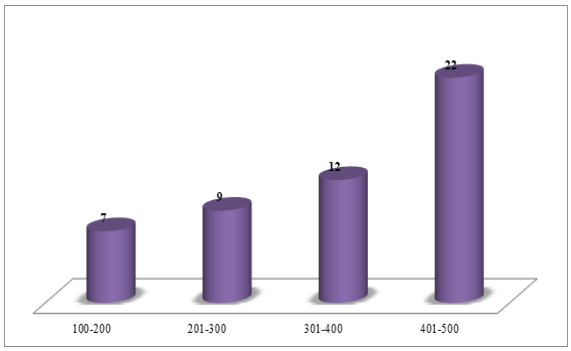

Figure 2: Classification of patients based on IgE levels

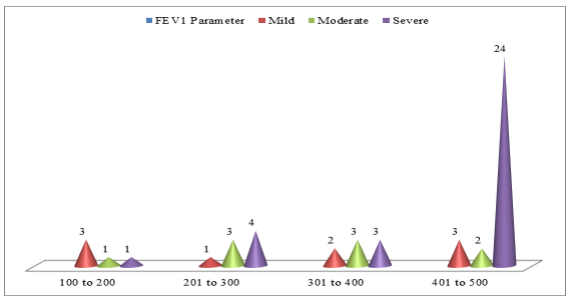

Figure 3: Comparison of IgE levels based on degree of respiratory obstruction with FEV1 parameters

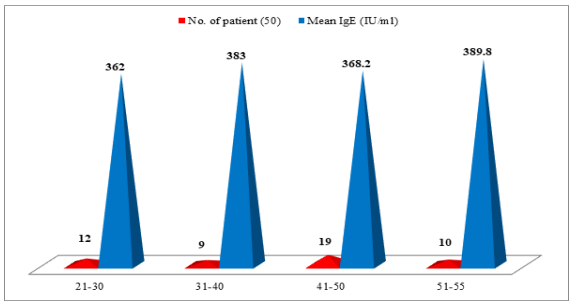

Figure 4: Mean distribution of IgE (IU/Ml) as per the age

[Table 1] Clinical Manifestation of Bronchial Asthma Patients: 24 (48%) patients had dyspnea, 16 (32%) coughed, and 10 (20%) wheezing.

[Table 2] Classification of patients based on IGE level – 7 (14%) 100–200, 9 (18%) 201–300, 12 (24%), 301–400, and 22 (44%) 401–500.

[Table 3] Comparison of IgE levels with the degrees of respiratory obstruction – Mild 3 (100-200), 1 (201-300), 2 (301-400), and 3 (400-501). Moderate – 1 (100–200), 3 (201-300), 2 (301-400), 3 (400–500). Severe – 1 (100–200), 4 (201-300), 3 (301-400), and 24 (401–500).

[Table 4] Mean distribution of IgE (IU/MI) as per age: 12 (21–30 years) 362, 9 (31–40) 362, 19 (41–50) 384, 10 (51–55) 389.

Table 1: Clinical Manifestation of Bronchial asthma patients

Symptoms	No. of patients (50)	Percentage %
Dyspnoea	24	48.0
Cough	16	32.0
Wheeze	10	20

Table 2: Classification of patients based on IgE levels.

IGE (IU// ml)	No. of patients (85)	Percentage %
100-200	7	14
201-300	9	18
301-400	12	24
401-500	22	44

Table 3: Comparison of IgE levels based on degree of respiratory obstruction with FEV1 parameters

FEV1 Parameter	100 to 200	201 to 300	301 to 400	401 to 500
Mild	3	1	2	3
Moderate	1	3	3	2
Severe	1	4	3	24

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 4: Mean distribution of IgE (IU/Ml) as per the age

Age of the patients	No. of patient (50)	Mean IgE (IU/ml)
21-30	12	362
31-40	9	383
41-50	19	368.2
51-55	10	389.8

DISCUSSION

Present study of IgE as bio marker in bronchial asthma patients in the South Karnataka population. The clinical manifestations were 24 (48%) cases of dyspnea, 16 (32%) coughs, and 10 (20%) wheeze [Table 1]. The classification of patients as per the IgE levels was 7 (14%) for 100–200, 9 (18%) for 201-300, 12 (24%) for 301-400, and 22 (44%) for 401-500 IgE [Table 2]. According to FEV1, 9 patients had mild bronchial asthma, 9 patients had moderate bronchial asthma and 32 had severe bronchial asthma [Table 3]. IgE distribution by age: 12 (362); were 20–30 years old, 9 (382) were 31-40 years old, 19 (368.2) were 41-50 years old, and 10 (389.8) were 51-55 years old [Table 4]. These findings were more or less in agreement with previous studies.[5-7]

The quantity of IgE and the presence of allergen specific IgE antibodies in the serum are both important biomarkers for defining the phenotype of a patient who presents with asthma symptoms.[8] The levels of IgE also be useful i predicting persistent wheezing and its management. Detection of local IgE antibodies in the skin and tissue extracts may aid in adjudicating negative in vivo and serological measures of IgE antibody despite clinical evidence of atopic asthma.[9,10] The clinics can order specific IgE antibody tests for more than 200 individual allergen specificities, each of which corresponds to Dermatophagoides pteronyssinus (dust mite).[11] Individually performed specific IgE tests have been classified as supplemental biomarkers because the participant's clinical history is needed to identify the target allergens for testing, and more than an IgE antibody test is generally needed to characterise particular participant's sensitivities.

CONCLUSION

The present study of levels of IgE in bronchial asthma was very high compared with normal, compared with a spirometric study. This study will be useful to predict the severity and prolongation of atopic asthma. The study found that the severity of asthma was higher at night compared to day, which could be because Eosinophills are more active at night. But this study demands further genetic, hormonal, nutritional, pathophysiological, and environmental studies because the exact pathogenesis of bronchial asthma is still unclear.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556