



Total Serum Immunoglobulin's E Levels in Chemical Industry Workers (SITE Area, Kotri, Jamshoro) Exposed with Organic Acid Anhydrides(OAAs)

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ABSTRACT

Objective: Allergy has been a health risk to Organic acid anhydrides (OAAs) exposed workers for many decades. It is one of the most serious public health problems among chemical industry workers of SITE Area kotri, Sindh, Pakistan. Immunoglobulin IgE is an essential antibody responsible for various allergic reactions occur after exposure to harmful chemicals occupationally

Method: In this recent study, Immunoglobulin IgE levels were determined quantitatively in the serum of exposed chemical industry workers (n=45) with comparison to healthy control subjects (n=40).The IgE quantitative test was done by Enzyme linked immunosorbant (ELISA) Kit Method system based on solid phase.

Result: The Serum IgE mean levels of workers determined about 212 IU/L were higher as compared to the 63.3 IU/L in healthy controls.

Conclusion: It is concluded that increased IgE levels leading to mild asthma and other respiratory problems induced by inhalation of Haptens like Organic acid anhydrides(OAAs) in SiteArea,Kotri, workers.

Keywords: Organic acid anhydrides (OAAs), Immunoglobulin IgE, ELISA, Workers, Asthma.

INTRODUCTION

The occupational workers exposed to hazardous chemicals like Organic acid anhydrides(OAAs) may have allergy, asthma and sensitization¹⁻². Hay fever,

atopic dermatitis and asthma with allergic complications may have found with elevated IgE levels in blood serum reported among exposed workers³⁻⁴. Ig-E mediated

hypersensitivity is produced by elevated IgE levels for allergic reactions⁵. Hence, IgE test is recommended for the allergic and hypersensitive response in human serum by sensitive, rapid, accurate and expensive ELISA assay Kit Method system⁶. The immunoglobulin IgE has significant role in terms of allergy, sensitization and asthma treatment since its discovery since 1966⁷.

The main purpose of this present study was to explain the relationship by estimating and comparing serum IgE levels in exposed workers to Organic acid anhydrides(OAAs) with control group.

MATERIALS & METHODS

This study was conducted from 15th-20th may 2014 upon the serum samples of local chemical industry(Site Area Kotri, Jamshoro). The clinical data and demographic properties were obtained with the help of questionnaire by local physician after taking consent. A total of 45 workers and 40 control (normal) persons participated (age group 20-55yrs for both groups) included. The 10ml blood sample was collected and made to clot for about half an hour. Blood serum was separated by centrifugation at 5000 rpm for about 25minutes.The blood serum was stored at 40°C until ELISA analysis by kit method system(Genway platinum, Immunoglobulin IgE Kit) based upon sandwich ELISA standard method⁸ (Total IgE ELISA,2013). All chemicals and reagents were used of analytical graded purity.

RESULTS & DISCUSSIONS

Serum IgE levels(mean) were found high 212IU/Lin case of chemical industry workers as compared only 63 IU/L for control subjects(as shown in table 2 and Fig 1). The elevated IgE values may even show initiating mild asthma by sensitization to inhaled antigen and OAAs chemicals. There

are also other causes of asthma, which are even responsible for viral infection and bronchial asthma. But here increased IgE levels among workers indicate exposure-response relationship of asthma may simply responsible for allergic problems.

Extrinsic asthma occurred generally by inhaled antigens and induced haptens (like organic acid anhydrides) contribute the extent of allergic reactions among exposed workers. Although there are also other clinical disorders and factors like cigarette smoking, atopy and airway obstruction responsible for increased IgE levels⁸⁻⁹. Still the mechanism and pathway behind this is unknown. Inflammation, congestion in a bronchial reaction, skin allergies and hypersensitivity are some of prominent symptoms developed among workers after exposure. Since the major finding of present study showed that a significant positive correlation>150 IU/L among more workers develop association with asthma. The serum IgE relation with asthma was already reported quantitatively¹⁰⁻¹². Therefore, the present study is consistent and useful with other main studies done in the past. Further, our study highlights low molecular weight Organic acid anhydrides(OAAs) key role by enhancing allergic etiology of asthma among suffered workers groups after comparing with healthy group serum IgE levels.

CONCLUSION

The conclusion is Serum IgE total levels were found to be higher in chemical industry workers as comparative study with healthy normal group due to harmful chemicals.

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Conflict of interest

None

REFERENCES

1. C.B.Mathias, Freyschmidt E J,Oettgen (2009) Immunoglobulin E antibodies enhance pulmonary inflammation induced by inhalation of a chemical haptene, *Clinical & Experimental allergy*;:39(3):417-425.
2. Drexler H., Jönsson B. A. G., Göen T., Nielsen J., Lakemeyer M. and Welinder H.(2000) Exposure assessment and sensitisation in workers to organic acid anhydrides. *Int. Arch. Occup. Environ. Health*:73, 228-234.
3. Grammer, L. C., Ditto, A. M., Tripathi, A., and Harris, K. E. (2002) Prevalence and onset of rhinitis and conjunctivitis in subjects with occupational asthma caused by trimellitic anhydride (TMA). *J. Occup. Environ. Med.* 44, 1179–1181.
4. Peng Z(2009) Vaccines targeting IgE in asthma and allergy. *Hum vaccine*:18:5.
5. Thirunavukkarasu Sandeep, Mysore Subrahmanyam Roopakala, Chickballapur Rayappa Wilma Delphine Silvia, Srikantaiah Chandrashekara (2010) Evaluation of serum immunoglobulin E levels in bronchial asthma; *Lung India*:27(3):138-140.
6. Uotila M, Ruoslathi E, Envall E(1981) Two-site sandwich enzyme immunoassay with monoclonal antibodies to human alphafetoprotein. *J Immunol Methods* ;42:11-15
7. Rage E, Jacquemin B, Nadif R, Oryszczyn MP, Siroux V, Aguilera I, *et al.*(2009) Total serum IgE levels are associated with ambient ozone concentration in asthmatic adults. *Allergy*;64:40-6.
8. Buhl R.(2005)Anti-IgE antibodies for the treatment of asthma. *Curr Opin Pulm Med.*;11,27–34.
9. Husain A N,Kumar V(2007) pathologic basis of disease *The lung India* :7:711-772.
10. Dearman RJ, Warbrick EV, Humphreys IR, Kimber I(2000) Characterization in mice of the immunological properties of five allergenic acid anhydrides. *Journal of Applied Toxicology*,20:221–230.
11. Grammer L, Shaughnessy M, Kenamore B.(1998) Utility of antibody in identifying individuals who have or will develop anhydride-induced respiratory disease. *Chest*;114:1199-1202.
12. Sherril D L, Stein R, Halonen M, Holberg C J,Wright A,Matinez FD (1999) Total serum IgE and its association with asthma symptoms and allergic sensitization among children, *J Allergy Clin Immunol*:104: 28-36.

Table 1: Clinical profile of chemical industry workers compared with normal (controls)

Groups	n (male)	Age (Mean)
Workers	45	36
Controls	40	32

Table 2: Immunoglobulin(IgE) levels (mean) in healthy controls(normal) and chemical industry workers by ELISA

Groups	n (male)	IgE (Mean)
Workers	45	212 IU/L
Controls	40	63.3 IU/L

