IMMUNOGLOBULIN E SCREENING OF SERUM AND LACRIMAL FLUID – A NEW DIMENSION IN THE MANAGEMENT OF CHRONIC CONJUNCTIVITIS

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ABSTRACT

Purpose: The purpose of present study is to differentiate between allergic and environment related chronic conjunctivitis on the basis of the measurement of Immunoglobulin E levels in tears and serum.

Patients and Methods: Forty specimens of tear and serum from drivers were sent for Immunoglobulin E assay. Samples were divided clinically into two categories. Group A included twenty four samples (60%) who were clinically chronic conjunctivitis (chronic conjunctivitis is defined here as conjunctival inflammation of period greater than a year, remissions and relapses, with no obvious cause/ophthalmic disease and patient on or off topical treatment) and group B included sixteen samples (40%), of clinically normal (normal having no ocular symptoms) (control). Length of service as driver, hours of daytime driving, primary ocular symptom, history of atopy or allergy, tear film break up time (BUT) were emphasized at history and ophthalmic examination. None of the subjects had clinically obvious cause of conjunctivitis. The group-A (patients) were randomly treated with fluoromethalone and artificial tears. The patients were required to record the subjective improvement.

Results: Tear Immunoglobulin E values were normal (1-2ku/L) in both A and B groups. Serum Immunoglobulin E was elevated significantly in twenty samples (84%) in group A (clinically chronic conjunctivitis) whereas, it was elevated in six samples (38%) in group B (clinically normal group). Serum Immunoglobulin E levels were normal in 16% and 62% of group A and B respectively. The recovery was significant with fluoromethalone use at 4 weeks as compared to that of artificial tears but at 8 weeks and 12 weeks, there was no significant difference between artificial tears group and fluoromethalone group.

Conclusion: Serum Immunoglobulin E and tear Immunoglobulin E levels can be used to investigate the cases of chronic conjunctivitis as normalcy of tear Immunoglobulin E reasonably excludes local allergy. This enables the clinician to resort to tear replacement therapy rather than prescribing steroids with accompanying side effects. However, there is no correlation of serum Immunoglobulin E with tear Immunoglobulin E.

Keywords: Allergic conjunctivitis, environment related chronic conjunctivitis, tear Immunoglobulin E, serum Immunoglobulin E

INTRODUCTION

The ocular surface is exposed maximally to environmental pollutants like CO2, smog, smoke, dust particles and varying levels of humidity in different regions [1]. These are direct ocular irritants, exogenous in origin. Their ocular symptomatology is non immunological in origin in contradiction to allergic conjunctivitis which is an immunological process involving allergens and implication of endogenous phenomenon

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i.e. Immunoglobulin E mediated hypersensitivity reaction [2]. The signs in environment related chronic conjunctivitis are trivial in relation to symptoms. Because of this, there is extensive subjective and objective variations in diagnosis and treatment. Therefore, the clinician genuinely errs on the side of diagnosing environment related chronic conjunctivitis as allergic conjunctivitis and risking the patients to the potential hazards of prolong use of steroids, vasoconstrictors and their combinations. Hence, there is need of some form of standardization.

Allergic conjunctivitis and their related entities are distinct hypersensitivity reactions involving Immunoglobulin E, eosinophils and their effects through chemical mediators. Elevated tear Immunoglobulin E level is a well-recognized fact in allergic conjunctivitis [2,3]. However, its levels are normal in environment related chronic conjunctivitis. Locally produced Immunoglobulin E has been shown to be the largest contributor to the severity of the disease. Normalcy of tear Immunoglobulin E level could provide a much better way in diagnosing environment related chronic conjunctivitis. This prospective study was undertaken to measure serum and tear Immunoglobulin E concentrations in environment related chronic conjunctivitis and normal subjects (control) by means of ELISA.

PATIENTS AND METHODS

Our study includes fifty drivers (fig.1), who had their tear and serum Immunoglobulin E assay done. Ten samples out of these were rejected because of sampling error. Remaining forty samples were clinically divided into two categories A& B. Group A included twenty four samples (60%) who were clinically cases of chronic conjunctivitis which is here defined as inflammation of conjunctiva for a period exceeding a year, remissions and relapses, on and off treatment, with no obvious ophthalmic cause. Group B included sixteen samples (40%) who were clinically normal having no ocular symptoms.

In our study, all the drivers were male having a mean age of thirty years (fig.2). All cases of chronic conjunctivitis were diagnosed on the basis of history and symptomatology, that is, grittiness, watering and redness of eyes. All chronic cases had no treatment for the last four to six weeks. Main emphasis was on the length of service as driver and period of daytime driving (mean- eight hours) (fig.3). Primary ocular symptoms i.e. grittiness, foreign body sensation and watering, were required to be graded + to +++ depending upon severity. Tear film BUT (break up time), normal-15 to 35 seconds was done. History of atopy and systemic allergy was taken. Immunoglobulin E levels in serum and tear using ELISA method were measured in both groups i.e. group A(chronic conjunctivitis) and group-B (normal). Cases of chronic conjunctivitis were further sub-divided randomly into two groups. Group A1 received topical Fluoromethalone three to four times per day whereas group A2 was prescribed tear substitutes. The response i.e. improvement in symptoms were recorded at 4 weeks, 3 months and 6 months. Informed consent was taken from all the patients (group A) and controls (group B).

Collection of Samples

Tear samples were collected from the middle of lower fornix of eyes while instructing the subject to be in upgaze, using the tubing of butterfly needle (gauge 19) mounted on the syringe. Tears were retrieved in Eppendorfs tubes and transported to laboratory. No topical anesthesia was employed. Serum was extracted from the blood taken from antecubital vein.

Data was analyzed using SPSS version 10.0. Chi-square test was used and P-value $\leq$ 0.05 is considered significant.

RESULTS

Tear Immunoglobulin E levels were normal in both groups i.e. A and B (normal 1-

2 ku/L max upto 5 ku/L). Serum Immunoglobulin E levels were elevated in twenty samples (83%) of group A(chronic conjunctivitis)and in six samples (38%)of group B(normal). Serum Immunoglobulin E levels were normal in 16% of group A and 62% of group B. This difference is statistically significant ($p<0.05$). Six patients with elevated serum Immunoglobulin E in group A were having history of asthma, nasal and skin allergy (fig-4). Tear film BUT (break up time) was on an average of 12 seconds which was consistently found to be on the lower side of the normal (15-35 seconds) (fig -5).

DISCUSSION

Immunoglobulin E is a special class of immunoglobulin produced by B cells on first exposure to a specific allergen. It is attached to the mast cells in tissues and basophils in the blood [3,4]. On subsequent exposure mast cells degranulate leading to release of histamine, cytokines, leukotrines and chemical mediators of inflammation responsible for symptoms [2,5]. In allergic conjunctivitis i.e. VKC (vernal kerato conjunctivitis), PAC (perennial allergic conjunctivitis), SAC (seasonal allergic conjunctivitis), tear Immunoglobulin E is elevated [1,6]. Therefore, measuring tear Immunoglobulin E is a relevant tool in diagnosing allergic conjunctivitis immunologically and its normalcy helps to exclude the same [6-8]. It is more important in diagnosing allergic conjunctivitis when clinical signs are trivial as compared to symptoms and be safely employed for screening allergic from environment related chronic conjunctivitis which has no allergic predisposition. Hence, immunologically conjunctivitis can be divided into Immunoglobulin E positive and Immunoglobulin E negative cases, the latter has different prognosis and outcome of treatment as revealed in our study. In our study serum Immunoglobulin E was elevated in 84% of the chronic conjunctivitis and 38%of the normal but tear Immunoglobulin E levels were normal in all cases.

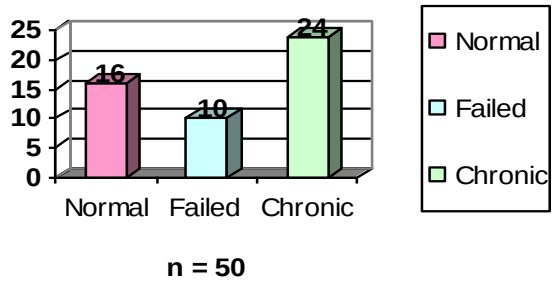
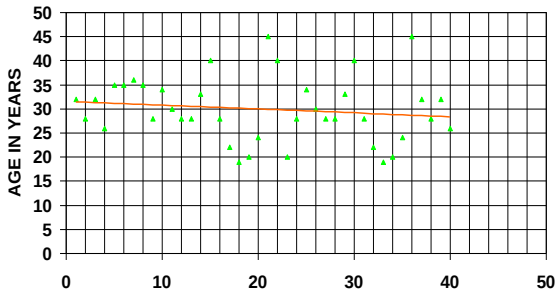


Fig.1: Samples breakup.



Fig,2: Age of drivers.

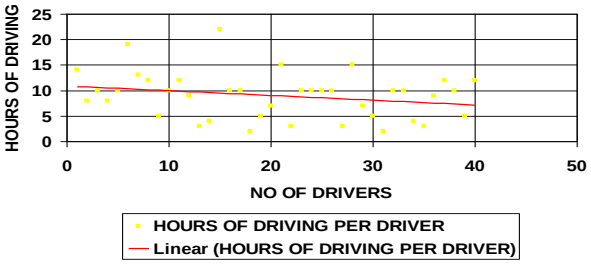


Fig.3: Driving times.

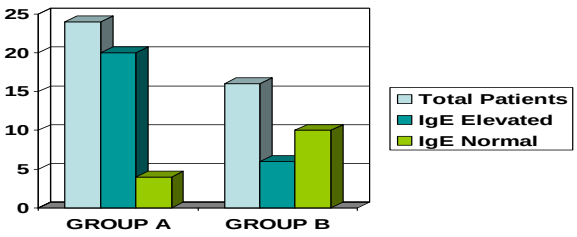


Fig.4: Serum IgE levels.

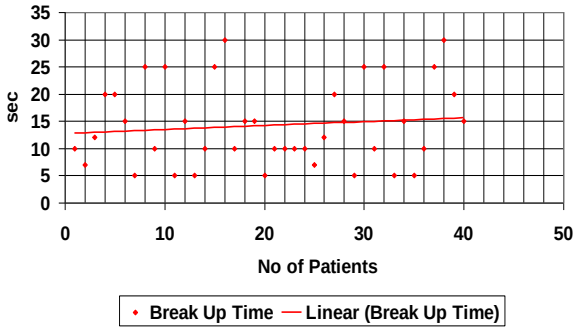


Fig.5:

In a study by Namura and Takamarua, tear Immunoglobulin E concentration was significantly increased in cases of allergic conjunctivitis as compared to normal [2]. Further, serum Immunoglobulin E has no correlation with tear Immunoglobulin E and symptomatology as revealed in previous studies and cannot be a reliable tool of diagnosing or excluding allergic conjunctivitis.

Measuring tear Immunoglobulin E is a relevant tool in diagnosing allergic conjunctivitis immunologically and its normalcy helps to exclude the same. So the clinician can safely prescribe tear replacement therapy and other precautionary measures in environment related chronic conjunctivitis rather than prescribing various brands of steroids with accompanying side effects.

CONCLUSION

Serum immunoglobulin E and tear Immunoglobulin E estimation acts as recognition component in differentiation of allergic conjunctivitis from chronic conjunctivitis (environment related).

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