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A STUDY OF CORRELATION BETWEEN ABSOLUTE EOSINOPHIL COUNT AND ASTHMA CONTROL IN ADULT PATIENTS

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ABSTRACT

Introduction: Bronchial Asthma is one of the most common disorders of inflammatory reactions of the respiratory tract, characterized by breathlessness, wheezing, minimal cough and expectoration. Hence aim of our study is to correlate absolute eosinophil count with asthma control in adult. **Methods and Methodology:** This study was conducted on the patient who attended the Asthma OP in a tertiary care teaching hospital. Patients of 18-75 years were selected for the study. Both the sexes were included and who belong to different socio-economic groups was taken as per inclusion criteria. A total of 40 cases were selected minimum of study was 6months. The statistical analysis made here is based on the data obtained from 40 cases. **Results:** In our study 57.5% of the asthmatic had increased eosinophil count (more than 450 cell/cumm) and 42.5% had normal absolute eosinophil count and p value 0.000. Mean eosinophil count was high in Uncontrolled asthmatics. **Conclusion:** Our study shows that serum absolute eosinophil count has a significant impact (p value 0.000) on asthma control, higher levels correlating with poor control, so increased dose or frequent steroid inhalation and dose adjustment, lower absolute eosinophil count well control of asthma. Measurement of absolute eosinophil count can be useful in assessing the severity of such inflammation.

KEYWORDS: Asthma, Eosinophil count, Control.

INTRODUCTION

Asthma has an alarmingly increasing incidence in the past few decades[1] and is one of the leading causes of morbidity in adults. Bronchial Asthma is a very common chronic disorder of the airways which affects individuals at almost any age and is an important cause of respiratory morbidity and mortality. The World health organization estimate is that there are 15 to 20 million people with asthma in India and affects 7% of the population and 300 million people worldwide.[2]

Bronchial asthma is a predisposition to chronic inflammation of the lungs in which the bronchi are reversibly narrowed.[3] It creates a substantial burden on individuals and families as it is more often under diagnosed & undertreated. Though effective screening, evaluation and management strategies are well established in developed countries, these are not fully implemented in India. Thus, asthma appears to be increasing in prevalence despite considerable improvements in management and numerous drugs for treatment of asthma. So, it is essential to study the role of other extraneous factors influencing the control of asthma. There is various Allergens concern everyone, since it has become the part and parcel of life due to various factors involved. To an extent, no one is spared

by allergens in atmosphere in which we live. All this allergen will precipitate the condition, leading to exacerbations of asthma where the smooth muscle cells in the bronchi constrict the airways and become inflamed and swollen thereby breathing become difficult. In modern system of medicine, drugs are used for long term prevention, starting with inhaler, corticosteroids and then long acting β-2 agonists if necessary.

Absolute eosinophil count is shown to be a risk factor for allergic asthma and can be used as a marker of disease severity in adult with asthma.[4] So, in the present study our aim was to study of correlation between absolute eosinophil count and asthma control in adult patients. These have prompted me to undertake a clinical study of Absolute Eosinophil count in bronchial asthma and to evaluate the effectiveness of medicine.

MATERIALS AND METHODOLOGY

This study was done as a cross sectional study in asthma clinic, in a tertiary care teaching hospital for a period of six months.40 patients who were aged 18 to 75 years attending asthma clinic were included in study. Patients with pulmonary tuberculosis, drug allergy, patients with acute infections, chronic inflammatory disorders, chronic systemic diseases and malignancies,

immunocompromised state, cardiac failure, pulmonary edema, pulmonary embolism, COPD, were excluded.

Detailed history and clinical examination was done. Peak expiratory flow rate (PEFR) was measured by using peak flow meter. Asthma control was assessed based on the parameters of GINA guidelines. Informed consent was obtained and blood samples were taken for measuring serum absolute eosinophil count. One way Anova followed by TUKEY HSD method for quantitative variables. Chi square test for qualitative variable was done.

RESULTS
In our study population among totally 40 patiens, male were 21 and female were 19 among which in males 6 were uncontrolled and 5 were partially controlled whereas in females among 19 patients 6 were uncontrolled and 7 were partly controlled. In male the sum of uncontrolled and partly controlled[11] is equal to controlled group.[10] In females sum of uncontrolled and partly controlled (68%) 2 times greater than controlled group (32%). There was no statistically significant difference between male and female with control.

Coming to influence of socioeconomic status in our study, there was equlaay 20 patients with low socioeconomic status and 20 patients with high socioeconomic status. Among low socioeconomic class 8 were uncontrolled, 5 were partly controlled, while 7 was well controlled, while among high socioeconomic group 4 were uncontrolled, 7 were partly controlled, while 9 was well controlled. High social economic and low social economic are equal disturbance with level of asthma control.

Next, we moved on to analysed the influence of various precipitation factor among our patients. As a whole 27 patients had precipitating factors, among which pet animal was the factor in ten patients, mosquito repellent in 6 patients, viral infection in four patients, pollens in 6 patients and smoke in one patient.

Next, we analysed the x ray findings in all patients and it was normal; in 32 patients and hyperventilation in 8 patients, all 8 patients were in uncontrolled group which was also statistically significant with a p value of 0.001. In 32 patients who had normal X ray 16 were well controlled, 12 partly controlled and 4 were well controlled.

Next, we did sputum microscopy to analyse the presence of eosinophils, where in our study 12 patients no eosinophils were seen and among which 11 were well controlled, among 28 with eosinophils present in sputum, 11 were uncontrolled and 12 were partly controlled and only 5 were well controlled. This was statistically significant with a p value of 0.001

We moved on in evaluate if there is any relation between ECHO finding and asthma controls, among 40 patients 6 patients had mild pulmonary hypertension and all six was poorly controlled, in rest 34 patients ECHO was normal. This relation was statistically significant too.

We analysed the absolute eosinophil count among our patients where 17 patients had count less than 450 and 23 had more than 450 among 17 with less than 450 16 were well controlled, whereas among 23 with more than 450 12 were uncontrolled and 11 were partly controlled. This was statistically significant.

We next moved on analysing the basic parameters like age, weight, height between different control groups and in all three groups and there was not much difference between groups in all three parameters.

Next we analysed the hospitalization and number of emergency visits to hospital and uncontrolled patients had more emergency visit and hospitalization when compared to normal or partly controlled patients which was also statistically significant in both cases.

We also analysed the PEFR values in our patients and the mean PEFR level was very low with amean value of 184.25 and partly controlled had a mean PEFR value of 260.33 and well controlled had a mean PEFR value of 346.5, this was analysed using ANOVA and it was also statistically significant. We further also analysed the mean PEFR % and it was also statistically significant lower values in uncontrolled group in comparison with other two groups.

Table 1: Control vs absolute eosinophil count.

GROUP	MEAN	SD
UNCONTROLLED	1070	130.38
PARTLY CONTROLLED	489.17	48.09
WELL CONTROLLED	218.25	54.23
ANOVA		
P VALUE – 0.001		
SIGNIFICANT		

We next calculated the mean absolute eosinophil count in all three groups, and absolute eosinophil count was very high in uncontrolled group and in normal range in controlled group and was statistically significant.

DISCUSSION
Bronchial Asthma is one of the most common disorders of inflammatory reactions of the respiratory tract, characterized by breathlessness, wheezing, minimal cough and expectoration. It is true that allopathic treatment can arrest the disease, but cannot cure completely.

This study was conducted on the patient who attended the Asthma op in tertiary care teaching hospital. The patients of 18-75 years were selected for the study.Both the sexes were included and who belong to different

socio-economic groups were taken as per inclusion criteria. A total of 40 cases were selected minimum of study was 6months. The statistical analysis made here is based on the data obtained from 40 cases.

In our study the total number of patients, recruited were 40. There was almost equal distribution of cases in the three groups with 12(30%) in uncontrolled, 16(40%) in controlled, and 12(30%) in partly controlled group as per GINA guidelines.

Sex distribution was almost equal among the subjects with 51% males and 49% females. Fifty percent of boys were found to be in the controlled group while the majority of girls (48.6%) were in the uncontrolled group. Totally 40 patient, male 21, female 19, uncontrolled asthma 6 for male 6 for female. Partly controlled male 5, female7. But contrarily Studies done by Kynyk Et al[5] show that women are more likely to develop asthma and suffer from more mortality than men.Hormonal and genetic susceptibility both contribute to this change.

Sex wise difference: male - sum of uncontrolled and partly controlled[11] equal to controlled group.[10] Female-sum of uncontrolled and partly controlled[13] (68.4%)2 times greater than controlled group[6](31.6%)

Among the overall sum of uncontrolled and partly controlled group, females constituted 68.4%, even though the initial sample sizes in both sexes were comparable. Males had sum of uncontrolled and partly controlled constituted 50%. The increased absolute eosinophil count seen in girls noted in our study needs to be validated by a larger study.

High social economic and low social economic are equal disturbance with level of asthma control, Low socioeconomic status (SES) has been linked to higher morbidity in patients with chronic diseases, but may be particularly relevant to asthma, as asthmatics of lower SES may have higher exposures to indoor (e.g., cockroaches, tobacco smoke) and outdoor (e.g., urban pollution) allergens, thus increasing risk for exacerbations.[6] An attempt was made in our study to find the correlation of height, weight and BMI with absolute eosinophil count.

Our study also find out relation between precipitating factor and asthma control. Asthma precipitating factors are pet animals, mosquito repellants, viral infections, pollens, smoke. As a whole 27 patients had precipitating factors, among which pet animal was the factor in ten patients, mosquito repellent in 6 patients, viral infection in four patients, pollens in 6 patients and smoke in one patient. In a study done by de Groot et al[10], the comorbidity associated with AR is high in adult age group and in children, Studies by Louis Philippe Boulet[11], Marie Eve Boulay, report that asthma in adults is most commonly associated with comorbidities such as rhinitis, sinusitis, obesity, obstructive sleep apnea and gastro-oesophageal reflux disease which is similar to comorbidities in our study population.

An attempt was made in our study to find the correlation of hospitalization, emergency visit ray chest, ECHO with absolute eosinophil count sixty percent (60%) of the asthmatic had increased eosinophil count and forty percent (40%) had normal absolute eosinophil count, similar to the study by Koshak et al and Kamfar et al.[7] Among the 40 asthmatic patients 27(67.5%) had precipitating factors.so may be allergic asthma patient had increased absolute eosinophil count compares with non-precipitating (non atopic) factors.

Our study shows that serum absolute eosinophil count have a significant impact on asthma control, higher levels correlating with poor control so increased dose or frequent steroid inhalation and dose adjustment, lower absolute eosinophil count well control of asthma.

Lung function as measured by PEFR in our study, showed a positive correlation with absolute eosinophil count. Patients with high absolute eosinophil count (more than 450) had a much lower PEFR %, thus indicating an impaired lung function. High absolute eosinophil count is generally associated with inflammatory and infectious diseases thus impairing pulmonary function and contributing to poor control. It must be noted however that PEFR is currently not recommended for asthma diagnosis by most international guidelines.[8] However, PEFR provides additional objective evidence of airflow obstruction in the absence of spirometry.[9]

Respiratory tract infections are the commonest trigger for asthma exacerbation. High absolute eosinophil count is frequently associated with increased incidence of respiratory tract infections and inflammation. Thus it is worthwhile to assess the absolute eosinophil count status in all adults with asthma especially so in the uncontrolled and partly controlled group. Supplementation of systemic or inhaler steroids decreases the incidence of respiratory inflammation, thus diminishing the asthma exacerbations. It is difficult to ascertain that high absolute eosinophil count alone is responsible for poor asthma control from observational study like ours. Interventional studies with larger sample size would be required to prove the cause-effect relationship.

Persistent inflammation is the prime contributory factor for the symptomatology in uncontrolled asthma. Measurement of absolute eosinophil count can be useful in assessing the severity of such inflammation. So the evaluation of absolute eosinophil count is a useful baseline investigation and its serial measurements can be taken as a marker for adjusting the dose of inhaled steroids. Thus we infer from our study that there is a positive correlation between absolute eosinophil count and asthma control.

CONCLUSION

The prevalence of Allergic bronchial asthma is more in females 19 (47.5%) than in males 21 (52.5%) Bronchial asthma is equal on both social economic status. Absolute eosinophil count in majority of the cases 24 (60%) had increase absolute eosinophil count more than 450 cells/mm3. 4.our study shows that serum absolute eosinophil count have a significant impact on asthma control, higher levels correlating with poor control, so increased dose or frequent steroid inhalation and dose adjustment, lower absolute eosinophil count well control of asthma. Our study show sixty percent (60%) of the asthmatic had increased eosinophil count and forty percent (40%) had normal absolute eosinophil count. A detailed case taking and evaluation is necessary for the management in these cases. Creating awareness and promoting knowledge education, among the patients and their families is also vital for the proper implementation of the treatment. Measurement of absolute eosinophil count can be useful in assessing the severity of such inflammation. So the evaluation of absolute eosinophil count is a useful baseline investigation and its serial measurements can be taken as a marker for adjusting the dose of inhaled steroids.

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