

EOSINOPHIL COUNT AND RELATION TO CHILDHOOD ASTHMA

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Abstract

Background: Asthma is a diffuse obstructive lung disease with hyperreactivity of the airways to variety of stimuli. The prevalence and severity of the disease are steadily increasing. In addition to broncho-constriction and viscid secretions, inflammation is an important pathophysiological factor, eosinophil play important role in this inflammation. Eosinophil peripheral blood count in Asthmatic patient is our concern in this study.

Objective: Study the relationship of eosinophil peripheral blood count and Asthma.

Methods: A total number of 55 asthmatic children subjected to a prospective study regarding the severity of asthma, which assessed by clinical examination and spirometry and for each patient a sample of blood, were collected and eosinophil count was calculated.

Results: 35 of a total 55 asthmatic patient found to have moderate to severe asthma of this category 82.8% (29 patients) were having high eosinophil count $>400 / \text{mm}^3$ while 17.2% (6 patient) of less eosinophil peripheral count $< 400 / \text{mm}^3$. The other 20 patients were mild to moderate severity, of these 80% (16 patients) were of low eosinophil count < 400 and 20% (four patients) were of high eosinophil count).

Conclusion: There is an increase in eosinophil peripheral blood count in Asthmatics and the more the severe the attack, the more the eosinophil count.

Key words: Asthma, Eosinophil, Severity

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Introduction

Asthma is a leading cause of chronic illness in childhood and responsible for a significant proportion of school days lost because of chronic illness.

Asthma can lead to severe psychosocial disturbance in the family^[1]. Asthma is a condition characterized by variation of intrathoracic airway obstruction, which occur spontaneously, or because of treatment. Asthma in fact is an umbrella term rather like hypertension both are clinically important syndromes brought about by several different mechanisms. The prevalence and severity are steadily increasing in most industrialized nations, presumably as a result of environment change^[2]. Asthma defined

as a diffuse obstructive lung disease with hyperreactivity of the airways to a variety of stimuli and a high degree of reversibility either of the obstructive process, which may occur spontaneously, or because of treatment. In addition to broncho-constriction and viscid secretions, inflammation is an important pathophysiological factor; it involves eosinophil monocytes and other immune mediators^[3].

The eosinophil is a minor species of granulocyte comprising 1-4% of total peripheral blood WBC (normal range $0.04-0.44 \times 10^9/\text{L}$). The eosinophil is the densest leukocyte in the peripheral blood but can also exist as hypodense form common in the blood of patients with asthma or dermatitis. Eosinophils have less phagocytic and bactericidal activity than neutrophils but have an important role in mediating hypersensitivity reactions, bronchial asthma and skin inflammation^[4].

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Eosinophil, predominantly provide protection against parasites aided by T-Helper lymphocyte^[4].

The intention of the study is to find the relation between eosinophil count in the peripheral blood of patients with asthma and severity of their disease.

Patients and Methods

A total number of 55 asthmatic children subjected to a prospective study regarding the severity of their asthma, which assessed by clinical criteria (mild, moderate and severe) and supported by spirometry measurement of FEV1 taken by portable spirometer in out patient clinic.

From each patient venous blood collected into dik-EDTA tube, and 20-millimeter blood mixed with 400 mm of glacial acetic acid, improved Neubaur

chamber used to calculate the total leukocyte count, a blood film was prepared using leishman's stain and the differential WBC count found^[5]. The absolute Eosinophil count calculated according to the formula^[6].

$$\text{Absolute eosinophil count} = \frac{\text{differential eosinophil count} \times \text{total WBC}}{100}$$

Results

There was 35 cases with moderate-sever asthma (63.6%), divided into 29 (82.8%) with $>400/\text{mm}^3$ and 6 (17.2%) $<400/\text{mm}^3$ and 20 cases were mild-moderate asthma (36.4%), divided into 16 (80%) <400 and 4 (20%) >400 , the difference between the two groups was statistically significant using chi-square.

Severity of Asthma attacks

Parameters	Mild	Moderate	Severe	Respiratory arrest imminent
Talking in alertness	Sentences , may be agitated	Phrases, usually agitated	Words, usually agitated	Drowsy or confuse
Respiratory rate	Increased	Increased	Mark increase	Paradoxical
Accessory muscle	Usually not	Usually	Usually	Paradoxical thoraco-abdominal movement
Wheeze	Moderate , often only end expiratory	Loud	Usually Loud	Absence of wheeze
Pulse / min	<100	100-200	>120	Bradycardia
PEF	over 80%	60-80%	$<60\%$	

Discussion

Many studies suggest the relation of eosinophils to allergy and hyper reactive airway diseases. The increase in the percentage of moderate-severe asthmatic children may be because the mild case did not reach the center and treated as out patients. The following are examples of some international studies about asthma and eosinophil:

Tonnel and colleagues in their study^[7] showed the relation of neutrophils and eosinophil increase in asthma in blood and sputum^[6]. Lemiere and colleagues^[8] discover the increase in

eosinophil in peripheral blood with the more exposure to trigger factors (which support this study). Yamada and colleagues said that the high eosinophil count. And Eotaxin (protein secreted in the lung of asthmatic which is a chemo attractant for eosinophil) the more unstable asthma^[9]. They found that about 75% of patients were of high eosinophil count.

Also Lilly CM and Colleagues showed that the more unstable acute attack of asthma the more high eotaxin and eosinoph count^[8,10]. However good relationship of eosinophil to asthma

eosinophil can increase by many allergic conditions and parasitic infestation, which can bias the study and this, can be overcome by selection of defined asthmatic by proper history and clinical finding and spirometry.

Conclusion

The increase in eosinophil count in asthmatic patients is correlate with the severity of attack, the more severe the high blood eosinophil

Recommendations

1. Eosinophil count could be used to asses asthmatic severity.
2. Correlation of clinical and lab finding (eosinophil count) give the best assessment by decrease the range of error in the assessment.

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