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Original Research Article

Study of Eosinophil Count by Indirect Method in Medical Students of a Medical College in North-East India

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ABSTRACT

Background: Eosinophils are granulocytes with normal count in between 200-500 per cubic millimeter. Exceeding this range is referred to as eosinophilia. Eosinophilia may be an incidental finding but mostly it is due to parasitic infestation, allergy disorder etc. This study was therefore done to determine the incidence of eosinophilia among the student volunteers and to find out the difference in eosinophil count between normal and eosinophilia cases.

Material and Methods: This study was done in Dept. of Physiology, Jorhat Medical College. Eighty newly admitted student volunteers of age 17-25 years were taken for the study. 3 ml of blood was collected from each subject. Total and Differential Leucocyte count (DLC) were measured. Thereafter using these two, the Eosinophil Count was measured by Indirect Method. Descriptive statistics like mean and standard deviation were calculated using MS Excel. Student's Unpaired t- test was used to compare data and P value <0.05 was considered as significant.

Results: Distribution on the basis of eosinophil count showed that 76 students (95%) had normal count while 4 students (5%) had mild eosinophilia. There was significant difference in eosinophil count between the two groups (p value <0.0001).

Conclusion: Eosinophilia may be associated with parasitic infections, skin diseases and allergic disorders. Thus, necessary investigations and proper history count should be carried out to evaluate any cases of eosinophilia.

Key-words: Medical students, Eosinophil count, Eosinophilia.

INTRODUCTION

Eosinophils, usually bilobed, 12–17 μm in diameter. are granulocyte white blood cells, first described by Paul Ehrlich for their characteristic granules that exhibit a high affinity for eosin, a negatively charges dye. They are present in peripheral blood and tissue and also found sparsely in tissues like the medulla of thymus, lower gastrointestinal tract, ovary, uterus, spleen and lymph nodes.[1]Eosinophils however are physiologically not seen in the lungs, skin, esophagus and other internal organs.[2] Eosinophils comprises 1 – 6% of peripheral blood leukocytes and their absolute count is 200- 500 /μl.[3]Mild eosinophilia is considered to be 500–1500 cells/μL; moderate : 1500–5000 cells/μL; extreme eosinophilia is regarded as >5000 cells/μL.[4] Any abnormality in eosinophil count can be detected on a complete blood count (CBC). Alternatively, the eosinophil count may be recorded as a percentage of total leukocyte count, along with other white blood cells like monocytes, basophils, neturophils or lymphocytes.[5] Several factors affect the normal values of eosinophil count including diurnal variation, age sex and geographical distribution. In hospitals, eosinophil count is frequently advised to monitor response to allergic conditions and in patients under treatment for parasitic infections.[6] In recent years there has been an explosion of interest in the eosinophil, reflected in an exponential increase in the number of published papers and books devoted to the cell.[7] .This is because eosinophil is responsible for the tissue damage seen in asthma and modulation of eosinophil function may be an effective therapy for the disease. We have therefore decided to study the eosinophil count among the first-year medical students and detect if there is any cases of eosinophilia.

MATERIALS AND METHODS

This study was done in Dept. of Physiology, Jorhat Medical College**.** This experimental study was carried out among the first-year medical students of Jorhat Medical College, Jorhat. Sampling technique was simple random sampling. Eightystudents were taken for the study. Ethical clearance was obtained from Institutional Ethical Committee (H), Jorhat Medical College, Jorhat.

The study included student volunteers of age 18-25 years who were apparently free from any allergic disorder, helminthic infestation, bronchial asthma, rheumatoid arthritis and other documented medical or surgical illness. 3 mls of blood was collected from each subject, from a prominent vein, using the standard venepuncture techniques. 3mls of each sample was dispensed into EDTA anticoagulant bottle. Total and Differential Leucocyte count (DLC) were measured by Accurex Acculab Cbc 360+ Hematology Analyserand the percentage of eosinophils from DLC was recorded. Thereafter using these two, the Eosinophil count was measured by indirect method.

STATISTICAL ANALYSIS

The data were entered into the computer catalogue. Descriptive statistics like mean and standard deviation were calculated using MS Excel. The response frequencies were calculated and analysed by using statistical software QUICKCALs software version 2.0. Student's Unpaired t- test was used to

compare data and P value <0.05 was considered as significant and P value <0.01 and P value <0.001 was considered as highly significant and extremely highly significant respectively.

RESULTS

Distribution of 80 participants showed that 46 students (57%) were male and 34 students (43%) were female. **(Table 1)**

Table-1: Distribution of Male and Female Study participants

Gender	N	%
Male	46	57%
Female	34	43%

Distribution on the basis of eosinophil count showed that 76 students (95%) had normal count while 4 students (5%) had mild eosinophilia. **(Table 2)**

Table-2: Distribution of the study participants as per Eosinophil count.

Parameters	Mild eosinophilia	Normal count
No. of Students (%)	4 (5%)	76 (95%)

In Table-3, comparison of male and female participants with respect to Eosinophil count showed that 44 males (95.6%) and 32 females (94.1%) had normal eosinophil count while 2 males (4.4%) and 2 females (5.9%) had mild eosinophilia.

In Table-3, comparison of male and female participants with respect to Eosinophil count showed that 44 males (95.6%) and 32 females (94.1%) had normal eosinophil count while 2 males (4.4%) and 2 females (5.9%) had mild eosinophilia.

Table-3: Percentage of male and female participants with No and Mild Eosinophilia.

Parameters	**Male (n=46)**	**Female(n=34)**
No eosinophilia	44 (95.6%)	32 (94.1%)
Mild eosinophilia	2 (4.4%)	2 (5.9%)

Table-4 shows difference in eosinophil count between 'No Eosinophilia' and 'Mild Eosinophilia'.

Table-4: Comparison of Eosinophil count of 'No' and 'Mild Eosinophilia' groups

Parameters (Mean ± Sd)	No eosinophilia **(n**= 76)	**Mild eosinophilia (n**=4)	P value
Eosinophil count	173.01± 111.65	895.75 ± 371.74	<0.0001*

***statistically significant**

DISCUSSION

In our study, eosinophilia was detected in 5% of the study population. Similarly, a study done by Rimpi et al[3] found incidence of eosinoiphilia to be 10%.

In our study, 4.4% males and 5.9% females had mild eosinophilia. This was much less compared to a study done in northern India where 71.2% males and 28.8% females had eosinophilia.[5] In our study, 5% of the total participants had mild eosinophilia. This was in contrast to study done among rural population of Barabanki and neighbor districts where all, 47% of the study population had mild and 30% had moderate eosinophilia.[6] Presence of eosinophilia in our study was an incidental finding. So, those students were sent to Medicine O.P.D and further investigations and diagnostic work up were carried out after careful history to assign a definite cause of eosinophilia.

Previous studies also showed that a thorough history is important for evaluation of blood eosinophilia.[19] A common cause of eosinophilia is allergic reaction to drugs (iodides, aspirin, sulfonamides, nitrofurantoin, penicillins, and cephalosporins).[7] Other laboratory tests include urine and stool examination for parasites, cysts and ova.[6,7,8] Significant advancement is made to understand eosinophil immunology like eosinophil production, apoptosis. Interleukin (IL)-5, IL-3, and the granulocyte-macrophage colony-stimulating factor (GM-CSF) increase eosinophil production .Chemokines like eotaxin-1, eotaxin-2, and RANTES (regulated on activation normal T cell expressed and secreted) cause eosinophils to migrate from bone marrow into blood and then into peripheral tissues.[9,10] Eosinophils are source of many cytokines, including IL-2, IL-3, IL-4, IL-5, IL-7, IL-13, IL-16, TNF-α, TGF-ß, RANTES, several proteins like eosinophil cationic protein (ECP), eosinophil peroxidase (EPO), lysophospholipase, major basic protein (MBP) and eosinophil-derived neurotoxin (EDN), contributing to their immunologic responses.[11,12] Eosinophilia affects individuals of all ages. Evaluation of unexplained eosinophilia in an asymptomatic individual is a challenge that requires knowledge of many potential pathogens. Nevertheless, the prevention of morbidity by the diagnosis and prompt treatment in a case of eosinophilia is utmost important.

CONCLUSION

Eosinophilia cases may be asymptomatic as reported in our study. However, eosinophilia may be associated with parasitic infections, skin diseases and allergic disorders. Organs like heart, lungs and gut can also be infiltrated and damaged by eosinophils. Assessment of all these organs is necessary. Thus, Complete blood count including eosinophil count and proper investigations with thorough history taking should be carried out to evaluate any cases of eosinophilia to assess the cause.

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