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Original Research Paper

Physiology

INCIDENCE OF EOSINOPHILIA IN RURAL POPULATION OF NORTHERN REGION OF KASHMIR IN INDIA (A STUDY AT TERTIARY CARE HOSPITAL)

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ABSTRACT

Background: Eosinophilic count varies and fluctuates demographically because of culture, exercise and environment i.e. seasonal allergen exposure, classified as mild if more than 500- 1500/cu mm, , moderate if 1500-5000 /cu mm, and severe more than 5000 /cu mm.(1,2). Significant tissue eosinophilia can occur without an elevated blood count and vice versa (3). Percentages above 5% are regarded as elevated, but is not reliable indicator as it depends on total leucocytes, hence absolute count (AEC) is necessary for diagnosis. Evaluation of unexplained eosinophilia in an asymptomatic subject, needs further exploration, **Method;** A prospective tertiary Hospital study of non-randomized 2138 subjects aged 10 yrs.to 75yrs attending OPD and indoor admitted was conducted. **AIMS;** The aim of the study was to determine the incidence of eosinophilia in the rural border areas in Kashmir, where negligible literature is available and comparison with whatever available literature. **Conclusion:** In tropical countries like India, high percentage is expected.. In this study eosinophilia was present in 5.09%, of subjects which is very less as compared to other parts of India though this province of kashmir is near border hence under developed, being at an altitude of >5128ft, cold, lush green hilly area with allergy related problem is prone for chronic respiratory problems..

KEYWORDS : Eosinophils, Allergy, Helminthic, Immunology

INTRODUCTION

Eosinophil's are granulocytic white blood cells, recognized by Paul Ehrlich about 125 years ago (4) and is the second least in number. They are also found i.e medulla of thymus, lower gastrointestinal tract, ovary, uterus, spleen and lymph nodes, normally not seen in the lungs, skin, esophagus and other internal organs, there presence in them indicates disease (5,6). Eosinophilia is count above 0.5 10^9/l., higher in neonates than in adults and the values gradually fall in the elderly. In some institution higher values are recommended (7, 8).

There is no sex or ethnic variation, in subjects with primary eosinophilia without organ involvement, no treatment may be necessary. Diurnal variation may be as much as 100% (9,10), lowest counts in the morning 10 A.M-12A.M a time at which endogenous steroids are the lowest and the highest in the midnight 00 A.M- 04 A.M. The circulating life span of eosinophil is 6-12 hrs. Before it migrates to tissue In contrast, blood hyper eosinophilia (HE) is defined as an AEC of $\geq 1.5 \times 10^9$/ which is relatively rare and should prompt a thorough evaluation for an underlying cause. The majority of cases of eosinophilia are Secondary (reactive) with allergic disorders , drugs ,infectious diseases, gastrointestinal disorders, vasculitis's, rheumatologically disease, respiratory disease, neoplasms (non-hematological and hematological in which the eosinophil's are not part of the neoplastic clone, lymphocytic variant hyper eosinophilic syndrome ,miscellaneous causes graft-versus-host disease, Gleich syndrome (11) Primary (clonal) eosinophilia

Meteorologically seasonal variations usually starts in late April, peaks in May and gradually subsides in late June. Blood picture depend upon the physiological adaptation of the body to the new set of environmental situation. (12, 13).but unlike the neutrophils it can recirculate and have a much longer life(14).In tertiary care hospital situated against a backdrop of a rural population, it was observed that surgeries were delayed as a result of an increased blood eosinophilia, due to bronchoconstriction during anesthesia. The clinical manifestations becomes important to prevent organ damage by these inflammatory substances. Refined hematological computerized equipment, are spotting a lot of new, repeatedly unanticipated cases of eosinophilia (15).

AIMS AND OBJECTIVES;-

1. A study was undertaken to find out the Hospital based prevalence of blood eosinophilia in a rural population
2. Compare these figures with blood eosinophilia in a hospital based urban and rural population of other places as very less literature is available in this tropical country

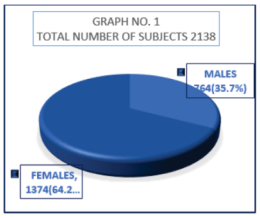
MATERIALS AND METHODS:

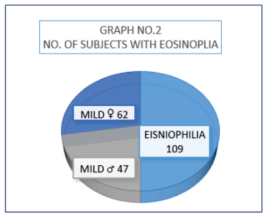
This was a prospective study which was conducted in the Pathology department of the newly created govt. medical college and tertiary hospital in rural area of northern province in Kashmir.. A total number of 2138 subjects who visited our hospital were tested. These included OPD, indoor and emergency ward subjects. Subjects with hematological malignancy were excluded from our study, a detailed medical history that including an assessment for allergic disorders, such as asthma, eczema, urticarial and hay fever. Skin rashes or lymphadenopathy, cardiorespiratory and gastrointestinal symptoms i.e, fever drenching night sweats, weight loss, pruritus. A detailed travel and drug history was also recorded. A thorough physical examination was done. Total complete blood count and differential counts was done on IRIF-I count 5 Hematology Analyzer. Having normal range of 0.04-0.50 for eosinophils**,** 5.09% were found to have eosinophilia. The arbitrary eosinophil count accepted for a diagnosis of CEL, NOS and idiopathic HES (16) (Chusid et al, 1975) was not accepted because the new version of equipment analysis at an molecular level hence permits certain entities to be diagnosed with a lower count (because hypo granular eosinophil's may not be counted accurately by automated counters).Also the cytological features of eosinophil's are not helpful in the differential diagnosis given that striking abnormalities can occur in reactive and clonal eosinophil's are cytological fairly normal.(17) Eosinophilia was based on counts and not defined by the percentage (typically <5 percent in healthy individuals), as it varies with the total WBC count and the proportion of other WBC lineages (eg, neutrophils, lymphocytes).

RESULTS:

Total number of subjects registered was 2138, Graph -1 shows subjects were 321(33%) males and 663 (67%) were females. Age group of subjects varied from 10 yrs. to 75 yrs**.** Graph -2 shows Eosinophilia distribution of subjects according to severity of

eosinophilia was mild in 109 .out of which 62 were females and 47males.





Compared with other states of India, mean eosinophil counts were not higher in peak pollen month i.e. april as compared to the counts taken one month earlier but the results had no statistically significance. The chief complaints of our subjects were related to fever, cough, rashes, and breathlessness, wheezing etc. other major group of subjects had symptoms of abdominal pain, diarrhea, pallor, pica and loss of appetite.

DISCUSSION;-

Despite being the second least represented granulocyte subpopulation in the circulating blood, eosinophils are receiving a growing interest from the scientific community, due to their complex pathophysiological role in a broad range of local and systemic inflammatory diseases as well as in cancer and thrombosis Eosinophilia was detected in 5.09% of the population who visited the hospital. The disparity in the incidence in males and females is probably due to the fact that the overall number of male subjects visiting the hospital is low as compared to females during this period which is beginning of farming season. Eosinophilia was seen in subjects of all age groups. Many subjects came with chief complaints associated with eosinophilia i.e. allergy in others it was an incidental finding (18) Eosinophilia is diagnosed by a simple blood test if problem exists then diagnoses will involve examination of the relevant tissue normal bone marrow contains between 1% and 6% eosinophils and these produce an eosinophil count in the peripheral blood of 0.05–0.59 109/l. In tropical countries like India, the most common cause of eosinophilia is parasitic infestation, unhygienic living condition and poor sanitation that accounts for high worm infestation in India. These finding differ from another study from India done a decade ago, which reported parasitic infestation as a more common cause than allergic rhinitis (19). As the subjects who are well with mild to moderate eosinophilia between 0.5-1.53 109/l may not require further testing. Subjects with systemic symptoms and those with persistent eosinophilia (0.5-1.53 109/l), irrespective of suspected organ damage, should be considered for additional testing for an underlying cause In another study done (10.7%) subjects visiting the hospital of northern India had (62%) mild eosinophilia, of which (71.2%) were males and (28.8%) females. In all, 47% of the study population had mild and 30% had moderate among rural population of barabanki and neighbor districts were no access is to hygienic mode of stool disposition as reactive type based on clinical suspicion, should be confirmed or excluded at an early stage by appropriate testing. In one of studies carried at SKIMS Kashmir for patients with RA shows almost more than 70% had normal count though suffering from autoimmune diseases with high disease activity.

TABLE NO. 1 COMPARISION AT NATIONAL AND INTERNATION LEVEL

	NO. OF FEMALES	NO. OF MALES	HIGH COUNT	NORMAL
OUR STUDY	1374	764	5.09%	94%
1. SKIMS Kashmir with RA[20]	103 (76.9%)	31 (23.1%)	29 (21.6%)	105 (78.4%)
2. Barabanki and neighboring districts of eastern Uttar Pradesh [21]	73 (64.03%)	41 (35.97%)	69 (60%)	45 (40%)
3. Incidence of eosinophilia in rural population in North India: A Study at tertiary care hospital [22]	71.2%	28.8%	(10.7%)	89.3%
4.Blood and tissue eosinophilia 23	Eosinophilia 14. %	Eosinophilia 11.17%	100 (25%)	400(75%)
5. Seasonal variation in eosinophil count in normal healthy adult females [24]	------	45	40(88.88%) seasonal increase in April.	5(11.2%)

The present study was conducted with an aim to document the prevalence of eosinophilia in rural population of kashmir . Identification of possible cause's may be a next step as a significant proportions of children are suffering from anemia, under nutrition, anorexia, pain abdomen, cough and hence long term morbidity. All these chronic problems are preventable and treatable with simple corrective steps of which the most important ones are access to safe drinking water and toilet.

Further significant advancement in recent times has been made in understanding the mechanisms of eosinophil production, apoptosis, and how eosinophil immunology contributes to both host defenses against infections, tissue damage and autoimmune diseases. New syndromes like hyper- eosinophilic syndromes (HESs) that effects almost any organ has been documented where there is moderate to severe eosinophilia which leads to extensive extracellular deposition of eosinophil-derived proteins in tissue as demonstrated by immunostaining.(25) The other is eosinophilia-myalgia syndrome which is a multisystem disease, chronic and fatal with counts > 1500 /µl without any cause. Subjects with AEC ≥1500/ µl should have a CBC repeated in one to two weeks to determine if the eosinophilia is transient, stable, or rising; the CBC should be repeated even when eosinophilia is detected incidentally in an asymptomatic patient.

CONCLUSION;-

Eosinophilia appears to be a common occurrence in rural population around the tropical countries across the globe due to poverty, hygiene, diet and in addition Kashmir being an border area hence underdeveloped, besides high altitude >5128 ft. effects, cold and green hilly belt area prone to allergy at the peak of allergic season i.e. march - June leads to more respiratory problems, our study showed lower incidence of mild eosinophilia only effecting all ages this indicates probably good living habit, proper diet, better hygiene and education ,that may not require further testing**.** For such asymptomatic subjects it may be reasonable to postpone a repeat CBC for a month or longer, after ensuring there are no clinical findings suggestive of eosinophilic end-organ damage, no history of travel or residence in helminthic-endemic areas, no history of drugs and no features of a malignancy, concurrent neutrophilia suggest infection or inflammatory condition, basophilia reflect a myeloid malignancy or allergic disorder, and lymphocytosis associated with a lymphoid malignancy and persistent eosinophilia at least 1-5.3 10^9/l), irrespective of suspected organ damage, should have additional testing for an underlying cause, i.e., stool test, allergic tests, marrow smears, fluorescence in situ hybridization (FISH) or PCR. Further long-term studies could answer the question of immunological response for potential asthmatics or high risk of seasonal allergic rhinitis.

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