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Analysis of association of diseases, drug use, smoking and alcoholism in patients with eosinophilia: A prospective study

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Abstract

Background: Increase in the eosinophil count is commonly observed in various pathological conditions. The present study aimed to assess the association of diseases, drug use, smoking and alcoholism in patients with eosinophilia.

Materials and Methods: The present study was conducted in the Department of Pathology, Government Medical College, Thrissur, Kerala for one year. A total of 116 patients were included in the study on the basis of inclusion and exclusion criteria. All the patients were explained the study procedure and informed consent was obtained. The patient's demographic and clinical data was recorded. Blood samples were collected from each patient and used for peripheral smear analysis. The data was expressed in number and percentage. Microsoft excel was used for analysis.

Results: Maximum patients were between the age of 41-50 years. Males were more in number compared to females. Hypertension and ischemic heart diseases were the most common diseases compared to others. Most of the patients were on aspirin medication. In study population, 40 were smokers and 30 were alcoholics.

Conclusion: Eosinophilia is commonly seen in middle aged patients with cardiovascular disease, smoking and alcoholism.

Keywords: Alcoholism, eosinophilia, age, gender, smoking, drugs

Introduction

Eosinophils are mobile, terminally differentiated granulocytes that arise principally from the bone marrow^[1]. In 1879, Paul Ehrlich reported the avidity of a subtype of blood leukocytes for the acidic stain eosin and thus named these cell types "eosinophils"^[2]. Although rare in healthy individuals, the eosinophil is prominent in peripheral blood and tissue in association with various disease conditions including allergy, inflammatory responses against metazoan helminthic parasites and certain skin and malignant conditions. Diseases of hematopoietic system like chronic myeloid leukemia, polycythemia vera, pernicious anaemia, myelofibrosis and Hodgkins lymphoma may exhibit eosinophilia. Normal eosinophil count in the human blood varies from 0-500 cells/mm³. Eosinophilia is considered to be mild when the eosinophil count is between 500-1500/mm³, moderate when the count is between 1500-5000/mm³ and severe when the count is above 5000/mm³. The half-life of eosinophils in the circulation is approximately 18 hours with a mean blood transit time of 26 hours^[3]. Circulating eosinophil counts exhibit diurnal variation in humans, in which the lowest and highest levels are seen in the morning and evening respectively, often exhibiting more than 40% variation within a day^[4, 5]. Eosinophil count can significantly increase in allergic reactions, parasitic infection, drug use, smoking, alcohol consumption and solid organ malignancies^[6, 7]. The present study aimed to evaluate the association of diseases, drug use, smoking and alcoholism in relation to eosinophilia.

Materials and Methods

Study design and settings

The descriptive study was done in the Department of Pathology, Government Medical College, Thrissur, Kerala. Study protocol was approved by Institutional Research Committee (IRC) and Institutional Human Ethics Committee (IHEC). The study procedure followed standard diagnostic methods.

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Inclusion criteria

- Males and females
- Eosinophil count more than 500/mm³
- Willing to sign on informed consent form

Exclusion criteria

- Patients in ICU
- Cancer
- AIDS
- Major surgery (Last 3 months)

Procedure

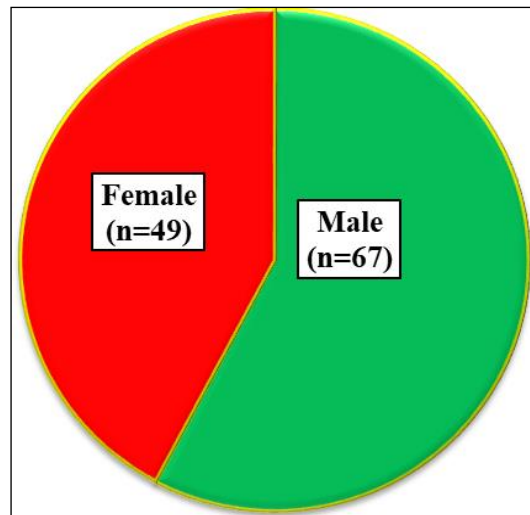
The study included a total of 116 patients fulfilling the inclusion and exclusion criteria. All the patients were explained study procedure and informed consent was obtained. Demographic data like age, gender, smoking, alcohol consumption, drug medication and comorbid conditions were recorded for analysis.

Statistical analysis

The data was expressed in number and percentage. Microsoft excel 2019 used for the calculation of percentage and drawing the graphs.

Results

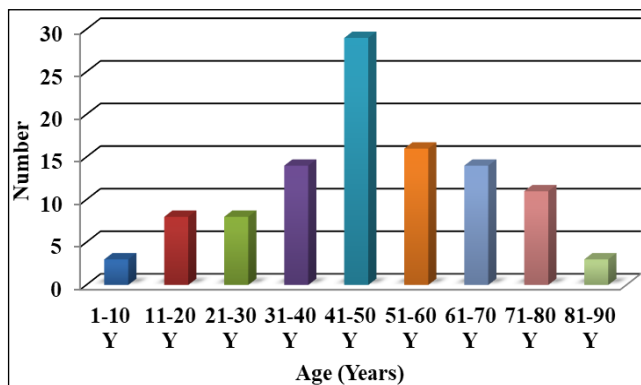
The study was done on 116 patients. Maximum number of patients were between 41-50 years. Least number was seen in age group between 1-10 and 81-90 years (Graph-1). Males were more compared to females in the study population (Graph-2). Hypertension was the most common condition (n=16) observed in the study population compared to others. 10 patients had ischemic heart disease and 8 had diabetes (Table-1). All the patients were using some drugs for comorbid conditions. Aspirin was the most commonly used drug (n=11) compared to other classes of drugs (Table-2). In the study population 40 were smokers and 30 were alcoholics (Graph-3).



Graph 2: Distribution of patients based on the gender

Table 1: Distribution of patients based on associated conditions with eosinophilia

| Condition | Number |
|--|--------|
| Hypertension | 16 |
| Ischemic heart disease | 10 |
| Diabetes mellitus | 8 |
| Cerebrovascular disease | 6 |
| Exfoliative dermatitis | 6 |
| Asthma | 5 |
| Old pulmonary tuberculosis | 5 |
| Neoplasia | 4 |
| Occupational exposure to dust | 2 |
| Valvular heart disease | 2 |
| Cervical myelopathy | 2 |
| Henoch Schonlein Purpura | 1 |
| Hypersensitivity reaction to phenytoin | 1 |
| Hyperthyroidism | 1 |
| Hypothyroidism | 1 |
| Psoriasis vulgaris | 1 |
| Scabies | 1 |
| Wilson's disease | 1 |
| Snake bite | 1 |
| Erythema multiforme | 1 |
| Seizure disorder | 1 |
| Alcoholic liver disease | 1 |
| Pulmonary tuberculosis | 1 |
| Sickle cell disease | 1 |
| Amoebic liver abscess | 1 |
| Erythema annulare centrifugum | 1 |

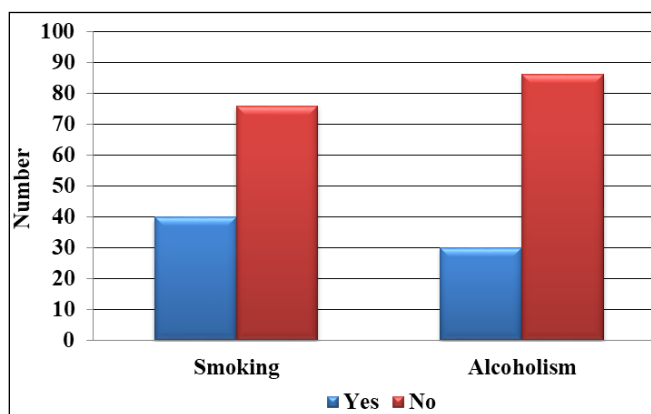


Graph 1: Distribution of patients based on the age

Table 2: Distribution of patients based on the drug use with eosinophilia

| Drugs | Number | Percentage (%) |
|------------------|--------|----------------|
| Aspirin | 11 | 32.4 |
| Amlodipine | 7 | 20.6 |
| Metformin | 7 | 20.6 |
| Clopidogrel | 6 | 17.6 |
| Glibenclamide | 5 | 14.7 |
| Enalapril | 3 | 8.8 |
| Atenolol | 3 | 8.8 |
| Sodium valproate | 2 | 5.9 |
| Losartan | 2 | 5.9 |
| Gliclazide | 2 | 5.9 |

| | | |
|------------------|---|-----|
| Atorvastatin | 2 | 5.9 |
| Nitrates | 1 | 2.9 |
| Diazepine | 1 | 2.9 |
| Lorazepam | 1 | 2.9 |
| Deriphyllin | 1 | 2.9 |
| Phenobarbitone | 1 | 2.9 |
| Aripiprazole | 1 | 2.9 |
| Trihexyphenidyl | 1 | 2.9 |
| Thyroxine | 1 | 2.9 |
| Cyclophosphamide | 1 | 2.9 |
| Co-trimoxazole | 1 | 2.9 |
| Neomercazole | 1 | 2.9 |
| Penicillin G | 1 | 2.9 |
| Metoprolol | 1 | 2.9 |
| Haloperidol | 1 | 2.9 |
| Phenytoin | 1 | 2.9 |



Graph 3: Distribution of patients based on the smoking and alcoholism with eosinophilia

Discussion

The study was done in Department of Pathology, Government Medical College Hospital. Based on inclusion and exclusion criteria, a total of 116 patients were included in the study. In the study, both gender was included. It was observed that age group between 41-50 years are more prone to eosinophilia than other age group. Rimpi B *et al.*, observed similar results [8]. Makkar A *et al.* Study showed that eosinophilia is more prevalent in males than females [9]. The present study showed that eosinophilia was more in males than females. In our study, 34 patients (29.3%) had history of drug intake. The drugs commonly implicated were aspirin, amlodipine and oral hypoglycemics especially metformin. One patient had developed hypersensitivity reaction to phenytoin and presented with fever, skin rashes and features of pneumonitis (DRESS Syndrome- Drug Rash with Eosinophilia and Systemic Symptoms). The symptoms developed one month after starting phenytoin for generalized tonic clonic seizure. Intake of different medications had been a well-documented cause of peripheral blood eosinophilia [10]. Kobi Sade *et al.*, found that drug hypersensitivity was the cause of eosinophilia in 6% of their patients specifically amiodarone, allopurinol, various NSAIDS, amoxycillin and phenytoin [11]. Unlike in our study, Lombardi *et al.* [12] found no cases attributable to allergic drug reactions as important potential cause of eosinophilia. The discrepancy between the findings in our study and those in Lombardi and Passalacqua's study may be stemming from the different patient populations selected for the study; ours was a combined inpatient and outpatient group while in the above mentioned study, it was an outpatient group. The diagnosis of belated drug

hypersensitivity is difficult because often there is no rash, the interval between the drug and the eosinophilia can be quite long-even years- and patients were often taking other medications. While the prevalence of eosinophilia as a cause of drug hypersensitivity is difficult to estimate, our study points to the importance of differential diagnosis of the condition. Patients with smoking and alcohol consumption had more eosinophil count than others.

Conclusion

The study concluded that most frequent conditions associated with eosinophilia was hypertension and drugs like aspirin. Eosinophilia with comorbid conditions requiring drug use can increase the mortality and morbidity.

Conflict of interest: Nil.

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