

Eosinophilia: a study in hospitalized patients in southern India

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Abstract: Background: Eosinophilia is defined as an abnormally elevated accumulation of eosinophils in the peripheral blood. Elevated levels necessitate investigation. **Our aim was to investigate eosinophilia with clinical profile. Methods:** This is an observational record-based study over 1 year. All relevant clinical data of the patients were recorded from the medical record and laboratory values were recorded using Beckman coulter LH750 hematology analyzer. **Result:** Of the 100 patients (58 males, 42 females), 65 were classified as mild, 25 as moderate, and 10 as severe eosinophilia. Breathlessness (32%) is the most common symptom and diabetes mellitus (17%) is the most common concomitant disease of eosinophilia in our study. **Conclusion:** Eosinophilia has been associated with a wide range of diseases and conditions. We concluded that, in addition to the known clinical features, lower limb pain is one of the unavoidable features in the evaluation of eosinophilia.

Keywords: Eosinophilia, Clinical Profile, Breathlessness, Lower Limb Pain.

INTRODUCTION

Eosinophilia is defined as an abnormally elevated accumulation of eosinophils in various tissues or peripheral blood. Elevated levels call for an investigation, especially if the eosinophilia is severe and/or accompanied by unusual or unexpected findings such as fever, rash, renal failure, pulmonary infiltrate, cardiac involvement, or neuropathy [1]. An increase in peripheral blood eosinophil count is seen in some diseases, including allergic/atopic diseases, parasitic diseases, and malignancies. Hypereosinophilia-associated diseases (HEADs) show eosinophil infiltration into some organs, leading to organ damage [2]. The finding of eosinophilia in peripheral blood may reflect a variety of different diseases, including benign or malignant conditions[3].

The level of eosinophils is normally tightly regulated in the body. In normal individuals, eosinophils constitute only a small minority of leukocytes in the peripheral blood, and their presence in tissues is mainly restricted to the gastrointestinal mucosa. However, in certain disease states, eosinophils may selectively accumulate in the peripheral blood or in any tissue of the body. Any disorder that results in eosinophilia, defined here as abnormal accumulation of eosinophils in the blood or tissues, can have profound clinical implications. Eosinophilia can be harmful because eosinophils are proinflammatory, or it can be helpful because these cells are antiparasitic[4].

Hematologic analyzers have greatly facilitated the detection of eosinophilia. In an otherwise asymptomatic individual, detection is routinely followed by investigations to determine the cause, especially if the eosinophilia is significant, prolonged, or associated with organ damage [1]. Eosinophilia is associated with many diseases and conditions, but information is lacking on the clinical features of patients hospitalized for this abnormality. Normal eosinophil counts are up to 600/cmm, and when levels exceed this, it is referred to as eosinophilia. Most eosinophils are treated in the community, but some are hospitalized, and there is no established protocol for testing such patients. The degree of eosinophilia can be classified as mild (600-1500 cells/ml), moderate (1500-5000 cells/ml), or severe (> 5000 cells/ml)[5]. We aim to determine the clinical profile and the most informative diagnostic test in patients admitted to a tertiary hospital for eosinophilia

METHODS

This is an Observational Record based Retrospective study over one year at Father Muller Medical College Hospital, Mangalore. A minimum of 100 cases with Eosinophilia above 600/cmm was taken up for the study. All relevant patient clinical data were collected from the case sheet and the laboratory parameters like Hemoglobin, platelets count, total leucocyte count, differential leucocyte count, and absolute eosinophil count values were recorded from Automated hematology analyzer Beckman Coulter LH 750. All age group hospitalized patients were included in the study and Eosinophilia treated patients were excluded from the study. Symptoms evaluation for systemic symptoms, cutaneous symptoms as well as respiratory symptoms including;

- Fatigue, Fever, weakness, and weight loss.
- Rash, Itching, and Red eyes.
- Sneezing, shortness of breath, running nose.

Statistical Analysis: The primary objective of this study was to analyze eosinophilia with the clinical profile of hospitalized patients. The statistical significance of frequency and percentage values were assessed by the Mann – Whitney test and Chi-squared test respectively and results are presented as the geometric frequency and percentage in the form of tables and graphs.

RESULT

Analysis of eosinophilia among hospitalized patients during the study period of one year. Out of 100 patients, 42 patients were females (42%) and 58 patients were males (58%) represented in figure 1. Table 1 and figure 2 represented the commonest presenting symptoms were Breathlessness (32%), followed by Fever (21%), Itching (14%), Lower limb pain (14%), Cough (13%), Rash (3%), Sneezing (2%), Fatigue (1%). The percentage of cases according to a category of eosinophilia (figure 3) is 65% of patients showing

mild (600-1500) eosinophilia, 25% of patients showing moderate (1500-5000) eosinophilia, 10% patients showing severe (>5000) eosinophilia. Diabetes mellitus (17%), and hypertension (16%) are the most commonly accompanied diseases in eosinophilic patients represented in table 2.

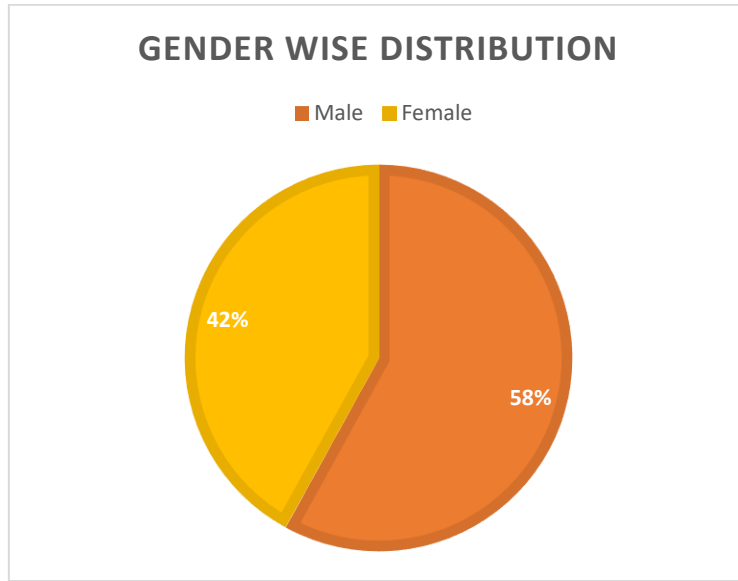


Figure 1: Pie diagram showing the gender-wise distribution of patients.

Table 1: Symptoms-wise distribution

Symptoms	Frequency	Percentage
Breathlessness	32	32%
Fever	21	21%
Itching	14	14%
Lower limb pain	14	14%
Cough	13	13%
Rashes	3	3%
Sneezing	2	2%
Fatigue	1	1%

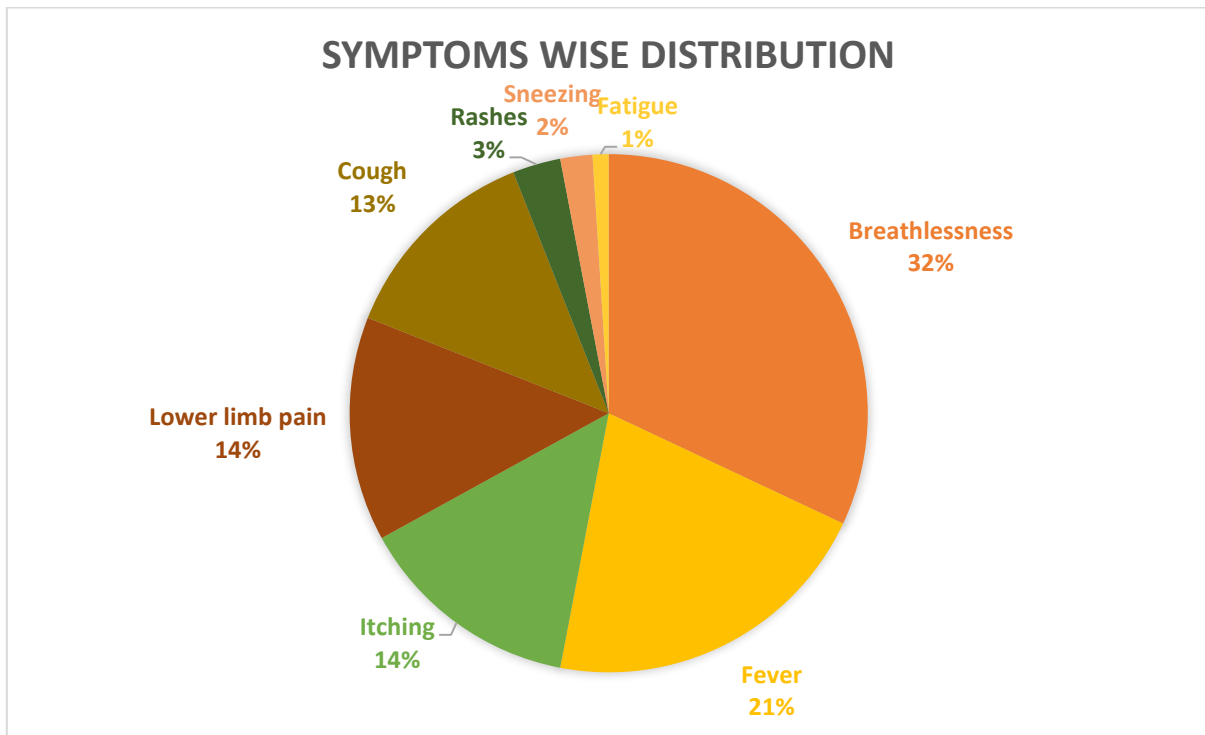
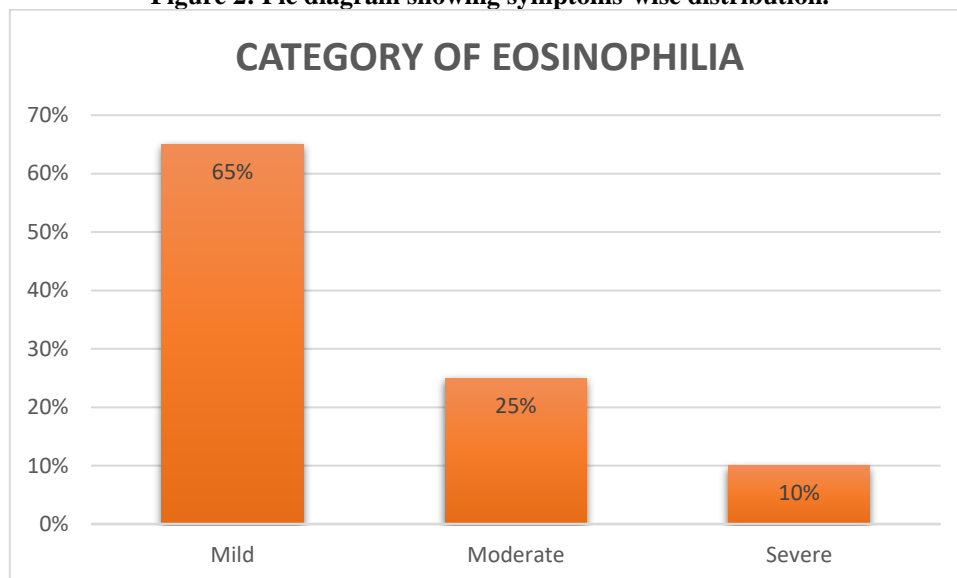


Figure 2: Pie diagram showing symptoms-wise distribution.**Figure 3: Bar diagram showing cases according to the category of eosinophilia.****Table 2: Diseases that accompanied eosinophilia in our patients.**

<i>Diagnosis</i>	<i>Number of cases</i>	<i>Percentage</i>
Diabetic Mellitus	17	17%
Hypertension	16	16%
Bronchial asthma	14	14%
Eosinophilia for evaluation	10	10%
Acute exacerbation of COPD	6	6%
Pulmonary eosinophilia	6	6%
Allergic rhinitis	5	5%
Ischemic heart disease	5	5%
Acute kidney injury	4	4%
Acute bronchitis	3	3%
Bronchiectasis	3	3%
Hyper-eosinophilia	3	3%
Allergic bronchitis	3	3%
Urinary tract infection	3	3%
Respiratory tract infection	2	2%
Reactive arthritis	2	2%
Obstructive airway disease	2	2%
Tropicalesosinophilic syndrome	2	2%

DISCUSSION

Eosinophils were first described by Paul Ehrlich in 1879. They account for 1-5% of peripheral leukocytes. Because they play an important role in innate immunity, they are also normally found in the lymphoid organs, gastrointestinal tract (GIT) and lungs.

We report in our data adult patients hospitalized for eosinophilia. Usually, patients with eosinophilia are asymptomatic, as reported in the study by Schulte C et al [6]. They are generally discovered incidentally during a routine hematologic examination. However, in our study, most patients were symptomatic. The symptoms reported by the patients were heterogeneous and involved many organs and systems, with the lungs, skin, and cardiac system being the most severely affected. The lack of correlation between the severity of eosinophilia (Table 3) and the type or severity of symptoms was likely due to the fact that patient-reported symptoms were within the broad range of clinical presentations known to be associated with eosinophilia. Tal Y et al [12] noted in their study that malignancy was the most common cause in 40% of patients with severe eosinophilia.

Table 3: Comparative studies concerning the category of eosinophilia

<i>Sl no</i>	<i>Studies were done by</i>	<i>Mild</i>	<i>Moderate</i>	<i>Severe</i>
1	Subramony A et al [7]	56%	42%	2%
2	Makkar A et al [8]	52%	34%	14%
3	Juul S et al [9]	51%	46%	3%

4	Present study	65%	25%	10%
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Table 3 shows that the present study involved a large number of cases that fall under the mild category of eosinophilia 65% and the findings are compared with other studies and shows similarity in all the studies.

Table 4: Comparative studies about gender-wise distribution

Sl no	The study was done by	Male	Female
1	Makkar A et al [8]	20%	30%
2	Sade K et al [1]	58%	42%
3	Okada R et al [2]	248%	194%
4	Present study	58%	42%

In the present study, 58% of the population was male and 42% was female with eosinophilia. This study is very similar to the study by Sade K et al [2]. The study of Hartl S et al [13] shows that (47.8%) of male population and (41.9%) of female population were affected.

The present study shows that the most common symptom in our hospital was breathlessness (32%) and the least known symptom was fatigue (1%). In a study conducted by Makkar A et al [8], patients presented with fever (32%) and breathlessness (30%), cough (22%), anorexia (40%) and abdominal pain (38%). The overall percentage of patients with symptoms was high compared with our study. Another unusual clinical finding was pain in the lower limbs. 14% of cases had this feature, and one of the case reports was confirmed in their study [14].

The cause of the eosinophilia in the present study was mainly diabetic mellitus (17%), hypertension (16%), and bronchial asthma (14%). Compared to Sade K et al [1], the majority of eosinophilia was asthma or other atopic diseases in (13%) of cases. Dihingia A et al [10], show that most cases of bronchial asthma (56%) were in males and allergic rhinitis (64%) in females. Hasegawa K et al [11] found that (59%) of patients with asthma exacerbations were the most common cause in the general population.

CONCLUSION

Eosinophilia associated with a wide spectrum of diseases and conditions; therefore, finding its etiology can be difficult and require numerous laboratory tests. When eosinophilia is discovered in a patient, evaluation is based on the severity of the eosinophilia, symptoms, and results of initial diagnostic testing. Investigations are always required to rule out hidden but treatable diseases such as parasitic infections, drug allergies, or neoplasms. Organ damage must be assessed even if the cause of the eosinophilia is benign and transient, such as an allergic reaction. We concluded that other than the known clinical features, the lower limb pain is also one of the un avoidable features to evaluate the eosinophilia.

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