



EOSINOPHILIA IN HOSPITALIZED PATIENTS, A RETROSPECTIVE STUDY

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ABSTRACT

Background: Eosinophilia is associated with a large number of diseases and clinical conditions, but there is no information about the clinical characteristics of patients who are hospitalized due to this abnormality. The aim of this study is to determine the clinical profile and most informative diagnostic tests in patients hospitalized in a tertiary hospital with the finding of eosinophilia. **Methods:** This is a retrospective study that was done in the time period between January, 2015 till June, 2015 as a collaborative effort between Princess Iman Center for Laboratory Sciences and Research and the Internal Medicine Department/ King Hussein Medical City. Data was retrieved from the medical records of patients who were hospitalized with the finding of eosinophilia. All relevant data including clinical findings, laboratory tests, and imaging studies were analyzed. **Results:** A total of 130 patients were included in the study; (65 males and 60 females, with an age range between 26 and 60 years). The blood eosinophil absolute count was 2500-5600/ μ l (mean \pm SD) and this in the majority of cases persisted for a few months. The causes of the eosinophilia were:

- Asthma or other atopic disease in 28patients (21.5%),
- Pneumonia in 20 patients (15.4%),
- Neoplastic diseases in 18 patients (13.8%),
- Infections in12 patients (9.2%),
- Skin diseases in 6 patients (4.6%),
- Allergic drug reaction 5 patients (3.8%),
- Hypereosinophilic syndrome in 1patient (0.77%),
- And the cause was unknown in 40 patients (30.8%).

Conclusion: Guidelines are needed for the investigation of patients hospitalized with eosinophilia, including the level of the eosinophilia associated with specific diseases and the most information yielding diagnostic tests.

KEYWORDS: Eosinophilia, Allergy, Pneumonia, Neoplastic, Hypereosinophilic syndrome.

INTRODUCTION

Eosinophils are non-dividing, end stage cells differentiating from hematopoietic stem cells in the bone marrow. Eosinophils then migrate to the peripheral blood.^[1]

Eosinophilia is an abnormal condition where the eosinophils abnormally accumulate in various tissues or in the peripheral blood. It is defined as a peripheral eosinophil count that exceeds $4.5 \times 10^8/L$ (450/ μ l).^[2]

Eosinophils normally comprise less than 5% of the total WBCs in the peripheral blood. Many conditions and disease states have been associated with accumulation of eosinophils. Several causes of eosinophilia are known, with the most common being allergic reactions or parasitic infections. Although some reports have noted that eosinophilia is present in different

diseases states, the degree of eosinophilia for specific conditions has not been determined.

Diagnosis of eosinophilia is made by acomplete blood count (CBC), but diagnostic procedures aimed to know the underlying cause vary depending on the suspected disease state (s).^[3]

The pathophysiology of eosinophilia is IgE mediated eosinophil productionwhich is induced by compounds including eosinophil chemotactic factor of anaphylaxis, leukotriene B4, complement complex, interleukin 5, and histamine.^[4]

A full history, physical examination, and laboratory investigations are all carried out, aimed mainly at excluding allergic conditions, parasitic infections, vasculitis, and hematological disorders.^[5]

To date, there is no protocol for investigating patients hospitalized for eosinophilia.

In this study, we report a retrospective review of the medical records of such patients.

We wanted to identify the various clinical profiles and the associated etiologies in order to establish guidelines for the work-up and diagnosis of such cases.

METHODS

A retrospective study was done in the time period between January, 2015 till June, 2015 on all the medical records of adult patients hospitalized in the medical ward of Al Hussein Hospital which is the major hospital in KHMC which is a well-known and reputable tertiary care center.

It was a collaborative effort between Princess Iman Center for Laboratory Sciences and Research and the Internal Medicine Department/ Al Hussein Hospital.

Only patients who were admitted with a primary diagnosis of eosinophilia were included.

The normal eosinophil count was considered to be 0-450/ μ l.

Data was retrieved by hematopathology residents with the aim to extract demographic data, diagnosis, causes of accompanying eosinophilia and possible associated disease states.

All relevant data including clinical findings, laboratory tests, and imaging studies were analyzed.

The study was approved by the hospital IRB.

RESULTS

The study included 130 patients who were hospitalized because of eosinophilia. 65 were males and 60 females, and they had an age range between 26 and 60 years.

Primary data analysis revealed no correlation between gender, age, or origin and the eosinophil blood count.

Half of the patients admitted were hospitalized once and 15% were hospitalized twice.

Duration of hospitalization was less than one week in 50% of cases and ranged from 5 days to 3 weeks.

There was no correlation between the number or duration of hospitalizations and the eosinophil blood count.

Patients were admitted with a variety of clinical symptoms: 23% with respiratory symptoms, 20% with constitutional symptoms (e.g., fatigue, weakness, fever

and weight loss), 17% with cardiovascular complaints and 11% with cutaneous manifestations.

There was no correlation between the type of presenting symptoms and the eosinophil blood count.

The disease states that accompanied the eosinophilia are summarized in Table 1.

There was no correlation between the eosinophil blood count and these conditions.

The routine laboratory tests are listed in Table 2.

The mean eosinophil blood count for all 130 cases was 2500-5600/ μ l (mean \pm SD).

The eosinophilia was mild in 37% of the patients, moderate in 50% and severe in 13%.

The mean white blood cell count was moderately high and correlated with the eosinophil blood count.

The mean hemoglobin level was slightly low (11.73 \pm 1.95 g/dl), with no correlation to the degree of eosinophilia.

The other tests didn't show any correlation with the degree of eosinophilia.

Other laboratory tests and imaging studies are listed in table 3.

The causes of the eosinophilia were:

- Asthma or other atopic disease in 28 patients (21.5%),
- Pneumonia in 20 patients (15.4%),
- Neoplastic diseases in 18 patients (13.8%),
- Infections in 12 patients (9.2%),
- Skin diseases in 6 patients (4.6%),
- Allergic drug reaction 5 patients (3.8%),
- Hypereosinophilic syndrome in 1 patient (0.77%),
- And the cause was unknown in 40 patients (30.8%).

Table 1, Disease states accompanying eosinophilia.

Diagnosis	Number of cases
Ischemic Heart Disease	30
Hypertension	32
Chronic Obstructive Lung Disease	23
Diabetes Mellitus	20
Peripheral Vascular Disease	10
Malignancy	10
End Stage Renal Disease	5

Table 2, Routine Laboratory tests.

Lab Test	Number	Mean	Range
Hemoglobin(g/dl)	130	11.65±1.82	7.1–16
Platelets(cell/ μ l)	130	255±110	72–742
WBC(cell/ μ l)	130	12,566±13,206	1240–95,000
Glucose(mg/dl)	130	106.8±35.0	65–296
Creatinine(mg/dl)	130	1.7±1.6	0.4–8.5
Lactate dehydrogenase(U/l)	115	307.5±117.6	31–803
Albumin(g/dl)	115	38.6±7.6	4.8–55.9
ESR (mm/h)	105	51.0±28.9	7–105

Table 3, Other Laboratory and radiological studies.

Test	Number of patients tested	Positive Results, number
Radiological studies CT Chest	125	25
Pulmonary function Test	123	45
Bronchoscopy	115	42
Blood Culture	100	5
Routine stool analysis& culture	50	2
Parasitology serological tests	48	0
IgE	46	25
RF	40	4
ANA	40	2
ANCA	40	1
SPE	35	0
Allergy panels	35	23
Skin biopsy	33	12
Bone marrow study	12	10

DISCUSSION

We present our collected data on adult patients hospitalized due to eosinophilia in a tertiary hospital.

The presenting symptoms were diverse and involved many organs and systems, with respiratory and the constitutional symptoms being the most prevalent. There was a poor correlation between the severity of the eosinophilia and the type or severity of the presenting symptoms and that was attributed to the symptoms related to accompanying diseases patients had.

None the less, the reported symptoms were within the wide range of clinical symptoms that are known to present with eosinophilia.

Most of the workup and investigations done on the 130 patients during hospitalization were done following the differential diagnosis suggested by the history, physical examination, and routine tests.

The causes of the eosinophilia were:

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Allergic or other atopic diseases were the most frequent causes of eosinophilia in our study which is similar to the western world.^[6]

The symptoms encountered by the patients were heterogeneous and involved many organs with skin and the cardiac system being the most prominent.

Mild anemia, leukocytosis, and high erythrocyte sedimentation rate were observed which possibly reflect systemic involvement and inflammation that usually accompany eosinophilia.

The lungs are one of the most prominent target organs in all cases of eosinophilia and this highlights the importance of pulmonary function tests and computerized tomography of the chest.

The high percentage of cancer patients in our study indicates the need for a cancer work-up in cases of eosinophilia and particularly in cases of unknown etiology and suggests that eosinophilia should be considered an indicator for malignancy and not only for allergic, parasitic, or various immune diseases.

The level of the eosinophilia in those cases was usually high. Many types of cancers are usually associated with eosinophilia.^[7]

Eosinophilia is usually seen in hematological tumors such as Hodgkin's disease and other lymphomas, but it can also be seen in other types of cancers.^[8]

CONCLUSION

In view of the wide range of disease entities with which eosinophilia can be associated, guidelines are needed for the investigation of patients hospitalized with eosinophilia, in an attempt to search for the etiology including the level of the eosinophilia associated with specific diseases and the most information yielding diagnostic tests.

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