

## SECONDARY PERIPHERAL EOSINOPHILIA IN RELATION WITH INTESTINAL PARASITIC INFESTATION IN WESTERN UTTER PRADESH, SHAHJAHANPUR

NAJMA KHAN<sup>a</sup>, MALLIK MRINAL KANTI<sup>b1</sup>, ASHISH BANSAL<sup>c</sup>, NIRANJAN SINGH<sup>d</sup> AND TEETOSHAMSHEER ALI<sup>e</sup>

<sup>abcde</sup>Department of Pathology, Varunarjun Medical College, Rohilkhand Hospital, Banthara, Shahjahanpur U.P., India

### ABSTRACT

Eosinophilia is a medical condition in which the peripheral blood eosinophil count exceeds the upper limit of 600 cells/cmm and it can be primary, secondary and idiopathic attributable to clonal expansion, immunological response and unknown etiology respectively, of them parasitic infections has become major public health problem particularly in tropical and subtropical regions depending on various factors but studies scrutinizing their value for diagnosing parasitic infections are rare. We studied the peripheral blood eosinophilia in relation with intestinal parasites in 125 cases fulfilled the inclusion criteria. Using automated cell counter and wet mount stool examination, study revealed 37.6%, 51.2% and 11.2% cases with mild, moderate and severe eosinophilia respectively. Out of 125 cases 58(46.4%) were positive for intestinal parasites and among them 53(42.4%) were found to harbor intestinal Helminthes and only 5(4.0%) had Protozoans. The distribution of helminthes in the descending order were: Hookworm 24(45.2%), Ascaris lumbricoides 19(35.8%), Trichuris trichura 5(9.42%), Taenia 3(5.66%), H. nana 2(3.77%) and Protozoan 5(4.0%). Our study found that Hookworm was the commonest parasite followed by ascaris and associated with moderate eosiniphilia and out of 24 hookworm positive cases, 13(54.1%) were positive for faecal occult blood. The commonest age group affected was 10-40 years with male predilection.

**KEYWORDS:** Shahjahanpur, Secondary Peripheral Eosinophilia, Intestinal Parasites

Peripheral Eosinophilia is a medical condition in which the eosinophil count exceeds the upper limit of 600 cells/cmm. It is normally measured by sampling peripheral blood. The degree of eosinophilia can be categorized into mild (600-1500 cells/cmm), moderate (1500-5000 cells/cmm) or severe (>5000 cells/cmm). Peripheral eosinophilia can be primary, secondary and idiopathic. Primary eosinophilia is attributed to clonal expansion, while secondary eosinophilia occurs as an immunological response to offending agents may be infectious or noninfectious (Weller, 1991).

Parasitic infections are the most common cause of eosinophilia worldwide, but are mostly prevalent and endemic in tropical and subtropical regions, particularly in rural communities with poor sanitation (WHO And UNICEF, 2006). The pattern of distribution depends mainly on the availability of certain conditions required by parasites, such as suitable climate, human activities, population movement and poor sanitation (Azazy et al, 2003). The transmission of intestinal parasites is affected directly or indirectly by objects contaminated with faeces. Moreover, agriculture and food production can be one of the main sources of parasitic infections (Alsubaie et al, 2014).

Parasites can live within the intestine for years without any symptoms include abdominal pain, diarrhea, nausea and vomiting, bloating, weight loss and passage of worms. Some individual with moderate to severe eosinophilia remain asymptomatic or develop signs of organ dysfunction many year after the eosinophilia is first noted (Chen et al., 2014 and Helbeig et al., 2004). Faecal occult blood is one of the common sign associated with some intestinal parasites (Mistcell et al., 2004, Beg et al 2002). Infections by certain intestinal parasites cause eosinophilia (Crompton and Stephenson, 1990), which is mainly mediated by certain chemokines and eotaxins (Rosenberg). Certain hematological parameters including eosinophil show alterations associated with a wide variety of diseases including infectious or noninfectious (Whettam et al 2003, Speare et al 2006).

### MATERIALS AND METHODS

#### Study Design and Period

The cross sectional study was conducted in 125 patients having eosinophilia >600 cells /cmm cut off point, within the age group of 1 to >60 years, during one year period from October 2015 to September 2016 in central laboratory of Varunarjun Medical College, Rohilkhand hospital, Banthara NH 24, Shahjahanpur (U.P.). Patient on

<sup>1</sup>Corresponding author

routine complete blood count examinations with eosinophilia of >600 cells/cmm, and with gastrointestinal system involvement were analyzed and containers for faecal sample were given and fresh morning stool sample was collected and examined macroscopically and microscopically for ova or cyst and its types.

**Sample Population**

**Inclusion Criteria**

- Peripheral blood eosinophils > 600 cells/cmm cut off point.
- Gastrointestinal system involvement:-
  - .Pain abdomen
  - .Abdominal distension
  - .Loss of weight and appetite
  - .Nausea and vomiting etc.

**Exclusion Criteria**

- Any H/O allergies
- Any dermatological disorder
- Any H/O clonal expansion
- Any H/O drug intake

**Sample Size**

A total of 125 patients were registered from October 2015 to September 2016.

**Data Collection**

Age, sex, eosinophil percentage, AEC, occult blood, clinical history of GIT system involvement and type of parasites etc. were collected

**Clinical History**

Symptoms of abdominal pain, distension, loss of weight and appetite, fever, nausea and vomiting etc. were included

**Complete Blood Count(CBC)**

Complete blood count was done by using Sysmex XS-1000i, using proper calibrator and controls

**Absolute Eosinophil Count(AEC)**

The absolute eosinophil count refers to the number of circulating eosinophil in the peripheral blood (cells/cmm). It is determined by multiplying the total white blood cells (WBC) count by the percentage of eosinophil.

**Stool Examination**

Stool was examined macroscopically for any visible worm or ova, consistency and color. Microscopic

examination was done by using direct wet mount method.

**RESULTS**

**Population Characteristics Stratified by Age and Sex**

During the study period of one year, 125 patients fulfilled the inclusion criteria were registered, 78 of them were males and 47 were females. The majority of studied population were in the age group of 10-40 years. The studied population stratified by age and sex are shown in Table 1.

**Symptoms in Patient With Eosinophilia**

In our study 125 patients with gastrointestinal system involvement, the most common symptoms were abdominal pain 53 (42.4%), followed by loss of appetite 39(31.2%), fever 34(27.2%), nausea and vomiting 23 (18.4%). Four children presented with abdominal distension, eyelid puffiness and joint pain.

**Distribution of Eosinophilia in the Subjects**

The study revealed 37.6% mild, 51.2% moderate and 11.2% severe Eosinophilia. In our study we found that majority of patient with parasitic infections had moderate eosinophilia in the range of 1500-5000 cells/cmm.

**Intestinal Parasitic infestation in Eosinophilics**

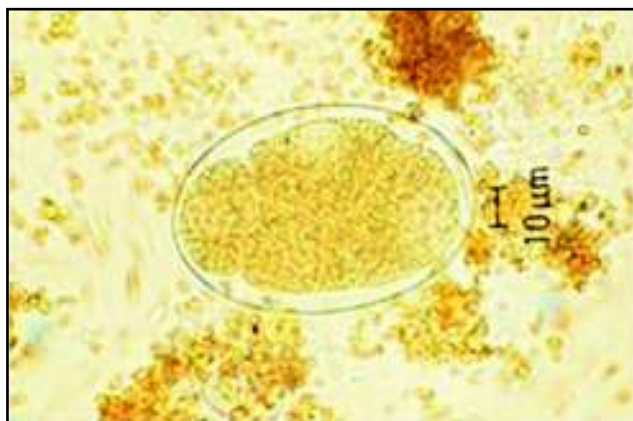
In our study of 125 Eosinophilics 58(44.6%) were found to be positive for at least one parasite. The infection rate was highest among the age group of 10-40 years with male predilection. Out of 125 cases 53(42.4%) were found to harbor intestinal helminthes and only 5(4.0%) had protozoal infection. The distribution of helminthes among the subjects detected in descending order were: Hookworm 24(45.2%), *Ascaris lumbricoides* 19(35.8%), *Trichuris trichura* 5(9.42%), *Taenia* 3(5.66%), *H. nana* 2(3.77%) and Protozoan 5(4.0%).(Table 2). Hookworm was found to be

**Table 1: Study Population Characteristics Stratified By Age And Sex**

Age Group (years)	Male	Female	Total
1-10	8	7	15
10-20	27	16	43
20-30	19	10	29
30-40	13	8	21
40-50	5	4	9
50-60	4	2	6
>60	2	0	2
Total	78	47	125

**Table 2: Definite Diagnosis In Patients With Eosinophilia**

Definite diagnosis	No.of caes (%)
Hookworm	24(45.2%)
<i>Ascaris lumbricoides</i>	19(35.8%)
<i>Trichuristrichura</i>	5(9.42%)
<i>Taenia</i>	3(5.66%)
<i>H. nana</i>	2(3.77%)
Protozoan	5(4.0%)



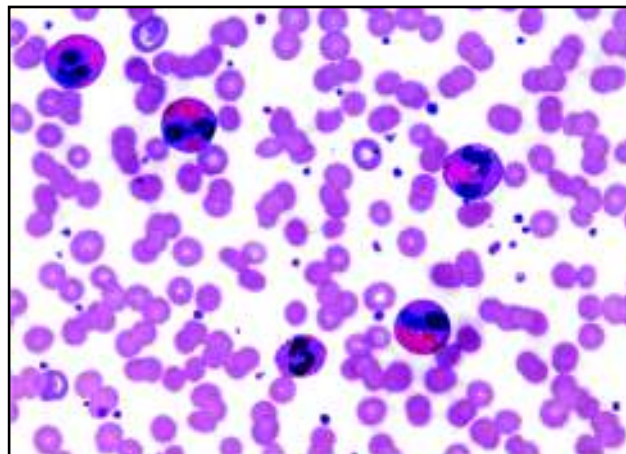
**Figure 1 : Microscopic view of Hookworm egg.  
(Magnification 100X x 10X= 1000X)**

commonest and associated with moderate eosinophilia (Fig 1,2). Also we found that 13 (54.1%) hookworm infestation showed positive occult blood unlike other parasites.

## DISCUSSION

Eosinophilia can arise from an extensive number of medical conditions, including allergic disorder, hematologic and neoplastic diseases, parasitic infections, particularly helminthic. The differential diagnosis of eosiniphilia is extensive. In industrialized countries, multiple medical conditions need to be considered, among them variety of malignant, atopic ,inflammatory and endocrine conditions .However in developing countries, infectious diseases account for the majority of cases of eosiniphilia.

The parasitic infection has become a major public health problem worldwide, particularly, in the developing countries which also vary from one region to another.In India,malnutrition ,unhygienic conditions, the improper disposal of sewage and the no availability of potable water



**Figure 2 : Microscopic view of Peripheral  
Blood Eosinophilia.  
(magnification 100X x 10X= 1000X)**

supplies in the rural and the urban areas are responsible for the high rate of intestinal parasitic infections.

Similar to the findings by some Authors ,where common symptoms were anorexia (40%),followed by pain in abdomen (38%), fever (32%) and breathlessness (30%). In our study most common symptoms were abdominal pain (42.4%) followed by loss of appetite (31.2%) .

Similar to the study by Surang et al,our study also found that majority of the patient affected were in the age group of 10 to 40 years with high male predilection.

Worldwide ,an estimated 1.4 billion humans have Ascariasis ,1.2 billion have Hookworm infections, 1 billion have Trichuriasis.In the study by Surang et out of 112 cases, 41% were found to harbor intestinal parasites and among them 49% were positive for *Ascarislumbricoides*, 25% for Hookworm and 22% for *Trichuristrichura*. In our study overall occurrence of intestinal parasite was 46.4% and among them 45.2% for Hookworm, 35.8% for

*Ascarislumbricoides*, 9.42% for *Trichuristrichura*, 5.66% for *Taenia* and 3.77% for *H. nana* and also 5.0% were found to harbor intestinal protozoan.

Similar to the study by Pilger et al, surang et al, number of eosinophil varied according to the infestation. In our study, majority of patients with hookworm infestation were found to have moderate eosinophilia (1500-5000 cells/cmm), also our study found that 54.1% patient with hookworm infestation were positive for stool occult blood, similar to other study.

## CONCLUSION

In conclusion, we have shown that in various rural and urban areas of western UP Shahjahanpur eosinophilia was strongly associated with the presence of intestinal helminthes in the age group of 10-40 years with high predilection to male. Hookworm infestation was found to be highest and associated with moderate eosinophilia and positivity for occult blood. Although high number of study population were noninfected which may be attributed to low parasitic burden resulting from anti helminthic usage, low sensitivity of stool wet mount method, which still remains the main diagnostic tool employed by most hospital laboratories in the developing countries, along with other factors.

In view of the increasing polyparasitism in the developing countries, there is a need of sensitive diagnostic tools that are simple to apply and to concurrently detect different intestinal parasitic species in the same stool sample. The choice of a particular technique for routine use is influenced by its affordability, simplicity, sensitivity and level of technical skill involved.

## REFERENCES

Azazy A. A. and Raja'a Y. A., 2003. Malaria and intestinal parasitosis among children presenting to the pediatric centre in Sana'a, Yemen. *East Mediterr*

*Health J.* **9** (5/6):1048-1053.

Alsubaie A. S., AL-Mekhlafi A. M. K., AL- Shibani L. A. N., Eryani S. M. A. AL, Azazy A. A., 2014. Hygienic assessment of pathogenic contamination in raw vegetables in local market, an implication for public health. *Int. Res J. Microbial (IJRM)*, **5**(2):16-21.

Beg M., Singh M., Saraswat M. K., Rewari B. B., 2002. Occult gastrointestinal bleeding: detection, interpretation and evaluation. *Journal Indian Academy of Clinical Medicine*, **3**(2):153-158.

Chen Y. Y., Khoury P., Ware J. M., 2014. Marked and persistent eosinophilia in the absence of clinical manifestation. *J Allergy Clin Immunol*, **133**:1195.

Crompton D. W. T. and Stephenson L. S. Hookworm infection, nutritional status and productivity. In: Schand GA, Warren KS, editors. *Hookworm disease, current status and New Directions*. London: Taylor and Francis; **199**: 231-265.

Helbeig G., Hus M., Franeuz T., 2004. Characteristics and clinical outcome of patients with hypereosinophilia of undetermined significance. *Med Oncol*, **31**: 815.

Mitchell S. H., Schaefer D. C. and Dubagunta S., 2004. A new view of occult and obscure gastrointestinal bleeding. *American Family Physician*. **69**(4):875-881.

Speare R., Canyon D. V. and Melrose W., 2006. Quantification of blood intake of the head louse: *Pediculus humanus capitis*. *Int J Dermatol*, **45**: 543-546.

Weller P. F., 1991. The immunobiology of Eosinophilics. *N Engl J Med* **324**(16): 1110-8.

Whettam J., Day J. N., Armstrong M., Chiodini P. L., Whitty C. J., 2003. Investigation of tropical eosinophilia; assessing a strategy based on geographical area. *J infect*, **46**: 180-185.

World Health Organization and UNICEF meeting the MDG drinking water and sanitation target: the urban and rural challenge of the decade, Switzerland, 2006.