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# Original Research

## Evaluation of incidence of microfilaria in bone marrow aspiration procedures attempted for different clinical conditions- A clinical study

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***ABSTRACT:***

**Aim:** The sole endeavor of present retrospective study was to highlight accidental finding and incidence of microfilaria in bone marrow aspiration procedures attempted for various conditions. Study population was from eastern Uttar Pradesh region as there is no reliable data available particularly from this part of the said state. **Materials & Methods:** All studied patients were belonging to both male and female genders. Patients in this study were both from urban as well as rural areas of eastern Uttar Pradesh. Patients of anemia, pyrexia of unknown origin and pancytopaenia were included in study. They were subjected to routine investigation followed by bone marrow aspiration procedure to rule out causes and assess microfilaria in bone marrow aspirates. Few of imperative clinical investigations were also conducted including haemoglobin levels, platelet levels and ultrasonography. All the blood smears from bone marrow were explored wherein erythroid hyperplasias with adequate megakaryocytes and microfilarias were noticed in some cases accidentally. Results thus obtained was tabulated and subjected to statistical analysis. **Statistical Analysis and Results:** Statistical analysis was done by statistical software Statistical Package for the Social Sciences (SPSS). The resultant data was sent to suitable statistical tests to achieve p values, mean, standard deviation, standard error an 95% CI. $P \leq 0.05$ was considered as statistically significant. All patients were further separated into three groups based on their ages. 12 patients were selected in the age range of 20-40 years (Group I). P value was significant here. 4 patients were noticed in the age range of 41-60 years (Group II). P value was not significant for this age group. Comparison of statistical data among the 3 study groups using one-way ANOVA showed highly significant p value. **Conclusion:** About fifteen percent of all studied patients have been identified positive for microfilaria. One patient with positive microfilaria sample in each group has been recognized. Inter group comparison also revealed highly significant results.

**Key words:** Microfilaria, Blood Smears, Bone Marrow, Pyrexia

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### INTRODUCTION

As we all are aware that filariasis is wide spread in south east Asia and found in all the states of India except in Punjab, Himachal Pradesh, Jammu & Kashmir and Rajasthan, all of which found in the north western part of the nation. The residents at risk have been calculated as 239million. Since 1955 national filarial control program has been launched.[1,2,3] Various survey based studies have been conducted and showed the principal parasite to be W. Bancrofti. In filariasis, it is very complicated to generate reliable data on the number of people infected with parasite or infected by filariasis. Filariasis is a major public health crisis of significant magnitude. Filariasis is identified in more than 2 billion peoples around the world. Out of these figures, more than 250 million peoples live in prevalent regions of India. Literature has well demonstrated that this is about $1/6^{th}$ of total worldwide population at risk to filariasis.[4,5] The disease is common in Africa and is

developed by the filarial worm Wuchereria bancrofti. The World Health Organization (WHO) data in the year 2000 demonstrated that more than 100 million people were affected worldwide.[6,7] The life cycle of W. bancrofti complete in two hosts, humans and mosquitoes. The adult W. bancrofti live in the lymphatics of the human body. A lymphatic vessel having various stages of filarial parasite gradually becomes dilated with non-functional values and defective contractility.[8,9] This retrospective study was attempted to highlight accidental finding and incidence of microfilaria in bone marrow aspiration procedures attempted for various conditions. All studied patients were belonging to eastern Uttar Pradesh region. Moreover, only case reports have been presented in the literature.

## MATERIALS & METHODS

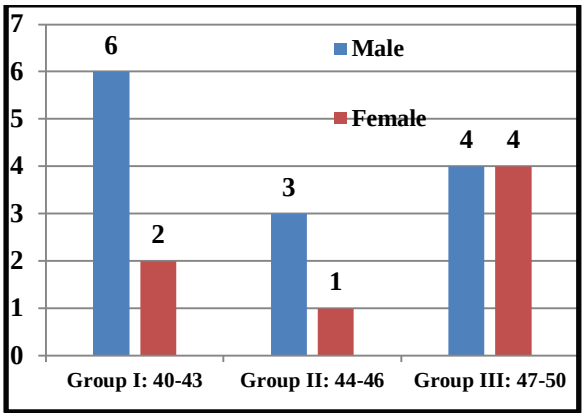
The present study was conducted to assess incidence of Filariasis in bone marrow aspirates in population of eastern Uttar Pradesh. Study was completed in six months in the department of pathology of Career Institute of Medical Sciences and Hospital, Lucknow. Author has designed this retrospective study to report accidental presence of microfilaria in bone marrow aspirates of studied patients. Total twenty patients were investigated for different clinical conditions like anemia, pancytopenia and pyrexia of unknown origin. Major investigation included bone marrow aspiration along with hemoglobin levels, platelet levels and ultrasonography. Inclusion criteria included patients with severe anaemia (haemoglobin< 5gm/dl), anemia with fever (hemoglobin 5-9gm/dl), pancytopenia (Haemoglobin 6gm/dl, Total leucocyte count 4000/cumm and platelet count 1.4 lacs/cumm), pyrexia of unknown origin. All studied patients were belonging to age group (20-80 years). Patients were selected from the regular OPD of the department. The usefulness of this study was revealed to all patients. The confidentiality of the respondents and their freedom of expression were completely ensured. All were informed regarding the study and written consent was obtained. Patients in this study were both from urban as well as rural areas of eastern Uttar Pradesh. The area of eastern Uttar Pradesh is known for high endemicity for filarial infections. In few of the studied patients, authors also noticed severe anemia and anemia with leucopenia since 20 days. Primary examination of all patients was completed by recording vitals and any other positive or significant finding. Before doing bone marrow aspiration, complete blood count and general blood picture was made. If no diagnosis was made on the basis of complete blood count, author performed bone marrow aspiration procedure in ward. Author conducted bone marrow aspiration on posterior superior iliac spine under local anesthesia with 2% lignocaine in all studied patients. This procedure was attempted in symptomatic patients with the help of salah bone marrow aspiration needle with guard. Operator has made smears with aspiration blood material having bone marrow particles. In laboratory, all the smears were stained with Leishman stain. All the smears were studied under oil immersion. After completing the procedure, benzoine tincture was applied and aspiration site was covered with micropore. All other smears there were no parasites and diagnosis was made according to cellularity. In between smear of three patients, author accidentally recognized thread-like parasite microfilaria (Wuchereria bancrofti) with sheathed nuclei and no nuclei in tail (figure 1). In one case, parasite was entangled in between marrow particle and other 2 cases parasite were seen in between marrow cells. On the basis of above findings we made diagnosis of megaloblastoid hyperplasia with filariasis was confirmed. Therefore, the ultimate incidence of filarialsis was figured during routine investigations of common clinical conditions. Results thus obtained was tabulated and subjected to statistical analysis using chi- square test. P value less than 0.05 was considered significant ($P < 0.05$). The recorded data was subjected to suitable statistical tests to obtain p values, mean, standard deviation, chi- square test, standard error and 95% CI.

**Figure 1: Photomicrograph showing a sheathed parasite microfilaria (Wuchereria Bancrofti) in bone marrow aspirate smear**

## STATISTICAL ANALYSIS AND RESULTS

In the current study, all obvious findings and data were gathered in logical manner. Compiled data was sent for statistical analysis using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). The processed data was subjected to suitable statistical tests to obtain p values, mean, standard deviation, chi- square test, standard error and 95% CI. Table 1 and Graph 1 showed that out of 20 patients, males were 13 and females were 7. All patients were further separated into three groups based on their ages. All patients were further separated into three groups based on their ages. 12 patients were selected in the age range of 20-40 years (Group I). P value was significant here.

**Graph 1: AGE & GENDER BASED DISTRIBUTION OF PATIENTS**




4 patients were noticed in the age range of 41-60 years (Group II). P value was not significant for this age group. Total 4 patients were identified in the age range of 61-80 years (Group III). P value was not significant for this age group (0.70). Consequently, it can be presumed that more half of the patients were in first age groups. Table 2 and 3 illustrated fundamental statistical description with level of significance evaluation using Pearson chi-square test [for Group I, II and III]. Authors noticed that p value was highly significant for group I (0.01). For group II and III, p value was considerably significant (0.02 and 0.04). Table 4 showed comparison of statistical data among the 3 study groups using one-way ANOVA [for group I, II, III]. The measured p value was very significant (0.001).

**Table 1: AGE & GENDER WISE DISTRIBUTION OF PATIENTS**

| Group (Yrs) | Male | Female | Total | P value |
|---|---|---|---|---|
| **Group I:** 40-43 | 6 | 2 | 8 | 0. 01* |
| **Group II:** 44-46 | 3 | 1 | 4 | 0.50 |
| **Group III:** 47-50 | 4 | 4 | 8 | 0.70 |
| Total | 13 | 7 | 20 | ***Significant** |

**Table 2: FUNDAMENTAL STATISTICAL DEPICTION [FOR GROUP I TO III: EVALUATED FOR POSITIVE FINDING OF MICROFILARIA AMONG THREE GROUPS]**

| Study Group | Microfilaria finding (n) | Std. Deviation | Std. Error | 95% CI |
|---|---|---|---|---|
| **Group I** | 1 | 0.834 | 0.726 | 1.19 |
| **Group II** | 1 | 0.342 | 0.384 | 1.96 |
| **Group III** | 1 | 0.849 | 0.928 | 1.72 |

***p<0.05 significant**

**Table 3: LEVEL OF SIGNIFICANCE EVALUATION BY PEARSON CHI-SQUARE TEST [FOR GROUP I TO III: EVALUATED FOR POSITIVE FINDING OF MICROFILARIA AMONG THREE GROUPS]**

| Study Group | Pearson Chi-Square Value | df | Level of Significance (p value) |
|---|---|---|---|
| **Group I** | 1.756 | 2.0 | 0.01* |
| **Group II** | 1.767 | 2.0 | 0.02* |
| **Group III** | 2.709 | 1.0 | 0.04* |

***p<0.05 significant**

**Table 4: COMPARISON OF STATISTICAL DATA AMONG THE 3 STUDY GROUPS USING ONE-WAY ANOVA [FOR GROUP I, II, III]**

| Parameters | Degree of Freedom | Sum of Squares ∑ | Mean Sum of Squares m∑ | F | Level of Significance (p value) |
|---|---|---|---|---|---|
| Between Groups | 3 | 1.890 | 1.984 | 2.960 | 0.001* |
| Within Groups | 21 | 6.946 | 0.356 | - | |
| Cumulative | 321.87 | 12.908 | - | | |

## DISCUSSION

As we all are aware that lymphatic filariasis was acknowledged in India in ancient times. World famous Sushruta firstly described human filariasis in 'Sushruta Samhita' in 6th century B.C. Filariasis is one of the major causes of handicap globally. It is also most debilitating disease in many Asian countries. As per latest data of world health organization, minimum 1250 million people in 81 nations including 540 million in India are at risk of having lymphatic filariasis.[10,11,12] The basic patho-physiology of filariasis is lymphoedema of lower extremities. This is particularly true for countries of south East Asia and Africa. Both developing and developed countries are distressing with this health issue. Many of the governments have included filariasis eradication programs in their health schemes and policies. Few of the countries have separate health budget for eradication of filariasis in their nation. Apart from lymphoedema, filariasis causes thick of skin and inner subcutaneous tissues, chiefly in the lower extremities, male genitals and female breasts. Patients with huge edema of the lower legs following lymphatic impediment by filariasis develop a typical clinical condition called elephantiasis. The clinical appearance of the filariasis typically emerges many years after the original infection. However, this disease has rarely shown immediate lethal patterns. Many of the researchers and clinicians have demonstrated that the disability remains untreated even after therapeutic a surgical intervention.[13,14] Tummidi et al presented a case report in which they investigated 65-year old female with back ache. Bone marrow aspiration revealed metastatic deposits along with surprise finding of W. Bancrofti similar to our patients.[15] Umashankar and colleague had stated that microfilariae are an uncommon finding in the bone marrow and their presence may be an incidental finding in the absence of the clinical features of lymphatic filariasis.[16] Kumar and colleagues also noticed moderately cellular bone marrow aspiration smear with microfilaria in 40 year old male who presented with complaints of generalized weakness, lethargy and breathlessness. It was an accidental finding wherein they concluded that any patient with pancytopenia in endemic region should be evaluated with bone marrow aspiration for microfilariasis.[17] Zafar and associates have reported an incidental finding of microfi lariae in the bone marrow aspirate of a patient who was under investigation of back pain with destruction of first lumbar vertebrae.[18] Our study results were in agreement of these pioneer workers however; differences in clinical and demographic interpretations have also been noticed.

## CONCLUSION

Filariasis is one of the common diseases in India. Commonly, only symptomatic patients having lymphoedema receive treatment while other patients getting treatment according to their symptoms like severe anemia, anemia with fever, pancytopenia and pyrexia of unknown origin however, these patients can also have microfilaria. Bone marrow aspiration is a painful procedure so it needs to be done cautiously with careful scanning of smear to find out microfilaria. Clinician also needs to differentiate microfilaria from platelet trails because most of the time this parasite was diagnosed as platelet trail. Author has drawn few very significant conclusions from this study. About fifteen percent of all studied patients have been identified positive for microfilaria. One patient with positive microfilaria sample in each group has been acknowledged. Inter group comparison also revealed highly significant results. The above data may only represent a tip of the iceberg of the dilemma. However, authors expect few other genuine studies to be conducted with larger sample size and wider parameters.

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