Significance of Peripheral Blood Smear in Diagnosis of Blood Parasitic Infection

GOPAL RAVAL*, DEVANG PATVARI*, D KOTHARI*, P JOSHI*, M PANDYA*

ABSTRACT

Bancroftian filariasis is a tropical and subtropical disease caused by *Wuchereria bancrofti* and transmitted by the Culex mosquitoes. It is conventionally diagnosed made by demonstrating microfilariae in the peripheral blood smear. Microfilariae and adult filarial worm have been incidentally detected in the blood. We here report an unusual case of Bancroftian microfilariasis in a 28-year-old male coming from endemic area with history of fever since 1 month. Patient had history of yellowish discoloration of skin and sclera.

Keywords: Microfilaria, *Plasmodium falciparum*, jaundice

Filariasis is caused by slender thread-like nematodes belonging to super family Filarioidea. Filariasis is endemic in India and South-East Asia. Present estimate suggest that over 120 million people in 80 countries are affected by filariasis and more than 1.1 billion people live in areas where there is risk of infection.[1,2] Individuals having circulating microfilariae are outwardly healthy but have the ability to transmit the infection to others through mosquito bites. Those with chronic filarial infection suffer severely from the disease but no longer transmit the infection. Diagnosis of filarial infection is frequently made on clinical grounds in endemic areas, but demonstration of microfilariae in circulating blood is the only means by which one can make definitive diagnosis.[2,3]

CASE REPORT

A 28-year-old male patient presented at Dr Jivraj Mehta Hospital with complaint of fever on and off since 1 month. Fever was associated with chills, and high-grade in nature. Patient also had a history of yellowish discoloration of skin and sclera since 1 month. Patient had past history of traveling to Madhya Pradesh 1 month before. He stayed there for 15 days. After returning to Ahmedabad, he had developed all these complaints. Patient had no any other sign and symptoms suggestive of filariasis like swelling, enlargement of limb except traveling and staying at an endemic area. So, when patient came with this complaint to Dr Jivraj Mehta Hospital, blood investigation was advised in form of complete blood count (CBC), peripheral smear for malaria parasite (PSMP), liver function test (LFT) and renal function test (RFT).

Peripheral Smear Findings

Blood sample collected at routine time (no night blood sample). Blood smear examination of patient

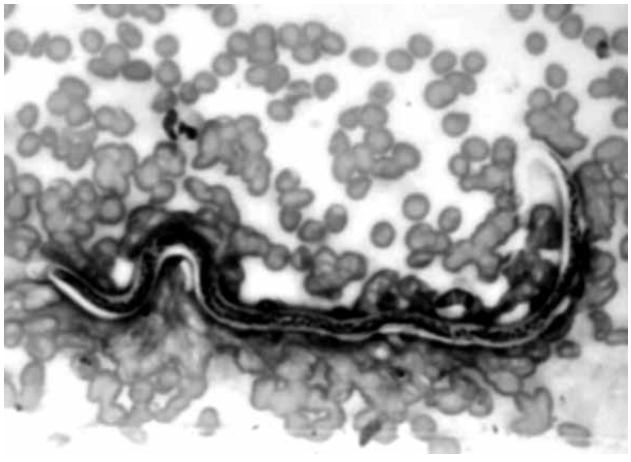

Figure 1. Microfilaria of *Wuchereria bancrofti.* Note the cephalic and tail tip free from nuclei (Fields stain, 40x).

*Nephrology, Pulmonary and Research Department
Dr Jivraj Mehta Smarak Health Foundation, Bakeri Medical Research Center
Ratubhai Adani Arogyadham, Ahmedabad, Gujarat
Address for correspondence
Consulting Nephrologist
Dr Jivraj Mehta Smarak Health Foundation
Bakeri Medical Research Centre
Ratubhai Adani Arogyadham
Dr Jivraj Mehta Marg, Ahmedabad - 380 007, Gujarat
E-mail: research@jivrajhealthcare.org

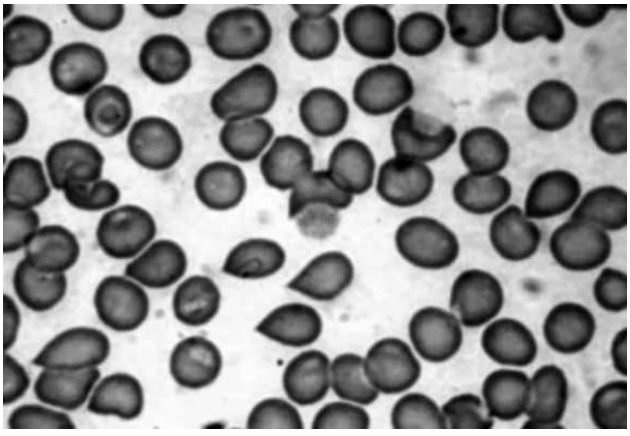

Figure 2. Trophozoites of *P. falciparum* (oil immersion field 100x Fields stain).

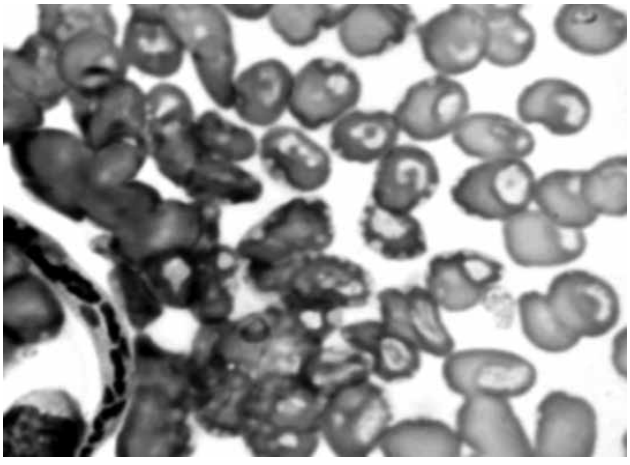

Figure 3. Trphozoites of *P. falciparum* and microfilaria of *W. bancrofti* (oil immersion field 100x Fields stain).

revealed the trophozoite of *Plasmodium falciparum* and scattered microfilariae in background of lymphocytes, neutrophils and eosinophils (Figs. 1 and 2). Morphologically the microfilaria showed presence of hyaline sheath (Fig. 1), cephalic space length: breath ratio of 1:1. Nuclei were spherical, regularly placed, appeared in row, well-separated without any overlapping (Figs. 2 and 3) and absent at cephalic end and tail tip (Figs. 1 and 2). The results of laboratory findings are summarized in Table 1.

Table 1. Other Laboratory Findings

Lab investigations	Results
Differential count	
Neutrophils	77%
Lymphocytes	21%
Eosinophils	01%
Monocyte	2%
Platelets counts	1,55,000/mm^3
Serum bilirubin	
Total	7.91 mg%
Direct	6.17 mg%
Indirect	1.74 mg%
SGPT	451 IU/L
Parasites	Trophozoite of *P. falciparum* Grade II and microfilaria of *W. bancrofti* are seen

DISCUSSION

Filariasis is a major public problem in tropical countries, especially India, China, Indonesia and parts of Africa. Clinically, filariasis can be of two major categories:

- Filariasis of skin and subcutaneous tissue
- Lymphatic filariasis.

Onchocerca volvulus and *Loa loa* are most common organisms reported in former and *W. bancrofti* and *Brugia malayi* are the two most common species in latter.[4]

The life cycle of *W. bancrofti* is found in two hosts. Man is definitive host and mosquito is an intermediate host. Adult worm resides in lymph nodes where the gravid female releases a large numbers of microfilariae. These larvae pass through the thoracic duct and pulmonary capillaries to the peripheral circulation.[5] Our case, *W. bancrofti* infection (filariasis) associated with *P. falciparum* infection. *P. falciparum* and *W. bancrofti* are transmitted by the same mosquito vector, *Anopheles gambiae* and interaction between the two species in the vector may have important implications for transmission of these two infections.[6] Patient also had raised serum glutamic-pyruvic transaminase (SGPT) and eosinophil counts were within normal range, which has also been reported by Varghese et al.[7]As in this case, patient had no other history suggestive of filarial infection except traveling and staying at an endemic area, this case would have been missed if peripheral smear was not properly examined. So, if a patient has any history of traveling and staying at an endemic area peripheral smear should be carefully examined for filarial infection. Patient was referred to physician and given falcigo 120 mg IV stat as loading dose on the first day followed by 60 mg IV twice-daily for 5 days and diethylcarbamazine (6 mg/kg) for 21 days. Patient was advised to come for follow-up after 21 days. Patient improved with the above treatment.

CONCLUSION

The main purpose of this case report is to raise the awareness that in tropical countries like India where filariasis is endemic, it should always be considered as a differential diagnosis of fever with history of traveling and staying at an endemic area. As patient also had an infection of *P. falciparum*, filarial infection would have been easily missed if the smear had not been examined properly. Careful examination of peripheral smears is very important in prompt recognition of the disease and institution of specific treatment especially in unsuspected cases.

REFERENCES

1. Sivakumar S. Role of fine needle aspiration cytology in detection of microfilariae: report of 2 cases. Acta Cytol. 2007;51(5):803-6.
2. Park K. Textbook of Preventive and Social Medicine. 18th Edition, Jabalpur, India: M/S Banarsidas Bhanot Publishers; 2005. pp. 211-6.
3. Rawat V, Rizvi G, Sharma N, Pandey H. An unusual presentation of Wuchereria bancrofti infection. Indian J Med Microbiol. 2009;27(4):382-3.
4. Mallick MG, Sengupta S, Bandyopadhyay A, Chakraborty J, Ray S, Guha D. Cytodiagnosis of filarial infections from an endemic area. Acta Cytol. 2007;51(6):843-9.
5. Kishore B, Khare P, Gupta RJ, Bisht SP. Microfilaria of Wuchereria bancrofti in cytologic smears: a report of 5 cases with unusual presentations. Acta Cytol. 2008;52(6): 710-2.
6. Marsh K, Kinyanjui S. Immune effector mechanisms in malaria. Parasite Immunol. 2006;28(1-2):51-60.
7. Varghese R, Raghuveer CV, Pai MR, Bansal R. Microfilariae in cytologic smears: a report of six cases. Acta Cytol. 1996;40(2):299-301.

■■■■

Low Vitamin D Tied to Increased COVID-19 Risk

Low plasma vitamin D level was found to be an independent risk factor for COVID-19 infection and hospitalization in a large, population-based study.

Individuals positive for COVID-19 had a 50% higher likelihood of having low versus normal 25(OH)D levels in a multivariate analysis controlling for other confounders. Investigators evaluated data for 7,807 individuals; of these, 10.1% were COVID-19 positive. About 90% of COVID-19 positive patients had low plasma 25(OH)D concentrations compared to 85% of participants negative for COVID-19. The findings are published online July 23 in *The FEBS Journal*… (*Medscape*)

Mothers Unlikely to Pass Coronavirus to Newborns with Proper Safety Techniques

Mothers infected with the novel coronavirus will not likely pass the infection to their newborns if appropriate health precautions are taken, suggests a study published in *The Lancet Child & Adolescent Health.*

There were no cases of viral transmission among 120 babies born to 116 COVID-positive mothers, reported researchers, even when they shared a room and the babies were breastfed. Precautions were taken; for instance, babies remained in enclosed cribs, 6 feet away from their mothers, except at the time of breastfeeding. Additionally, mothers wore surgical masks when handling the child and followed appropriate hand and breast washing procedures… (*CNN*)

COVID-19: WHO Chief Scientist Sees No Herd Immunity Yet

According to World Health Organization (WHO) chief scientist, nearly 50-60% of the population needs to be immune to the novel coronavirus for protective "herd immunity" effect to set in.

In a social media event, Dr Soumya Swaminathan mentioned that studies from some hard-hit countries suggest that about 5-10% of people have antibodies; some countries have shown it to be as high as 20%. She added that in order to achieve herd immunity through natural infection, you need to have several waves… (*HT*)