Filariasis in an infant with B-cell acute lymphoblastic leukemia: a rare enigma

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Abstract Filariasis, a tropical parasitic infection, is a common public health problem in the Indian sub-continent. Occurrence of filariasis with acute lymphoblastic leukemia (ALL) is unusual, particularly in infants, since filariasis has a long incubation period of about 1 year. Though, there are case reports of leishmaniasis, malaria and other vector borne diseases seen in association with leukemias, filariasis co-existing with ALL has not been documented to the best of our knowledge. We report an incidental finding of *Bancroftian filariasis* in an 11 month old female already diagnosed as B-cell ALL.

Keywords B-cell acute lymphoblastic leukemia · Filariasis · *Wuchereria bancrofti*

Introduction

Filariasis is caused by thread-like nematode worms. In India the main culprits are *Wuchereria bancrofti* and *Brugia malayi* (Park 2005). Filariasis is mainly a disease of adults seldom seen in infants where as B-cell acute lymphoblastic leukemia (ALL) is clonal malignancy of early hematopoietic progenitor cells of B-cell type presenting in

childhood (Witt and Ottesen 2001; Grove 2005; Borowitz and Chan 2008). Presence of filariasis along with ALL that too in an infant is not described in literature so far. Here we describe *Bancroftian filariasis* detected incidentally in a female infant with B-cell ALL.

Case history

An 11 month old female infant presented with low grade fever, lymphadenopathy and loss of appetite for 5 days. Physical examination revealed pallor, mild hepatosplenomegaly and bilateral inguinal lymphadenopathy.

The investigations revealed haemoglobin of 9.4 g per deciliter, Total leucocyte count was 1,05,000 per μl and platelet count was 60,000 per μl . Giemsa stained peripheral smear showed presence of 89% blasts. These blasts were of small to medium size with high nucleo-cytoplasmic ratio and scanty cytoplasm. Nucleus was round to oval with moderately condensed to open chromatin and 1–3 prominent nucleoli. Red cells were normocytic normochromic. Platelets were reduced in number. Microfilariae of *Wuchereria bancrofti*, which were sheathed and had no nuclei in the tail tip (Fig. 1), were seen in peripheral blood film. Higher magnification revealed a clear space at the cephalic and caudal ends of the microfilariae (Fig. 2). Flow cytometry revealed that the blasts were positive for CD10, CD19, CD20, and CD34. The final diagnosis of B-cell acute lymphoblastic leukemia with *Bancroftian filariasis* was made.

Discussion

Filariasis is considered endemic in tropical and sub-tropical regions of Asia, Africa, Central and South America and

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Fig. 1 Microfilariae of *Wuchereria Bancrofti*. Giemsa stain $\times 100$

Fig. 2 Microfilariae of *Wuchereria Bancrofti*. Giemsa stain $\times 400$

Pacific Island nations, with more than 120 million people infected and one billion people at risk of infection (Michael and Bundy 1997; Michael et al. 1996). Lymphatic filariasis is thought to have affected humans since approximately 4,000 years. Artifacts from ancient Egypt (2000 BC) and the Nok civilization in West Africa (500 BC) show possible elephantiasis syndrome (Nelson 1996). The first definitive reports of lymphatic filariasis only began to appear in the 16th century when lymphatic filariasis was called as “the curse of St. Thomas” (Laurence 1970). In contrast to many other mosquito-borne infections of medical significance lymphatic filariasis is transmitted by not just one but several genera of mosquitoes (Gambhir and Michael 2008; Snow et al. 2006). These include anopheles, culex and aedes, which differ in their efficiency of

transmission with anopheles and culex being the least and most efficient respectively (Gambhir and Michael 2008; Snow et al. 2006). While taking a blood meal, the vector injects the infectious larvae into the dermis. After about 1 year, the larvae molt through two stages, and mature into the adult worms which subsequently produce microfilariae (Grove 2005). So finding microfilariae in an infant is only possible if infestation is congenital or takes place in first few months of life.

Microfilaria of *Wuchereria bancrofti* and *Brugia malayi* occurring in India displays a nocturnal periodicity, i.e., they appear in large numbers at night and retreat from the peripheral blood stream during the day. The maximum density in blood is reported between 10 pm and 2 am in blood capillaries (Park 2005). Microfilaraemia is diagnosed primarily through direct observation of microfilaria in the peripheral blood, using the gold standard known as the finger prick test. In our case the patient was admitted in emergency unit at night and peripheral smear was made by the blood collected by heel prick which yielded capillary blood, thus emphasizing the role of capillary blood in diagnosis of microfilaria.

The differential diagnosis of microfilaria found in this case included *Wuchereria bancrofti*, *Dipetalonema perstans*, *Mansonella ozzardi*, *Brugia malayi* and *Loa loa* (Chatterjee 1980). As *Dipetalonema perstans*, *Mansonella ozzardi* are not sheathed and *Brugia malayi* and *Loa loa* have nuclei in the tail tip, the diagnosis of microfilaria *Wuchereria bancrofti* was made.

Although infection often begins in childhood, clinical filariasis is mainly a disease of adults and is more common in men (Witt and Ottesen 2001). It is rare in infants. Though, there are case reports of Leishmaniasis, malaria and other vector borne diseases seen in association with leukemias, filariasis co-existing with ALL has not been documented (Fakhar et al. 2008). To the best of our knowledge, this is the first case report of ALL with filariasis in an infant.

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