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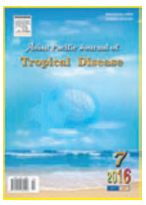

Parasitological research doi: 10.1016/S2222-1808(16)61081-2

Lymphatic filariasis: Surveillance action among immigrants from endemic areas, Acre State, Brazilian Amazon

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ARTICLE INFO

Article history:
Received 26 May 2016
Received in revised form 14 Jun 2016
Accepted 18 Jun 2016
Available online 22 Jun 2016

Keywords:
Wuchereria bancrofti
Filariasis
Surveillance
Immigrants
Diagnosis

ABSTRACT

Objective: To investigate the positivity of *Wuchereria bancrofti* (*W. bancrofti*) in immigrants who entered the country through Rio Branco, reducing the risk of introduction of parasites into new areas and endemic areas of the past.

Methods: It was realized a descriptive study. The AD12-ICT card test was applied on all immigrants living temporarily in the Chacara Alliance shelter, located in the metropolitan area of Rio Branco-AC, Brazil. For the positive patients, 10 mL of venous blood was collected between 11:00 pm and 1:00 am. About 4 mL of venous blood was collected to detect the presence of microfilariae in circulation in the tube using ethylene diamine tetraacetic acid and 6 mL of venous blood was collected to obtain blood serum for the Og4C3-ELISA, antibody Bm-14 and DNA-*W. bancrofti* tests.

Results: The present study evaluated 415 individuals in September 2014 by circulating filarial antigen for *W. bancrofti* using the AD12-ICT card test. A total of 15/415 (3.61%) positive cases were found, all from Haiti. Night blood collection and serum were performed on 1/14 for confirmation the infection of *W. bancrofti*, which presented 34 microfilariae/mL, antigen, antibodies and PCR positives.

Conclusions: This surveillance action reveals, in a pioneering and unequivocal manner, that Brazil is an influx of immigrants carrying lymphatic filariasis and there is an urgent need to step up surveillance at the main entry point for immigrants. Active surveillance may prevent the reintroduction of lymphatic filariasis in areas under control, or prevent its introduction into other states of Brazil.

1. Introduction

Lymphatic filariasis (LF), which is a parasitic disease caused by the infection of three species of nematodes, *Wuchereria bancrofti* (*W. bancrofti*), *Brugia malayi* and *Brugia timori*, was considered one among the six potentially eliminable infectious diseases of the globe for more than two decades. *W. bancrofti* accounts for nearly 91% of LF infections in humans worldwide and is a major cause of disabilities, disfigurement and incapacitated morbidity in endemic countries, affecting about 40 million people. The presence of these nematodes in the lymphatic system, its preferred site location, causes damage to the lymphatic system and produces the main chronic LF manifestations: lymphedema, hydrocele, chyluria and elephantiasis[1-3].

Eighteen years ago, the World Health Assembly, through Resolution 50.29, declared global elimination of LF as a public health problem[3,4]. From the resolution, World Health Assembly/50.29, through the Ministry of Health and the Conselho Nacional de Saúde, Brazil endorsed the resolution of Conselho

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The study protocol was performed according to the Helsinki declaration and approved by Ethics in Research Committee of the Clinical Hospital of Rio Branco, Acre-Fundhacre nº 040776/2015. Informed written consent was obtained from all participants.

Foundation Project: Supported by by the Department of Health Surveillance / Oswaldo Cruz Foundation/Foundation for Technological Development in Health - Vice-President for Research and Referral Laboratories (Fiocruz/FIOTECVPPLR)-002-LIV11-2-1 Project.

The journal implements double-blind peer review practiced by specially invited international editorial board members.

Nacional de Saúde n° 190/96, implementing the National Plan for the Elimination of LF (NPELF)[5].

In 2000, the Global Programme to Eliminate LF (GPELF) elaborated a plan to achieve the elimination of LF, in locations where it is endemic, by the year of 2020. The elimination strategy has two components: i) stoping the spread of infection by breaking the transmission cycle of vector-human parasite, by applying community-wide mass drug administration (MDA) to the population under risk of infection. The goal of GPELF is a yearly dose of albendazole (400 mg) associated with ivermectin (150–200 μg) or diethylcarbamazine (DEC) (6 mg/kg), reaching at least 65% population coverage yearly, for 5–6 years in areas where the prevalence of LF is equal to or greater than 1%, and ii) mitigating the suffering of affected individuals by controlling morbidity[3,6,7].

In the last half century, several countries have successfully eliminated LF, including Japan, China, South Korea, the Solomon Islands, Egypt and Togo[8]. In the Americas, only occurs infection of *W. bancrofti* and at the start of the GPELF, seven countries in the region were considered endemic for LF. In 2011, a review of epidemiological data led to the reclassification of Costa Rica, Suriname and Trinidad and Tobago as they are non-endemic. Thus, in the Americas, the remaining endemic countries are Brazil, Guyana, Dominican Republic and Haiti, with the latter being the country with the most cases of diseases and infection[9].

Epidemiological studies conducted in Brazil in the 1950s verified the existence of active transmission of LF in 11 cities from different States. With the control measures implemented over the years by the Ministry of Health, studies carried after the year of 1980 have shown a significant reduction, from 11 to only 2 and some areas are considered as active focus including Recife-Pernambuco and Belem-Pará[10]. Currently, Belem-Pará has eliminated LF under control and it is seeking full eradication. On the other hand, the metropolitan area of Recife, Olinda, Jaboatão dos Guararapes and Paulista, despite the significant decrease in prevalence (6.5% of microfilaremia in 1996 came to 0.002% in 2014 in Recife), is still considered the main focus of LF in Brazil[11-13].

The state of Santa Catarina is worth mention, where the years of 1951 and 1967 were considered endemic for LF. In both cases, a control action based on selective treatment of the microfilaremics and MDA using DEC was successful in eliminating the LF in that state[14].

Over the past 5 years, Brazil has become a migratory route of thousands of immigrants from African countries (Senegal, Gambia, Ghana), the Caribbean (Dominican Republic and Haiti) and Asian (Bangladesh and India), most considered transmission areas of filariasis by *W. bancrofti*. It is estimated that in the 2010–2014 period, about 42 000 immigrants from the Dominican Republic, Haiti and Africa settled in Brazilian States, of which approximately 11 500 (27.4%) resided in Southern Brazil[15-17].

The city of Rio Branco-Acre is the main gateway for immigrants, mostly from Haiti, considered hyper-endemic for LF and the source of over 90% of the total LF cases in the Americas. Immigrants are housed in a shelter in Rio Branco's metropolitan region, and then traveled by bus to the city of São Paulo, São Paulo, where they seeked jobs available especially in Southern and Southeastern Brazil[18,19]. Thus, the aim of this study is to investigate the positivity of *W. bancrofti* of immigrants who entered the country through Rio Branco, reducing the risk of reintroduction of parasites into new areas and endemic areas of the past.

2. Materials and methods

2.1. Study design and setting

This descriptive study was based on records from the databank of the Environmental Management Laboratory and Central Laboratory of Acre, Brazil. This data were generated by a surveillance action involving immigrants from endemic areas for LF, which took place during 1 week on September 2014 as part of Brazil's NPELF, conducted by the Central Laboratory of Acre, Rio Branco Municipal and State Health/Epidemiological Surveillance, the Brazilian Ministry of Health, and the National Filariasis Referral Service of the Aggeu Magalhães Research Center, Oswaldo Cruz Foundation of Pernambuco.

All immigrants living temporarily in the Chacara Alliance shelter, located in the metropolitan area of Rio Branco-AC, Brazil, during the period of the surveillance action were invited to attend the Lymphatic Filariasis Diagnostic Investigation Laboratory (LFDIL)[19].

2.2. Data analysis

The database analysis of Environmental Management Laboratory began in May 2015, after consideration and approval by the Ethics in Research Committee of the Clinical Hospital of Rio Branco, Acre- Fundhacre n° 040776/2015.

2.3. Study population

Before the LFDIL began, a lecture was given on the general aspects of LF (epidemiology, clinical features, diagnosis and treatment), as well as the objectives of this surveillance action coordinated by the Health Institutions of Brazil, with an emphasis on the enormous importance of diagnostic evaluation and treatment of positive cases. For better understanding of the information given, Haitian immigrants fluent in Portuguese provided simultaneous translation from Portuguese to French and Haitian Creole.

Participation was voluntary and prior to the LFDIL, consent for the tests was obtained from all participants, including minors who were accompanied by their parents, who authorized the participation of their children in the LFDIL. Sociodemographic information (full name, sex, age, parents and hometown) was collected, and individuals with difficulty in understanding the questionnaire in Portuguese were assisted by a translator.

2.4. Laboratory assays

The AD12-immunochromatographic (ICT) card test was applied according to the manufacturer's instructions and the results read by technicians trained in the field, precisely 10 min after taking the blood sample. The appearance of two lines (test and control) was interpreted as a positive result[20-22]. All positive cards were repeated on the same occasion to confirm the results, following the same criteria listed above. For the positive patients, 10 mL of venous blood was collected between 11:00 pm and 1:00 am. About 4 mL of venous blood was collected to detect the presence of microfilariae in circulation in the tube using ethylene diamine tetraacetic acid and 6 mL of venous blood was collected to obtain blood serum for the Og4C3-ELISA, antibody Bm-14 and DNA-*W. bancrofti* tests. Three drops of blood were placed on two slides for study of microfilariae morphology. Blood, serum and slides were stored at temperatures of 4°–20 °C and ambient temperature, respectively, and then sent to the SRNF/CPqAM/Fiocruz-PE until the application of the standard operating procedures for each specific test.

Assessment of microfilariae was carried out using diagnosis and quantification of microfilariae (DQM) and thick blood film (TBF), circulating filarial antigen (CFA) by Og4C3-ELISA, antibody Bm-