Clinical epidemiological profile of American tegumentary leishmaniasis at the Pinto Sugar Mill in Moreno Municipality, Greater Metropolitan Recife, Pernambuco State, Brazil

Perfil clínico-epidemiológico da leishmaniose tegumentar americana no Engenho Pinto, Município de Moreno, Região Metropolitana do Recife, Pernambuco, Brasil

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Abstract

American tegumentary leishmaniasis (ATL) is present in all regions of Pernambuco State, Brazil, where it is spreading, with the emergence of foci in new areas like the Municipality (County) of Moreno in Greater Metropolitan Recife. The objective of the current study was to assess the prevalence of infection and identify autochthonous cases of ATL. In April 2006 a population survey was performed using a questionnaire and the Montenegro skin test (MST) in 481 individuals from the Pinto Sugar Mill, of whom 47% were males and 74% were younger than 30 years. One hundred forty-four individuals (30%) showed a positive MST. Of these, five presented active lesions, 41 were cured after meglumine antimoniate treatment, and one showed a spontaneous cure. Indirect immunofluorescence (IIF) was performed on sera from 89 individuals and showed a 36% positive rate. The high ATL prevalence demonstrates the epidemiological spread of the disease in Greater Metropolitan Recife, a worrisome development since there are no effective measures for ATL control except ecological awareness raising to minimize the risk of infection.

Leishmaniasis; Infection; Prevalence

Introduction

American tegumentary leishmaniasis (ATL) is a parasitic disease that presents a variety of clinical manifestations, depending on the parasite species and host immune response, ranging from non-apparent forms with discrete skin lesions to multiple ulcerations and mucosal lesions with a slow course and favorable treatment [1,2].

Of the six species associated with ATL in humans in Brazil, *Leishmania* (*Viannia*) *braziliensis* is the principal species responsible for the disease in Brazil and is also the only species circulating thus far in the State of Pernambuco [3,4].

ATL diagnosis in endemic areas presents limitations and is routinely performed merely on the basis of clinical signs and symptoms. Laboratory diagnosis is based on demonstration of the parasite and immune assays. Such methods include direct identification of amastigote forms by light microscopy, *in vitro* isolation of the parasite, polymerase chain reaction (PCR), indirect immunofluorescence (IIF), ELISA, and the Montenegro skin test (MST) [5,6].

ATL affects all regions of the State of Pernambuco, predominantly in the Atlantic "Zona da Mata", with more than 60% of total reported cases [7]. From 2001 to 2005, the Municipality (County) of Moreno in Greater Metropolitan Recife reported 195 autochthonous cases according to the Municipal Center for Health and Environmental Surveillance. The aim of this study was

to assess the prevalence of infection and identify autochthonous cases of ATL at the Pinto Sugar Mill, which showed the highest number of reported cases.

Material and methods

This was a descriptive population study in the Municipality of Moreno, located 28 km from Recife, the Capital of Pernambuco State, with a rural population of 8,672 (600 of whom live at the Pinto Sugar Mill, the site with the largest number of ATL cases). The main economic activities are agriculture, poultry production, fishing, and fish farming.

A total of 481 individuals participated in the study, and the epidemiological survey was conducted from April 24 to 28, 2007, using a questionnaire to collect data on biological and social variables and the Montenegro skin test. In the individuals that reacted to the MST, venous blood samples were drawn for IIF to investigate the presence of anti-*Leishmania* antibodies. Frequency distributions and descriptive measurements like minimums, maximums, and means were calculated using Microsoft Office 2003 (Microsoft Corp., USA).

The research protocol was approved by the Institutional Review Board of the Aggeu Magalhães Research Center, Oswaldo Cruz Foundation (case nº. 11/05).

Results

Of the total sample, 256 (53%) were females and 225 (47%) males, with ages ranging from 1 to 71 years. Seventy-four percent of the individuals were less than 30 years of age, and mean schooling level was elementary. Forty-three percent were students, 23% farmers, 9% housewives, and 25% divided among other activities (Table 1).

Ten percent (47) had a previous history of ATL, with 1% (4) presenting a single active ulcerated lesion varying from 1 to 18cm^2, located on the lower limbs. Of these, only two were currently in treatment with N-methyl-glucamine antimoniate (Glucantime, Rhodia Farma).

MST was positive in 30% (144/481), and of these, 97 (67%) did not have a previous history of ATL. Prevalence of the disease was higher in males (53%) and from 11 to 30 years of age (48%), (Table 1). The one-to-10-year age bracket showed a 14.5% MST-positive rate, suggesting the importance of intradomiciliary transmission.

Forty-three individuals (71%) present typical scars, located on the lower limbs in 59%. These individuals received treatment with Glucantime, and one showed spontaneous resolution.

IIF was performed in 89 MST-positive samples (Table 2).

Discussion

ATL is spreading throughout Brazil and is clearly expanding in the State of Pernambuco. This situation is associated with haphazard deforestation and the emergence of new agricultural areas and consequently human dwellings built near remnants of the Atlantic Forest, where the presence of humans and synanthropic animals facilitates transmission and expansion of the ATL zoonotic cycle [7,8].

These environmental changes have been associated with a change in the ATL epidemiological profile, with more cases reported in areas without prior notification, suggesting the vector's adaptation to the altered ecosystem [9].

The variation in distribution of ATL cases across different age brackets emphasizes the possibility of intradomiciliary, peridomiciliary and extradomiciliary or occupational transmission. In a similar study in Sabará, Greater Metropolitan Belo Horizonte, Minas Gerais State, 9% of cases occurred in the zero-to-10-year age bracket [10].

The highest positive rates in males were observed in the 15-45-year bracket, corresponding to the most active working age and the heaviest occupational exposure. Similar results have been observed in other regions of Brazil [11]. However, in the current study the similar rates in males and females suggest the same risk of acquiring the disease. In Amaraji, in the Southern Zona da Mata in Pernambuco, the ATL transmission pattern differs from other areas of Brazil, since more males and adults were affected, suggesting extradomiciliary transmission in the workforce [8,12].

MST reactivity in the current study was higher than in the Jardins and Carnijó sugar mills, also located in the Municipality of Moreno [13]. MST is highly useful in epidemiological surveys in endemic and non-endemic areas, diagnosing situations in which the number of ATL cases is small or zero, indicating that the individual was sensitized by the infection [6,14]. The presence of 97 MST-positive individuals suggests the existence of the non-apparent or sub-clinical form of the infection.

The fact that 36% of 89 MST-positive individuals were IIF-positive (measuring circulating antibodies) was consistent with findings from other studies, characteristic of cutaneous forms of ATL and the parasite's weak antigenic potential [15,16]. Although widely used, IIF has not proven appro-

Table 1

Social and epidemiological characteristics of study participants and relationship to positive test results.

Variables	Total patient sample (N = 481)		MST-positive (N = 144)		IIF-positive (N = 32)	
	n	%	n	%	n	%
Gender						
Male	225	47	76	53	17	53
Female	256	53	68	47	15	47
Age (years)						
< 30	356	74	69	48	16	50
> 30	125	26	75	52	16	50
Occupation						
Agricultural	111	23	50	35	14	44
Non-agricultural	370	77	94	65	18	56

MST: Montenegro skin test; IIF: indirect immunofluorescence.

priate for ATL cases, since in addition to not correlating antibody levels with disease stage, it can show cross-reactions with visceral leishmaniasis and Chagas' disease [17].

In conclusion, this study shows a high prevalence of infected individuals in an important metropolitan area of Brazil, proving the epidemiological spread of ATL in the State of Pernambuco and the limited effectiveness of current ATL control strategies.

Table 2

Test results for American tegumentary leishmaniasis.

Tests	N	Positive		Negative	
		n	%	n	%
MST	481	144	30	337	70
IIF	89	32	36	57	64

MST: Montenegro skin test; IIF: indirect immunofluorescence.

Resumo

A leishmaniose tegumentar americana incide em todas as regiões do Estado de Pernambuco, Brasil, onde se apresenta em expansão, com o surgimento de focos em novas áreas, como o Município de Moreno, na região metropolitana do Recife. O objetivo deste estudo foi avaliar a prevalência da infecção e identificar os casos autóctones de leishmaniose tegumentar americana. Em abril de 2006, realizou-se um inquérito populacional por meio da aplicação de um questionário e do teste de intradermoreação de Montenegro a 481 indivíduos do Engenho Pinto, dos quais 47% eram do sexo masculino e 74% menores de 30 anos. Cento e quarenta e quatro (30%) indivíduos apresentaram reação positiva ao teste. Dentre estes, cinco apresentaram lesões ativas, 41 foram curados após quimioterapia e um curado espontaneamente. A RIFI realizada nos soros de 89 indivíduos apresentou 36% de positividade. A alta prevalência aponta para a expansão epidemiológica da doença nessa área da região metropolitana, fato preocupante, pois não há medidas eficazes para o controle da leishmaniose tegumentar americana, a não ser uma conscientização ecológica para minimizar o risco de infecção.

Leishmaniose; Infecção; Prevalência

Contributors

M. E. F. Brito coordinated and worked throughout the entire project, drafted the paper, and performed the final corrections. C. J. Silva, C. M. Silva, P. R. Salazar, and J. S. Coutinho participated in the fieldwork, analysis of the results, and elaboration of the paper. L. C. Reis participated in the entire project and elaboration of the paper. V. R. A. Pereira and S. P. Brandão-Filho participated in the elaboration of the paper. A. C. R. Medeiros participated in the elaboration of the research project and paper.

Acknowledgments

The authors wish to thank Éricka Lima de Almeida for her technical support throughout the development of this study.

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Submitted on 11/Sep/2007
Final version resubmitted on 15/Apr/2008
Approved on 24/Apr/2008