

Brief Original Article

Prevalence and risk factor analysis for HIV/HTLV 1/2 coinfection in Paraíba state, Brazil

Marcela Santos de Souza¹, Juliana Prado Goncales¹, Viviane Martha Santos de Morais¹, José Valter Joaquim Silva Júnior^{1,2,3}, Thaísa Regina Rocha Lopes^{1,2}, Joanne Elizabeth Ferraz da Costa¹, Maria Rosângela Cunha Duarte Coêlho^{1,4}

¹ Virology Sector, Keizo Asami Immunopathology Laboratory, Federal University of Pernambuco, Recife, Pernambuco, Brazil

² Virology Sector, Department of Preventive Veterinary Medicine, Federal University of Santa Maria, Camobi, Rio Grande do Sul, Brazil

³ Department of Microbiology and Parasitology, Federal University of Santa Maria, Camobi, Rio Grande do Sul, Brazil

⁴ Department of Physiology and Pharmacology, Federal University of Pernambuco, Recife, Pernambuco, Brazil

Abstract

Introduction: *Human T-lymphotropic virus* (HTLV) 1 and 2 infections can lead to neurological diseases, mainly in HIV/HTLV 1 coinfecting. Furthermore, HTLV 1 infection in HIV/AIDS patients has also been associated with AIDS progression. Despite this, HTLV 1/2 infections are not of mandatory notification in Brazil. Here, we describe the prevalence of HTLV 1/2 in HIV/AIDS patients from Paraíba state, Brazil, as well as the sociodemographic characteristics of the coinfecting individuals.

Methodology: Information about HIV viral load and TCD4 lymphocyte count were obtained from patients' records. Data on the patients' sociodemographic characteristics were obtained by interview conducted after signing the informed consent form. The serological diagnosis for HTLV 1/2 was performed by Enzyme-Linked Immunosorbent Assay (ELISA) and Western Blot (WB).

Results: A total of 401 HIV/AIDS patients participated in the study, of whom about 1.5% (6/401) were positive for antibodies against HTLV, specifically for HTLV 1, evaluated by both ELISA and WB. No risk factors were found associated with HIV/HTLV 1/2 coinfection.

Conclusions: We report a 1.5% prevalence of HTLV 1 infection in HIV/AIDS patients from Paraíba state. Although we have not identified risk factors associated with HTLV 1, we describe the most observed sociodemographic characteristics in HIV/HTLV 1 coinfection.

Key words: HIV/AIDS; HTLV 1/2; Epidemiology; Brazil.

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Introduction

Human T-lymphotropic virus (HTLV) 1 and 2, currently identified as *Primate T-cell lymphotropic virus 1* and 2, belongs to the *Retroviridae* family, *Orthoretrovirinae* subfamily and to the *Deltaretrovirus* genus [1]. HTLV 1 infection can result in HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP) and adult T-cell leukemia/lymphoma (ATL). HTLV 1 can also cause less severe diseases, such as arthropathies, polymyositis, uveitis, infectious dermatitis and Sjögren-like syndrome [2,3]. Initially identified as a virus with no clinical relevance, HTLV 2 infections have also been associated with neurological disorders [4]. It is estimated that 15 to 20 million individuals are infected with HTLV 1/2 worldwide [5]. High prevalence of HTLV 1 has been reported in Japan, Africa, Caribbean islands and South America [2]. On

the other hand, HTLV 2 infections are frequently reported in specific populations, such as American Indians and injecting drug users in the United States of America, Europe, South America and Asia [2,4]. Among the target populations of HTLV 1/2 infections, HIV/AIDS patients require special attention. The relationship between HTLV 1/2 and HIV coinfection seems to be species-specific: while HIV/HTLV 2 coinfection tends to have benign effects, it is possible that HIV/HTLV 1 infection accelerates the progression of AIDS, resulting in decreasing rates of survival [6]. In addition, an increase in the prevalence of neurological disorders has also been observed in HIV/HTLV 1 coinfecting [7]. In Brazil, the HIV/HTLV 1/2 prevalence varies considerably depending on the region, ranging from 1.5% in northeast Brazil to 10.7% in the southeast of the country [8,9]. Specifically in the northeast region,

the lowest and highest prevalence for HIV/HTLV 1/2 was found to be 1.5% (Recife, Pernambuco state, PE) and 21.1% (Salvador, Bahia state, BA), respectively [8,10]. However, since HTLV 1/2 infections are not of mandatory notification in Brazil, in many of its states there is still no record on the prevalence and characteristics of HTLV 1/2 individuals. In this context, we aim to describe the prevalence of HTLV 1/2 in HIV/AIDS patients from Paraíba state (PB) (northeast Brazil), as well as the sociodemographic characteristics of the coinfecting individuals.

Methodology

Design and population of study

This work is a cross-sectional analytical study carried out in 2015 with HIV/AIDS patients of both sexes, from the *Hospital Clementino Fraga*, João Pessoa city, Paraíba state, Brazil. Information about HIV viral load and TCD4 lymphocyte count were obtained from patients' records. Data on the patients' sociodemographic characteristics were obtained by interview conducted after signing the informed consent form. All patients were on antiretroviral therapy (ART) and had no symptoms or clinical manifestations of diseases associated with HTLV 1/2 infection. The study was approved by the ethics committee, process number 800.344 (Ethics and Research Committee of the Center for Health Sciences of the Federal University of Paraíba, UFPB).

Sampling calculation

Since there are no previous data on HIV/HTLV 1/2 coinfection in Paraíba, the sample size calculation was based on the prevalence of HTLV 1/2 infection in HIV/AIDS individuals reported by Brites *et al.*[10], which was 21.1% for Salvador (BA), Brazil. The Statcalc, Epi Info program v.7.1.3.0, was used for a random population tending to infinity and with expected prevalence of 20%, which may vary $\pm 15\%$ in a 95% confidence interval (CI). For these conditions, a sample of 270 patients would be needed.

Serological diagnosis

The HIV/AIDS patients were screened for antibodies against HTLV 1/2 by commercially available ELISA (HTLV I + II ELISA recombinante v.4.0, Wiener). Positive ELISA samples were evaluated by commercial Western blot (WB) (INNO-LIA HTLV I/II Score, Fujirebio), following the manufacturers' instructions.

Statistical analysis

The Fisher's exact test and χ^2 test (with Yates correction) were used for univariate analyses. The *p*-value < 0.05 and 95% CI were considered in all analyses. Statistical analyses were performed in the GraphPad Prism program v.7.0.

Results

A total of 401 HIV/AIDS patients participated in the study. The median TCD4 lymphocytes count was 534 cells/mm³, and 25.6% of patients (103/401) had a detectable viral load, with a median of 2,252 copies/mL. The HIV diagnosis time and ART time were 5.7 (± 5.2) and 4.4 (± 4.8) years, respectively.

The average age of HIV/AIDS patients was 41.26 (± 13.38) years old, and most of the HIV/AIDS individuals were: male (67.58%, 271/401), single (69.82%, 280/401), of white ethnicity (48.87%, 196/401), with higher education (38.15%, 153/401), regularly using condoms (45.13%, 181/401), did not have/did not report if they had infectious sexually transmitted disease (ISTD) (62.5%, 251/401), did not receive/did not report if they received a blood transfusion (84.28%, 338/401), they did not have tattoos (77.80%, 312/401) or piercing (93.26%, 374/401) and did not use injecting drugs (97.50%, 391/401) (Table 1).

Among the population described above, about 1.5% (6/401) were positive for antibodies against HTLV, specifically for HTLV 1, confirmed by both serological tests, ELISA and WB. The median TCD4 lymphocyte count was 788.5 cells/mm³. The HIV diagnosis time and ART time were 8.3 (± 5.8) and 7.3 (± 6) years, respectively.

Of the six HTLV 1 positive patients, half had a detectable HIV viral load (median 362 copies/mL). The average age of HTLV 1 patients was 47.83 (± 9.98) years old. Most HTLV 1 positive individuals were: male (66.66%, 4/6), single (83.33%, 5/6), used condoms regularly (83.33%, 5/6), did not receive/did not report receiving a blood transfusion (83.33%, 5/6), did not have a tattoo (83.33%, 5/6) and of white ethnicity (66.66%, 4/6). Half of the patients with HTLV 1 had a history of ISTD. None of the HTLV 1 positive patients had a piercing or used any injecting drug. Overall, no risk factors were found associated with HIV/HTLV 1/2 coinfection (Table 1).

Discussion

The HTLV 1/2 infection rate varies considerably according to the regions of the world and populations assessed [2,4,5]. In Brazil, a country of continental

dimensions, it is also possible to observe considerable differences in the prevalence of HTLV 1/2 depending on the region and the target population [10-16].

In our study, we found a prevalence of about 1.5% for HTLV 1 in HIV/AIDS individuals from João Pessoa (PB). This value is lower than that found in studies conducted in other states and regions of Brazil. In São Paulo and Ribeirão Preto cities, both in São Paulo state (SP), southeast Brazil, a prevalence of 4.7% (8/170) and 10.74% (16/149) of HIV/HTLV 1/2 individuals was found, respectively [9]. In Londrina (and surrounding region), Paraná state (PR), southern Brazil, and in Belém (Pará state, PA, northern Brazil), the prevalence of coinfecting patients was 6.46% (49/758) and 7.38% (11/149), respectively [11,12]. The prevalence reported here was also lower than that described for HIV/HTLV 1/2 coinfecting patients in Salvador (BA) (21.14%, 26/123), also located in the Northeast region of Brazil [10]. On the other hand, our results are similar to those found in other studies carried out in northeast Brazil. In Recife (PE) and in an urban area of Piauí state, a

prevalence of 1.53% (11/720) and 1.61% (13/805) was found, respectively [8,13].

Interestingly, although the prevalence of HTLV 1/2 in HIV/AIDS patients is often higher than that observed in the general population, our results are lower than those reported by Dourado *et al.* [14] in a study performed on the general population of Salvador (BA), who found a prevalence of 1.66% (23/1,385) for HTLV 1. In addition, the results reported in our study are also very similar to those reported in a population-based study conducted in Belém (PA), which found a prevalence of 1.42% (15/1,059) for HTLV 1 [15].

We have not found a significant relationship between population characteristics and HTLV 1 infection. However, it is possible that the individual behavior, sociodemographic characteristics and social (and medical) conditions are influencing the prevalence reported in our study. Most of the HIV patients analyzed here, for example, used condoms regularly, did not use injecting drugs and did not receive/did not report if they had received a blood transfusion. Blood transfusions and injecting drug use, in turn, have been

Table 1. Study population.

Variables	HIV (N = 395)	HIV/HTLV 1/2 (N = 6)	OR ¹	95% CI ²	p-value
Gender					
Male	267	4			
Female	128	2	1.04	0.18-5.77	0.96 ³
Civil status					
Single	275	5	-	-	
Married	81	0	-	-	
Cohabiting	39	1	-	-	0.43 ³
Education					
Illiterate	73	2	-	-	
Elementary school	84	1	-	-	
High school	86	2	-	-	
Higher education	152	1	-	-	0.60 ³
Ethnicity					
White	192	4	-	-	
Black	79	1	-	-	
Pardo	121	1	-	-	
Indigenous	2	0	-	-	0.84 ³
Condom use					
Regularly	176	5	-	-	
Sometimes	23	0	-	-	
No/N.R. ⁵	196	1	-	-	0.16 ³
ISTD⁶					
Yes	147	3			
No/N.R. ⁵	248	3	0.59	0.11-2.97	0.67 ⁴
Blood transfusion					
Yes	62	1			
No/N.R. ⁵	333	5	0.93	0.10-8.11	1.0 ⁴
Tattoo					
Yes	88	1			
No	307	5	1.43	0.16-12.44	1.0 ⁴
Piercing					
Yes	33	0			
No	368	6	1.18	0.06-21.45	1.0 ⁴
Intravenous drugs					
Yes	10	0			
No	385	6	0.35	0.01-6.71	1.0 ⁴

¹OR: Odds ratio; ²CI: Confidence interval; ³ χ^2 test with Yates correction; ⁴Fisher's exact test; ⁵Not reported; ⁶Infectious sexually transmitted disease.

previously associated with HIV/HTLV 1/2 coinfection [9,13,16]. In addition, sexual intercourse is one important route of transmission for HTLV 1 [3,16].

Female gender has also been associated with a higher risk of HIV/HTLV 1 coinfection [16]. In our study, however, the number of females was almost half the number of males assessed. In addition, black/pardo ethnicity was associated with the risk of HIV/HTLV 1/2 coinfection [16]. On the other hand, here, white ethnicity represented the majority of HIV/AIDS individuals assessed.

Conclusions

We describe a 1.5% prevalence of HTLV 1 in HIV/AIDS patients from Paraíba state, Brazil. Although the prevalence found in our study is lower than that described in other Brazilian states [9-12, 14], and although the patients with HIV/AIDS analyzed here did not have HTLV 1/2 infection-related disease, it is important to consider that HTLV 1 infection, especially in HIV coinfection, can increase the chance of neurological disorders, in addition to accelerating the progression of AIDS. Therefore, we believe that HIV/HTLV coinfection should be considered seriously, especially in Brazil, where HTLV 1/2 infections are not mandatory to report.

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Corresponding author

Maria Rosângela Cunha Duarte Coêlho, MSc, PhD
Setor de Virologia, Laboratório de Imunopatologia Keizo Asami, Universidade Federal de Pernambuco, address: Av. Prof. Moraes Rego, s/n. Cidade Universitária, 50.670-901, Recife, Pernambuco, Brazil.
Phone: + 55 81 21268586
E-mail: roelholika@gmail.com.

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