

## Serological diagnosis of Chagas disease in HIV-infected patients

**Dulce Stauffert**<sup>[1], [2]</sup>, **Mariângela Freitas da Silveira**<sup>[1], [3]</sup>,  
**Marilia Arndt Mesenburg**<sup>[3]</sup>, **Thiago Gaspar**<sup>[1]</sup>, **Adriane Brod Manta**<sup>[1]</sup>,  
**Guilherme Lucas de Oliveira Bicca**<sup>[1]</sup> and **Marcos Marreiro Villela**<sup>[2]</sup>

[1]. Departamento Materno Infantil, Faculdade de Medicina, Universidade Federal de Pelotas, Pelotas, Rio Grande do Sul, Brasil. [2]. Programa de Pós Graduação em Parasitologia, Instituto de Biologia, Universidade Federal de Pelotas, Pelotas, Rio Grande do Sul, Brasil. [3]. Programa de Pós Graduação em Epidemiologia, Universidade Federal de Pelotas, Pelotas, Rio Grande do Sul, Brasil.

### ABSTRACT

**Introduction:** This study assessed the rate of request for the serological diagnosis of Chagas disease among human immunodeficiency virus (HIV)-infected patients treated at the Specialized Care Service of Pelotas, Rio Grande do Sul, Brazil. **Methods:** This cross-sectional study used secondary data obtained from the medical records of 252 patients aged between 18 and 75 years. **Results:** The serological diagnosis of Chagas disease was requested only in 3.2% of cases. **Conclusions:** The results demonstrate poor adherence to protocols on the part of healthcare professionals, indicating the need to reevaluate the procedures applied to HIV-infected patients from endemic regions for both diseases.

**Keywords:** *Trypanosoma cruzi*. AIDS. Coinfection.

Chagas disease, also known as American trypanosomiasis, is a potentially life-threatening illness caused by the protozoan *Trypanosoma cruzi*. It mainly occurs in Latin American countries, where it is mostly transmitted to humans via contact with feces from triatomine insects. The World Health Organization estimates 10 million people are infected with Chagas disease worldwide, most of whom live in Latin America, and that this disease is one of the most commonly neglected diseases<sup>(1)(2)</sup>. If left untreated, the acute infection is followed by a chronic indeterminate phase or a chronic symptomatic phase in which the individual presents with visceral involvement, i.e., gastrointestinal or cardiac involvement or both. In the chronic phase, blood parasite levels are low. Patients are usually infected throughout life, given that specific anti-parasitic treatment is seldom effective. Approximately 30% of individuals living with Chagas disease worldwide develop cardiomyopathy or gastrointestinal manifestations such as megaesophagus and megacolon<sup>(3)</sup>. Organ transplant recipients as well as patients with cancer and acquired immunodeficiency syndrome (AIDS) may experience severe infection, because immunosuppression can reactivate the disease<sup>(4)(5)</sup>.

*Trypanosoma cruzi*/human immunodeficiency virus (HIV) coinfection began to be reported after the emergence of HIV and AIDS<sup>(6)</sup>. *T. cruzi* behaves opportunistically in individuals

with immunosuppression of any etiology, leading to the reactivation of chronic infection with increased parasitemia, worsening of myocarditis, occurrence of meningoencephalitis, and even mortality<sup>(7)(8)</sup>. Chagas disease reactivation in patients with HIV coinfection has been considered an AIDS-defining condition in Brazil since January 2004; moreover, the Brazilian Network of Attention and Studies for *T. cruzi*/HIV coinfection was established in 2006<sup>(9)(10)</sup>. Although the first case of *T. cruzi*/HIV coinfection was reported in 1981, the frequency of this association remains unestablished<sup>(9)</sup>.

In 2010, Almeida et al.<sup>(6)</sup> reviewed most of the 115 relevant studies published between 1980 and 2010 to investigate the incidence of *T. cruzi*/HIV coinfection. The results indicate Chagas disease reactivation, which is potentially serious, occurs in 41.2% of cases. The central nervous system is the main system affected in two-thirds of reactivation cases, followed by cardiac involvement and a combination of both. Furthermore, the review demonstrates systematic evidence of *T. cruzi*/HIV coinfection and its importance since the discovery of AIDS<sup>(9)(11)</sup>. However, there are few studies on this subject in Brazil and other countries where Chagas disease is endemic.

Although several studies on HIV/AIDS patients have been conducted in Pelotas, a city in Southern Brazil, no studies have investigated *T. cruzi*/HIV coinfection; this is in spite of the high incidence of Chagas disease in Pelotas (9.3% among blood donors)<sup>(12)</sup>, creating possibilities for exposure and *T. cruzi*/HIV coinfection. The Consensus of the Brazilian Ministry of Health (2008)<sup>(10)(13)</sup> for HIV-infected adults states that all HIV-infected patients should be tested for Chagas disease during their initial evaluation, especially patients from endemic areas.

**Corresponding author:** Dr. Dulce Stauffert. Rua Canoas 1295, Laranjal, 96090-130 Pelotas, Rio Grande do Sul, Brasil.

**Phone:** 55 53 9105-0808

**e-mail:** dstauffert@hotmail.com

**Received** 2 November 2014

**Accepted** 28 January 2015

Accordingly, this cross-sectional study assessed the rate of request for the serological diagnosis of Chagas disease and rate of positive results for the disease as well as their associations with sex, age, cluster of differentiation (CD4) cell count, and viral load of HIV-infected patients.

The secondary data from the medical records of HIV-infected patients between 18 and 75 years old treated at the Specialized Care Service of the Faculty of Medicine, Federal University of Pelotas [*Serviço de Assistência Especializada, Faculdade de Medicina, Universidade Federal de Pelotas (SAE-UFPEL)*], a referral center for HIV-infected patient care in Southern Rio Grande do Sul, Brazil, between January and September were analyzed. This study was approved by the Ethics Committee of the Faculty of Medicine of UFPel and performed in accordance with the Declaration of Helsinki. The following information was obtained: whether the serological diagnosis of Chagas disease was requested, the results of the requested tests, age, sex, CD4 cell count, viral load, and clinical signs or symptoms consistent with Chagas disease reactivation, especially neurological and/or cardiac alterations. A study on 4,482 blood donors surveyed in the blood center of Pelotas estimates the overall regional prevalence of Chagas disease to be 0.5%<sup>(14)</sup>.

The outcome was the rate of request of Chagas disease serological diagnosis and the rate of *T. cruzi*/HIV coinfection when available. The data were initially analyzed by a univariate descriptive analysis of the rate request for serological diagnosis of Chagas disease, the rate of positive test results, and sample characteristics (i.e., age and sex). Next, a bivariate analysis was performed using Poisson regression with robust variance correction. The level of significance was set at  $p < 0.05$ . Data were double-entered in Epi Info™ 7.1.5 (Center for Disease Control and Prevention, Atlanta, GA, USA) software, and statistical analysis was performed using Statistical Product and Service Solutions (SPSS Inc., Chicago, IL, USA).

A total of 252 patients between 18 and 75 years old were analyzed; their mean standard deviation age was 42.6 (11.8) years, 55.7% were female, and none were pregnant. Serological diagnosis of Chagas disease was requested in 3.2% (8 of 252) of cases. Among the 8 patients tested, 7 were negative for Chagas disease, and the result was unavailable in the medical record of the other patient.

There were no reports of events involving the central nervous system or myocardium in the medical records.

Because of the small number of requests for serological diagnosis of Chagas disease, there were no significant associations between the request for serological diagnosis of Chagas disease and test results, age, sex, or CD4 cells count in bivariate analysis (all  $p > 0.05$ ).

Although the Brazilian Ministry of Health's 2008 Consensus for the treatment of HIV-infected adults<sup>(4)</sup> states the serological diagnosis of Chagas disease must be requested during the initial consultation, the present results show this test was requested only in 3.2% of cases between January and September 2013. This result demonstrates extremely poor adherence to protocols on the part of healthcare professionals; in particular, it indicates either a lack of awareness of the above mentioned consensus

and/or Chagas disease reactivation in HIV-infected patients or simple disregard for procedure for HIV-infected patients from regions endemic for both diseases, such as Rio Grande do Sul<sup>(10)</sup>.

It is important to note that if the serological diagnosis of Chagas disease is not routinely requested by this HIV/AIDS Specialized Care Service in Rio Grande do Sul, which is used as a model for other regional cities, this is likely the case in other endemic regions of the state and country; therefore, protocol adherence should be reviewed.

In the present study, the low rates of request for the serological diagnosis of Chagas disease prevented the measurement of the actual incidence of *T. cruzi*/HIV coinfection. If undiagnosed, this coinfection can complicate the health of affected individuals, who will not be monitored or treated properly when necessary. Accordingly, this would result in missed opportunities for early initiation of specific drug therapy in patients with Chagas disease reactivation, which can improve prognosis<sup>(15)</sup>. In addition, the analysis of medical records revealed no data on meningoencephalic or cardiac involvement in patients, which are clinical and potentially fatal characteristics common in Chagas disease reactivation in HIV-infected patients<sup>(7) (8)</sup>.

The present results prompted the serological investigation of Chagas disease in all HIV-infected patients to determine the actual incidence of this coinfection in this region. In addition, the healthcare professionals from the Specialized Care Service and region were informed of the Brazilian Ministry of Health's recommendation regarding the serological diagnosis of Chagas disease among HIV-infected patients.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## REFERENCES

1. World Health Organization (WHO). Control of Chagas Disease. WHO; 2012. (Cited 2014 November 14). Available at: [http://www.who.int/topics/chagas\\_disease/en/](http://www.who.int/topics/chagas_disease/en/)
2. Hotez PJ, Dumonteil E, Woc-Colburn L, Serpa JA, Bezak S, Edwards MS, et al. Chagas Disease: The New HIV/AIDS of the Americas. *PLoS Negl Trop Dis* 2012; 6:e1498.
3. Rassi Jr A, Rassi A, Marin-Neto JA. Chagas disease. *The Lancet* 2010; 375:1388-1402.
4. Centers for Disease Control and Prevention (CDC). Guidelines for Prevention and Treatment of Opportunistic Infections in HIV - Infected Adults and Adolescents. Recommendations from CDC, the National Institutes of Health and the HIV Medicine Association of the Infectious Diseases Society of America. CDC; 2009. (Cited 2014 November 14). Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5804a1.htm>
5. Almeida EA, Ramos Jr AN, Correia D, Shikanai-Yasuda MA. Rede Brasileira de Atenção e Estudos na Co-infecção *Trypanosoma cruzi*/HIV e em outras condições de imunossupressão. *Rev Soc Bras Med Trop* 2009; 42:605-608.
6. Almeida EA, Ramos Jr AN, Correia D, Shikanai-Yasuda MA. Co-infection *Trypanosoma cruzi*/HIV: systematic review (1980 - 2010). *Rev Soc Bras Med Trop* 2011; 44:762-770.

7. Martins-Melo FR, Ramos Jr AN, Alencar CH, Heukelbach J. Mortality Related to Chagas Disease and HIV/AIDS Coinfection in Brazil. *J Trop Med* 2012; 1-4.
8. Verdú J, De Paz F, Castaño V, Torrús D, Reus S. Reactivation of Chagas disease with central nervous system involvement: peripheral blood smear evidence. *Int J Inf Dis* 2009; 13:e527-e528.
9. Ramos Jr NA. Inclusion of Chagas' disease reactivation as a condition for AIDS case definition to epidemiological surveillance in Brazil. *Rev Soc Bras Med Trop* 2004; 37:192-193.
10. Ministério da Saúde. Programa Nacional de DST e AIDS. Protocolo Clínico de Diretrizes Terapêuticas para Manejo da Infecção pelo HIV em Adultos. Brasília: Ministério da Saúde; 2013. (Cited 2014 November 14). Available at: <http://www.aids.gov.br>
11. Del Castillo ME, Mendoza G, Oviedo J, Bianco RPP, Anselmo AE, Silva M. AIDS and Chagas' disease with central nervous system tumor-like lesion. *Ame J Med* 1990; 86:693-694.
12. Baruffa G, Alcantara AAF. Inquérito Sorológico e Entomológico da infecção pelo *T. cruzi* na Região Sul do Rio Grande do Sul. *Ann Soc Belge Med Trop* 1985; 65:171-179.
13. Pinheiro CAT, Carvalho Leite JC, Drahler ML, Silveira VL. Factors associated with adherence to antiretroviral therapy in HIV/AIDS patients: a cross-sectional study in Southern Brazil. *Braz J Med Biol Res* 2002; 35:1173-1181.
14. Araújo AB. Doença de Chagas: Investigação das transmissões transfusional e congênita e avaliação de técnicas sorológicas. 2006, 142f. (Masters Dissertation). Instituto de Biologia da Universidade Federal de Pelotas. Pelotas, 2006.
15. Almeida EA, Lima JN, Lages-Silva E. Chagas' disease and HIV co-infection in patients without effective antiretroviral therapy: prevalence, clinical presentation and natural history. *Trans R Soc Trop Med Hyg* 2010; 104:447-452.