Anti-*Trypanosoma cruzi* inconclusive results in blood donor screening

Márcia Mitiko Otani

Fundação Pró-Sangue Hemocentro de São Paulo, SP, Brazil

The common occurrence of inconclusive results in blood donor screening for anti-*Trypanosoma cruzi* antibodies should be interpreted with caution. It is important to consider the fact that blood transfusion services in Brazil and some other Latin America countries simultaneously perform two tests that use different methodologies to detect anti-*T. cruzi* antibodies; this is determined by legislation currently in force in Brazil (Resolution 721 of August 9, 1989, and Resolution 1376 of November 19, 1993)[1-3].

This issue of the *Journal Brasileira de Hematologia e Hemoterapia* includes a study from the Blood Bank in Uberaba that employed three tests: enzyme immunoassay (EIA), indirect hemagglutination and indirect immunofluorescence[4]. Samples that presented discordant results between tests were considered inconclusive, for example: positive in one or two tests and negative in the other(s) and for samples with optical density/cut-off limit (OD/CO) values of 0.8 to 1.2 (the gray zone) in the ELISA test. The high rates of inconclusive results reported are mostly a result of the sum of false results of the three tests.

The diagnosis of Chagas disease is usually performed by the detection of anti-*T. cruzi* antibodies. Since Guerreiro and Machado developed the complement fixation method in 1913, the sensitivity and specificity of these tests have improved considerably[5]. The first Brazilian legislation that mentioned serology screening for Chagas disease is a decree dated September 25, 1969, of the Comissão Nacional de Hemoterapia, that states in nº 4, that serological screening for Chagas disease should be made prior to or subsequent to each donation and, when positive, the donor should be excluded and any collected blood discarded[6].

The first generation of commercially available serological anti-*T. cruzi* tests employed purified or total antigenic fractions of the epimastigote form of *T. cruzi* with the high rate of false positive as well as false negative results being unwanted characteristics of these tests. So, Decrees 721 of August 9, 1989 and 1376 of November 19, 1993 stipulate that serology screening for Chagas disease should be performed using two methods that apply different principles[1-3].

With the advent of sequencing and cloning immunodominant antigens of *T. cruzi* came the development of tests using recombinant protein mixtures of the parasite and/or synthetic peptides which resulted in an increase in the sensitivity and specificity. Moreover, it was only with Resolution 343 of December 13, 2002, that highly sensitive blood donor screening for Chagas disease using an enzyme immunoassay (EIA) test was established as compulsory.

At the same time, the blood transfusion services gradually implemented a set of quality control measures and introduced computer systems, which together, gradually reduced the number of erroneous and inconclusive results.

In this study by Pereira et al.[4], the prevalence found in the group of inconclusive samples was 13.3%; Remesar et al.[7] reported a prevalence of 18% in Chaco province, Argentina, where the prevalence of the disease is high (24.5%), Otani et al.[8] found 17% in samples collected from ten Latin America countries and Sabino et al. reported a prevalence of 20% for Brazil in the International Retrovirus Epidemiology Donor Study-II (REDS-II)[9].

An understanding of the meaning of results with low reactivity in screening tests to detect anti-*T. cruzi* antibodies however has not been reached. Sabino et al. (in press) report that the drop in the S/CO index in ten patients with negative results for Chagas disease using a polymerase chain reaction technique may be an indication of seroreversion as a result of a spontaneous cure of the disease.

The current work shows that the interpretation of the results of serology screening for anti-*T. cruzi* in association with the epidemiological data is strategically important for blood safety and for the diagnosis of Chagas disease[4].

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Corresponding author:
Márcia Mitiko Otani
Fundação Pró-Sangue Hemocentro de São Paulo
Avenida Dr. Enéas Carvalho de Aguiar, 155, Cerqueira César
05403-000, São Paulo, SP, Brazil
otanimarcia@prosangue.sp.gov.br

www.rbhh.org or www.scielo.br/rbhh

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References

1. Brasil. Ministério da Saúde. Gabinete do Ministro. Portaria 721, de 9 de agosto de 1989. Aprova normas técnicas para coleta, o processamento e a transfusão de sangue, componentes e derivados, e dá outras providências. Diário Oficial da União [Internet], Brasília, n.153, 11 ago. 1989. Seção 1, p.13643-50. [cited 2011 Nov 21]. Available from: http://www.anvisa.gov.br/legis/portarias/721_89.pdf
2. Brasil. Ministério da Saúde. Gabinete do Ministro. Portaria 1376, de 19 de novembro de 1993. Normas técnicas para coleta, processamento e transfusão de sangue, componentes e hemoderivados. Diário Oficial da União [Internet], Brasília, n.229, 2 dez. 1993. Seção 1, p.18405-415. [cited 2011 Nov 21]. Available from: http://www.anvisa.gov.br/legis/portarias/1376-93.pdf
3. Brasil. Ministério da Saúde. ANVISA. Resolução RDC 343, de 13 de dezembro de 2002, Aprova o regulamento técnico para a obtenção, testagem, processamento e controle de qualidade de sangue e hemocomponente para uso humano, que consta como anexo I, e dá outras providências. Diário Oficial da União [Internet], Brasília, n.13, 17, Jan. 2002. Seção 1, p.40-50. [cited 2011 Nov 21]. Available from: http://www.anvisa.gov.br/legis/resol/2002/343_02rdc.pdf
4. Pereira GA, Louzada-Neto F, Barbosa VF, Ferreira-Silva M, Moraes-Souza H. Performance of six diagnostic tests to screen for Chagas disease in blood banks and prevalence of *Trypanosoma cruzi* infection among donors with inconclusive serology screening based on the analysis of epidemiological variables. Rev Bras Hematol Hemoter. 2012;34(4):292-7.
5. Guerreiro C, Machado A. Da reação de Bordet e Gengou na moléstia de Carlos Chagas como elemento diagnóstico. Brasil Med. 1913;27:225-6.
6. Brasil. Comissão Nacional de Hemoterapia. Portaria n.4, de 25 de janeiro de 1969. Dispõe sobre normas de atendimento de doadores para a operação de coleta de sangue. Diário Oficial da União, Brasília, n.10, 15 jan 1970. Seção 1, pt.1, p.343-5.
7. Remesar MC, Gamba C, Colaianni IF, Puppo M, Sartor PA, Murphy EL, et al. Estimation of sensitivity and specificity of several Trypanosoma cruzi antibody assays in blood donors in Argentina. Transfusion. 2009;49(11): 2352–8.
8. Otani MM, Vinelli E, Kirchhoff LV, del Pozo A, Sands A, Vercauteren G, et al. WHO comparative evaluation of serologic assays for Chagas disease. Transfusion. 2009;49(6):1076-82. Comment in: Transfusion. 2010;50(7):1589.
9. Sabino EC, Salles NA, Sarr M, Barreto AM, Oikawa M, Oliveira CD, Leao SC, Carneiro-Proietti AB, Custer B, Busch MP; NHLBI Retrovirus Epidemiology Donor Study-II (REDS-II), International Component. Enhanced classification of Chagas serologic results and epidemiologic characteristics of seropositive donors at three large blood centers in Brazil. Transfusion. 2010;50(12): 2628–37.

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