

Orally-transmitted Chagas disease: Epidemiological, clinical, serological and molecular outcomes of a school microepidemic in Chichiriviche de la Costa, Venezuela



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ABSTRACT

Oral transmission of *Trypanosoma cruzi* is a frequent cause of acute Chagas disease (ChD). In the present cross-sectional study, we report the epidemiological, clinical, serological and molecular outcomes of the second largest outbreak of oral ChD described in the literature. It occurred in March 2009 in Chichiriviche de la Costa, a rural seashore community at the central littoral in Venezuela. The vehicle was an artisanal guava juice prepared at the local school and *Panstrongylus geniculatus* was the vector involved. TcI genotype was isolated from patients and vector; some showed a mixture of haplotypes. Using molecular markers, parasitic loads were high. Eighty-nine cases were diagnosed, the majority (87.5%) in school children 6–15 years of age. Frequency of symptomatic patients was high (89.9%) with long-standing fever in 87.5%; 82.3% had pericardial effusion detected by echocardiogram and 41% had EKG abnormalities. Three children, a pregnant woman and her stillborn child died (5.6% mortality). The community was addressed by simultaneous determination of specific IgG and IgM, confirmed with indirect hemagglutination and lytic antibodies. Determination of IgG and IgA in saliva had low sensitivity. No individual parasitological or serological technique diagnosed 100% of cases. Culture and PCR detected *T. cruzi* in 95.5% of examined individuals. Based on the increasing incidence of oral acute cases of ChD, it appears that food is becoming one of the most important modes of transmission in the Amazon, Caribbean and Andes regions of America.

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1. Introduction

Oral transmission of *Trypanosoma cruzi* has become the most frequent cause of acute cases of Chagas disease (ChD) in Brazil (Pinto et al., 2008; Shikanai-Yasuda & Carvalho, 2012; Coura, 2015) and in Venezuela (Alarcón de Noya et al., 2015). Andrade et al. (Andrade et al., 2014) registered 73 reports of acute ChD in Brazil during the past ten years contrasting with 41 cases that were reported in the previous 20 years (1981–2001). In Venezuela, 249 cases were reported since 2007 (Alarcón de Noya et al., 2015), and there were six new cases in 2015 alone, suggesting the progressive increase of oral outbreaks of ChD in the Amazon, Caribbean and Andes regions (Alarcón de Noya & Noya, 2015).

The acute phase of ChD has been traditionally considered difficult to diagnose due to the nonspecific clinical symptoms (Bastos et al., 2010). However, when the outbreaks of orally transmitted ChD occur in families or schools, the discovery of a case leads to the diagnosis of individuals at risk. The severe episode of the oral acute phase of ChD is the result of the host–pathogen interaction (Andrade et al., 2014; Cardillo et al., 2015) in which parasite inoculum, its genetic composition and the host's immune response are involved. The reasons for which the symptoms are so severe and mortality so high in oral acute cases remains unknown and the unexpected appearance of this medical emergency have limited the ability of the immunological studies to explain these pathogenic mechanisms.

The first large oral outbreak of ChD occurred in an urban school in a middle class area of Caracas, Venezuela in 2007. The outbreak resulted in an astonishing 103 infected individuals (Alarcón de Noya et al., 2010). Soon after, in March 2009, a second occurrence of fever and myocarditis arose, mainly in children, again in a school, from Chichiriviche de la Costa, a rural and touristic seashore community located on the central Venezuelan coast (Alarcón de Noya & Martínez, 2009). The aim of the present work is to report the epidemiological and clinic characteristics as well as the diagnostic procedures, the immunoglobulin isotype's response in serum and saliva and the *Trypanosoma cruzi* molecular characterization of the second largest outbreak of ChD described in the literature, highlighting the importance of this entity as a foodborne disease.

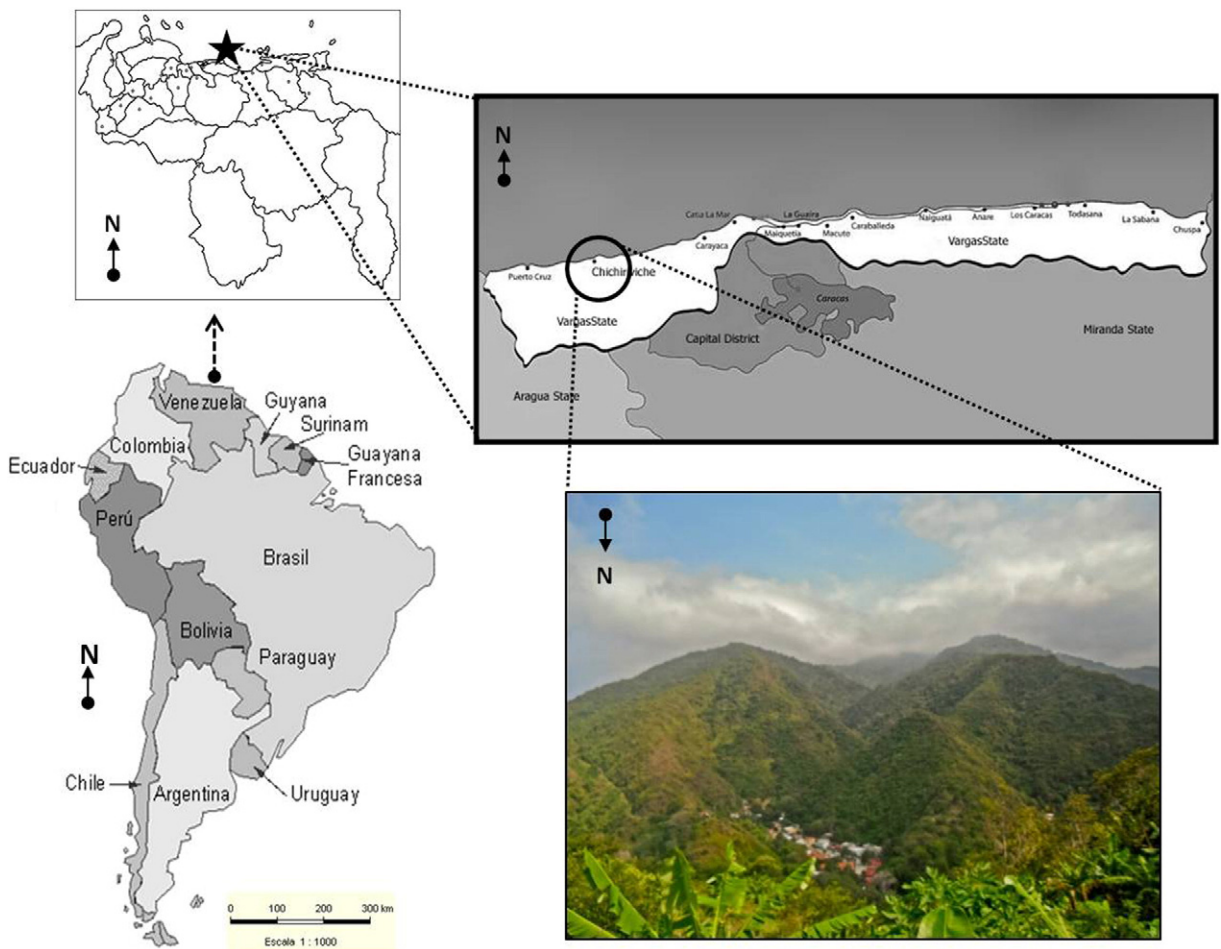


Fig. 1. Geographical location of Chichiriviche de la Costa, Vargas State in Venezuela. A coastal place hidden in the mountains in the north central littoral of Venezuela.

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