



Chagas disease in a child living in an urban area at 2850 meters above sea level, case report

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Abstract

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Introduction: Chagas disease is a parasitic disease transmitted by vectors with echo-epidemiological characteristics caused by the protozoan *Trypanosoma cruzi*. From 2013 to 2019, Ecuador reported 108 acute cases, of which 7 were in the province of Pichincha. We present the case due to its ecoepidemiological characteristics.

Clinical case: An acute case of a 14-year-old male resident in a nonendemic area that began with Romaña's sign, fever of three weeks of evolution with mild splenomegaly and concentric hypertrophy of the left ventricle.

Evolution: The patient was treated with benznidazole 7 mg/kg/day orally every 8 hours for two months, support measures and multidisciplinary follow-up.

Conclusion: The detection zone was the northeast of the metropolitan district of Quito, which is part of health district 17D01, without previous reports until 2016, whose appearance could be related to changes in the local ecosystem and the impact on the transmission of vector diseases.

Keywords:

DeCS: Chagas disease, *Trypanosoma cruzi*, Chagas cardiomyopathy, climate change, Case reports.

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Introduction

Chagas disease is a parasitic, systemic, chronic disease transmitted by vectors and caused by the protozoan *Trypanosoma cruzi*, associated with deficit socio-economic-cultural aspects, considering it a neglected disease [1]. From 2013 to 2019, 439 confirmed cases were registered in the Epidemiological Surveillance System (SIVE) of the Ministry of Public Health of Ecuador, and the proportion was higher for chronic Chagas ($n = 331$, 75.4%) than for acute Chagas ($n = 108$, 24.6%). In the 6 years of follow-up, Pichincha reported 7 acute and 29 chronic cases [2].

The authors present a clinical case of Chagas disease that debuts with the sign of Romaña, in the Metropolitan District of Quito, located in the parish of Pacto, health district 17D01, which according to the Secretary of the Environment of the Metropolitan District of Quito (DMQ) presents alteration of ecosystems, exposing the population to vectors transmitting diseases typical of tropical and subtropical areas [3] and that until 2016 it did not register acute or chronic cases [4].

Clinical case

This is a 14-year-old male adolescent, mestizo, natural and from Zaguánjal, Pacto parish (Northwest of Pichincha, Ecuador), with a history of intellectual disability of 30% and cutaneous leishmaniasis diagnosed at one year of age. The patient was evaluated at Nanegalito Hospital (Quito) for a clinical picture that began on October 27, 2018. Secondary to an insect bite, the patient had mild left eye edema, itching and moderate, intermittent headache, without radiation. The course of the subsequent 72 hours was accompanied by non-quantified fever, ophthalmia, conjunctival chemosis, blepharitis and periorbital cellulitis that progressively limited ocular opening and temporary loss of visual acuity.

In the physical examination upon admission to the hospital, he presented an axillary temperature of 38.8 °C. The left external eye examination revealed erythema and intense lower and upper eyelid edema accompanied by chemosis. Conjunctival (Figure 1), ocular aperture limitation, visual acuity 20/40, and pupil reactivity to light. On right eye examination: no apparent pathology, extraocular movements were intact,



Fig. 1 Romagna sign.

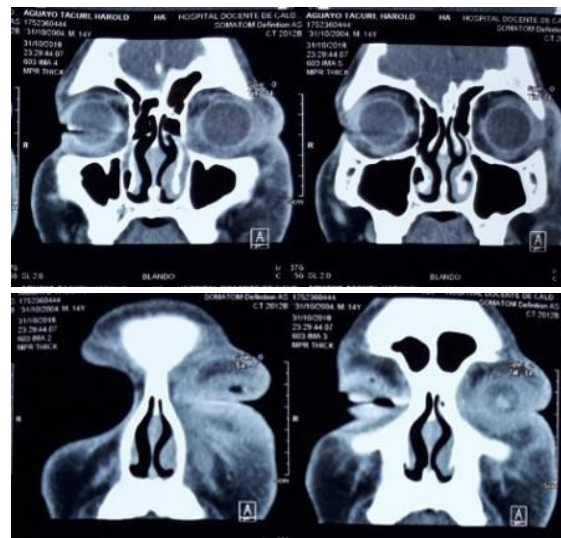


Fig. 2 CT of the facial mass on admission to hospitaliza-



Fig. 3 PA chest X-ray with cardiothoracic index > 0.5.

anictheric sclera, pink conjunctiva. The oropharynx without evidence of erythema, canker sores or exudate, without lymphadenopathy. Otherwise, physical examination without apparent pathology was performed.

The initial complementary examinations reported leukocytes of 4,510, neutrophils 82%, CRP: 2.2 mg / dl, computerized axial tomography of the facial solid described an increase in the density of the soft tissues at the peri-orbital level, the malar region and the upper maxilla on the left side, without compromise of the muscular planes, intra-orbital or bone fat. (Figure 2). Despite the use of antibiotic therapy and anti-inflammatory drugs for eighteen days, the clinical evolution was torpid, the diagnostic investigation did not present alterations in blood count, microbiology, metabolic markers and renal function, there was a slight increase in inflammatory markers (CRP - PCT) with persistence of fever and little decrease in left eye edema, the investigation was complemented with a PA chest radiograph, finding a cardiothoracic index > 0.5 , considering Chagas disease as a differential diagnosis (Figure 3).

In collaboration with the biomedicine center of Central University, a polymerase chain reaction was tested for *T. cruzi* (PCR; positive) and an enzyme-linked immunosorbent assay (ELISA; positive) confirming the case of acute Chagas disease, BENZNIDAZOL 150 mg (7 mg/kg/day) orally every 8 hours for 60 days, and supportive treatment was immediately prescribed. Antibiotic therapy was suspended in addition to assessing specific organ damage, transthoracic cardiac echo with nonobstructive left ventricular concentric hypertrophy, pericardial effusion of infectious etiology without requiring pericardiocentesis, ECG with sinus rhythm and incomplete block of the right bundle of His bundle, megacolon was ruled out, and abdominal ultrasound reported splenomegaly (Figure 4). The patient did not report adverse effects to pharmacological treatment, satisfactory evolution, resolution of left periocular edema (Figure 5), or control echocardiogram without pericardial effusion. After hospital discharge, follow-up was continued by cardiology, ophthalmology and pediatric services. The case was notified for epidemiological surveillance of the Ministry of Public Health.



Fig. 4 Presence of splenomegaly.



Fig. 5 Evolution of the periocular lesion, 30 days after the start of benznidazole.

Discussion

According to reports by Abad-Franch et al, the end of the nineties, the presence of *Triatoma carrioni* was reported in the subtropical valleys of the province of Pichincha-Ecuador [5]. Between 1997 and 2002, seroprevalence studies in Pichincha for Chagas disease found percentages from 0.1% in blood banks of 7000 donors to 3.9% in 103 field samples, with a global prevalence of 0.15%, with the Quito canton and its rural parishes - Nanegalito, Nanegal, Pacto - classified as low-risk areas for transmission of Chagas disease [6]. Despite the underestimated prevalence, it was determined that 47% to 63% of the population presented a risk of contagion for vector diseases [6, 7].

In 2000, the Ministry of the Environment of the DMO reported that the rural parishes of northwestern Quito as a whole registered levels of deforestation of 1,700 ha/year over a period of 30 years, exposing the population to vectors that transmit diseases typical of tropical and subtropical areas [3]. Reference studies

estimate that between 1891 and 1999, the average temperature in the region increased between 1.2 °C and 1.4 °C [8], and an increase of 2 °C is projected for the next hundred years [3, 8]. It should be noted that the biological cycle of the triatoma can accelerate at high temperatures, independent of the associated humidity [9]. According to Gómez-Núñez, the hatching percentages are 100% when triatoma eggs are kept at a temperature of 20 °C to 29 °C, showing that temperature influences not only the incubation period but also the rate of hatching [10,11], which is related to the average temperature of the area that oscillates between 11 and 20 °C [12].

According to the report "Climate Change, Health and Tropical Diseases in Quito 2014", the prevalence of seropositivity for *Trypanosoma cruzi* in the parishes of Pacto, Nanegalito, Nanegal, Gualea was 6.83% [3], classified by the Ministry of Public Health as area II of high priority for vector control, and where it is necessary to update the epidemiological information [2]. The parish of Pacto is the most vulnerable for vector diseases because it has a higher rate of exposure - presence of infected vectors and prevalence of diseases - higher sensitivity index - under 14 years of age, older adults and the disabled - and higher rate of susceptibility -social and infrastructure factors- than the rest of the parishes studied [3,13].

It is necessary to make this neglected disease visible once again to attract public health attention and relate it to changes in the ecosystem, exposure from human activities and the presence of cases in some communities previously considered low risk and where active epidemiological surveillance still persists with underregistration and deficit in seroprevalence tracking to prevent contagion, make early diagnoses, offer supportive treatment and reduce the impact on public health and ecosystems.

In the present case, the presence of acute infection associated with cardiomegaly, general symptoms and Romaña's sign was documented with PCR with a

good response to treatment with benznidazole. Epidemiological studies are required to collect longitudinal data in this area of Quito-Ecuador.

Conclusions.

This case documents the presence of Chagas disease in an unusual ecoepidemiological zone of the metropolitan district of Quito at 2,850 meters above sea level.

Abbreviations

PCR: Polymerase chain reaction. DMQ: Metropolitan District of Quito.

Supplementary information

Supplementary materials were not declared.

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Authors' contributions

José Llumiquinga Marçayata: Conceptualization, Data Conservation, Formal Analysis, Fund Acquisition, Research, Methodology, Project Management.

Maribel Freites Mata: Resources, software, supervision, validation, visualization.

María de Lourdes Alvear. Writing - original draft, Writing: revision and editing. All authors read and approved the final version of the manuscript.

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Availability of data and materials

The data sets generated and/or analyzed during the current study are not publicly available but will be available through the corresponding author upon reasonable academic request.

Declarations

Ethics committee approval and consent to participate

Ethics committee approval is not required for publication of clinical cases. Consent of the guardians was requested for the present case.

Publication consent

The tutors authorized the publication of RX images, skull tomography, abdominal ultrasound and two photographs of the physical examination. The data were hidden to avoid the identification of the patient.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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