

Case Report of Chronic Asymptomatic Chagas Disease: "The Importance of Epidemiological Laboratory Surveillance" at the Institute of Security and Social Services of Workers of the State of Mexico

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ABSTRACT

Chagas disease, also known as American trypanosomiasis, is a neglected parasitic infection caused by *Trypanosoma cruzi*, primarily transmitted through hematophagous triatomine insects. Endemic across Latin America, the disease poses a significant public health challenge, especially in impoverished rural and peri-urban areas. Its complex transmission cycle involves wild, domestic, and peridomestic reservoirs, with the vector playing a central role. Although most infections remain asymptomatic during the chronic phase, the disease can lead to severe cardiac and gastrointestinal complications. Diagnosis relies on serological, parasitological, and clinical evaluations, while treatment options are limited to the acute phase with antiparasitic drugs that have notable side effects. Epidemiological surveillance shows underdiagnosis, emphasizing the need for early detection and integrated control strategies. This review highlights the disease's epidemiology, transmission dynamics, clinical manifestations, diagnostic approaches, and current control measures, with a case illustration from Mexico demonstrating the importance of vigilant detection and management efforts to prevent progression and transmission.

KEYWORDS: Chagas disease, *Trypanosoma cruzi*, vector transmission, epidemiology, diagnosis, treatment, Latin America, public health, asymptomatic infection, control strategies

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INTRODUCTION

Chagas disease, also known as American trypanosomiasis, is a parasitosis caused by *Trypanosoma cruzi*. The infection is naturally transmitted by triatomines (Hemiptera: Reduviidae), which are hematophagous insects, commonly known as "kissing bug" or "field bug". This disease is associated with poverty and poor housing conditions; It is widely distributed, mainly in rural areas throughout the Latin American continent and in marginalized areas of large cities. ¹

Carlos Chagas, in 1909 (**Figure 1**), described the disease in Minas Gerais, Brazil, after isolating the parasite of *Panstrongylus megistus*, cultivating it, reproducing the infection in mammals and making observations of the course of the disease in laboratory animals, described the transmitting insects and detailed some symptoms, including cardiac and nervous system alterations. Originally, Carlos Chagas named the parasite that causes this disease as *Schizotrypanum cruzi*. In humans, it describes the acute form

in the case of Berenice, a two-year-old girl who dies until the age of 82 infected and without pathology compatible with the disease. In 1928, Hoffman was able to correlate triatomine as a transmitter of Chagas disease for the first time, and in 1940, Dr. Luis Mazzoti reported the first two human cases in Mexico. ²

This clinical entity is a complex zoonosis, since it involves the interaction between species of invertebrates (triatomines) and vertebrates (wild, peri-domestic, and domestic mammals, including humans). Due to its prolonged chronicity, it is considered the parasitic disease with the greatest economic burden in Latin America. The conditions of poverty and overcrowding in rural housing, as pointed out since 1909 by Carlos Chagas in Brazil and Salvador Mazza in Argentina, prevail in Latin America to this day and favor the colonization and dispersion of the vector with a geographical distribution that extends from the south of the United States to the south of Argentina and Chile. The World Health Organization

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(WHO) estimates that it affects 7 to 8 million individuals; especially in Latin America, a minimum of 110 million individuals in 21 countries are considered at risk of infection (Argentina, Brazil, Chile, Uruguay, Paraguay, Peru, Ecuador,

Bolivia, Venezuela, Colombia, French Guiana, Guyana, Suriname, Costa Rica, El Salvador, Honduras, Nicaragua, Panama, Belize, Guatemala and Mexico).

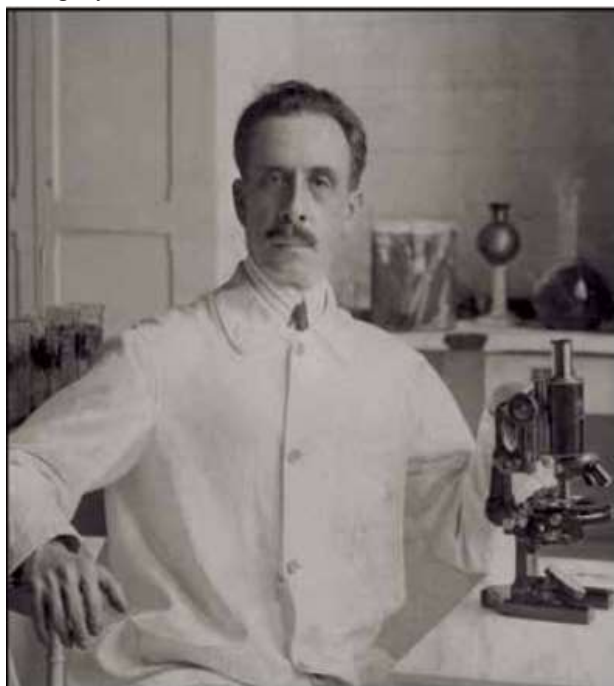


Figure 1. Dr. Carlos Chagas.

Population movements have modified the epidemiological profile of this disease and have made it a global risk, especially in blood banks where contamination rates vary between 3 and 53%, and it is considered emerging in non-

endemic countries (United States, Canada, Australia, Japan, France, Spain, Belgium, Portugal, Switzerland, Great Britain, Northern Ireland, Italy, Germany, Austria, Croatia, Denmark, Luxembourg, Norway, the Netherlands, Romania and Sweden) ³⁻⁶ (Figure 2).



Figure 2. Worldwide Distribution of Chagas Disease Cases.

Life Cycle: Natural, Vector or Rural.

In the world, more than 130 species of vectors have been identified that belong to the order Hemiptera, family Reduviidae, subfamily Triatominae, with three genera of

medical importance that are Triatoma, Rhodnius and Panstrongylus, distributed from the southern United States to southern Argentina and Chile. ⁷

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In the Mexican Republic, 32 species have been reported; 19 belong to the genus *Triatoma*, six to the genus *Meccus*, two to the genus *Panstrongylus* and one species to the genera *Belminus*, *Dipetalogaster*, *Eratyrus*, *Paratriatoma* and *Rhodnius*; there are 13 species related to housing; two of intradomiciliary habits (*Triatoma barberi* and *Triatoma dimidiata*) and 11 peridomiciliate, including *Meccus pallidipennis*.⁸ Currently, *Rhodnius prolixus* is considered eliminated.⁹

In addition to man and the transmitting arthropod, a large number of infected mammal species are involved in the natural biological cycle. When the transmitter feeds on an infected mammal, it ingests the circulating parasite along with the blood. In the lumen of the intestine it multiplies and develops into metacyclic trypomastigotes (infective forms) that come out together with the excrements, cross the skin or mucous membranes and infect the mammal where they circulate as blood trypomastigotes and later as amastigotes, in an intracellular form, they multiply by longitudinal binary fission within the cells of the mononuclear phagocytic system, lymphoid tissue. The cycle is completed when blood trypomastigotes are ingested by the transmitter. Infection in humans is acquired mainly by transcutaneous penetration of the parasite present in the excreta of infected hematophagous insects.¹⁰

Transmission by the vector route occurs in 90% of cases, this happens when the parasite enters the body through the area of the lesion caused by the bite of the insect after feeding, or some other lesion of the skin or mucous membranes, at which

time they can defecate due to the compression of their intestines produced by the ingestion of the suctioned blood. The feces must necessarily be contaminated with the parasite *Trypanosoma cruzi* (*T. cruzi*) and when both actions occur almost simultaneously, the feces can be deposited in the area near the continuity solution (lesion); then, when scratching, people can drag their feces and favor the entry of the parasite into the body of the bitten person, however the mechanisms of the innate and acquired immune response of the organism can destroy the parasites, so the infection/disease process is the result of a diversity of factors associated with the parasite (amount inoculated, parasite genotype, etc.) and the response and genetic characteristics of the individual.¹⁰

The life cycle of *T. cruzi* involves humans, insect vectors, and a large number of naturally infected mammalian reservoirs. The wild cycle is recognized as the scenario in which the parasite circulates among wild species of large, medium and small mammals and infected insect vectors. The domestic cycle in which man, domestic mammals and infected insect vectors participate within the house and the peridomestic cycle, which is considered the link between the two previous cycles in the transmission of *T. cruzi*, different species of wild, synanthropic and domestic mammals are involved, as well as vector species in this habitat.¹⁰ Figure 3.

There are other forms of transmission: by consumption of food contaminated by *T. cruzi*, blood transfusion, from infected mother to child, organ transplantation and laboratory accidents.¹¹

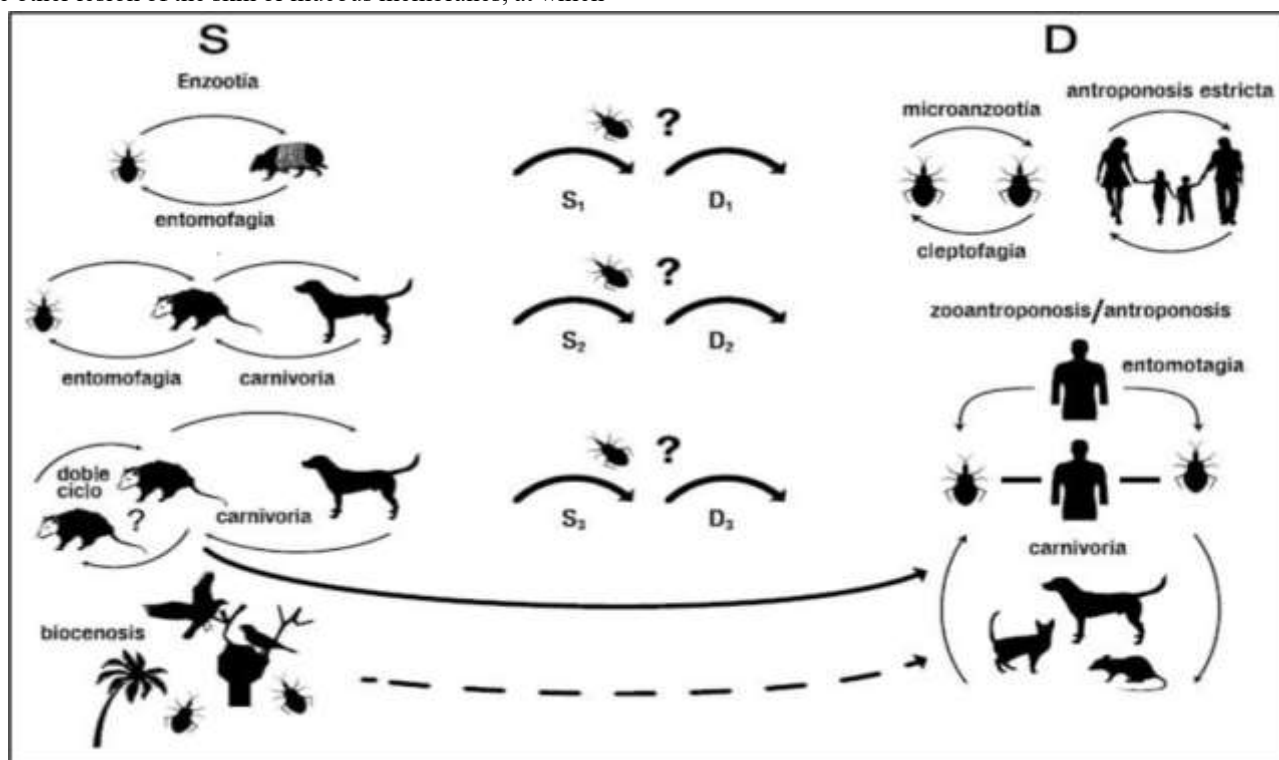


Figure 3. *T. cruzi* transmission cycle. Wild cycle with enzootic circulation of the parasite (S), domestic cycle with parasites circulating in zooantroponosis, anthrozoonosis, strict anthroponosis or in micro enzootics (D), wild subcycles (S n), domestic sub-cycles (D n). Question marks indicate uncertainty in the process. The dotted line indicates hypothetical routes. Taken from: Manual of Procedures for Chagas Disease in Mexico

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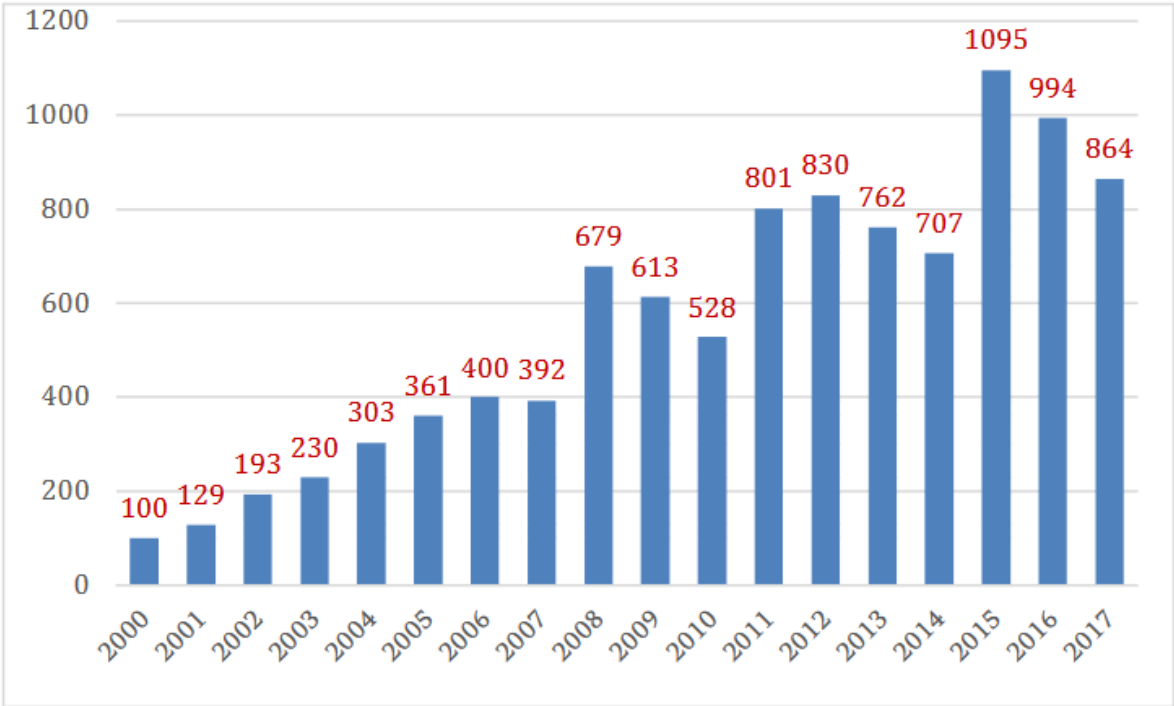
Epidemiological Overview of Chagas Disease in Mexico. The Program for the Prevention and Control of Vector-Borne Diseases and Arthropod Venom Poisoning is renewed for the period 2020-2024, going from six action programs, to only one; abandoning the programmatic organization based on diseases; and taking a radical turn towards a program organized and operated according to the basic processes of: entomological surveillance, management of case treatment, field operations for prevention and control; and elimination and post-elimination surveillance of vector-borne diseases, in addition to operational research, information and budget control. In this way, the pyramidal character in which the Dengue program in the States is constituted as the guiding program of the Vectors area is eliminated, subordinating the operation of the other components to what can be done with the remaining resources. ¹²

Mexico has aligned the program's strategies based on PAHO/WHO resolutions CD49. R19 and CD55. R9 (WHO 2009 and 2016) for the elimination of neglected diseases, which also provide the framework for eliminating Chagas disease as a public health problem based on two pillars: the interruption of vectorial and transfusion transmission, and patient care to reduce transmissibility. ¹⁰

Chagas Disease is considered in the International Statistical Classification of Diseases and Related Health Problems in its Tenth Revision (C.I.E. 10) in the chapter section on Diseases due to protozoa (B57, B57.0 - B57.5) (PAHO-WHO, 2018); and is considered within the group of neglected diseases or diseases of poverty (WHO, 2005). It is classified as endemic

in 21 countries of the American Continent, with relevant epidemiological importance from the South of the United States, Mexico, Central America and the Caribbean, to countries of the Southern Cone; where it is estimated that it affects 7 to 8 million people (WHO, 2017) and around 110 million individuals are at risk of contracting the infection, and die from this cause, approximately 14,000 cases per year. Currently, Chagas disease is considered an emerging pathology in non-endemic countries on other continents, mainly associated with movements of people from endemic areas or countries, imported cases and associated with blood transfusion and/or its derivatives. In Mexico, since 2000, there has been an increase in the notification of cases (**Graph 1**). In the period from 2000 to 2017, 9,981 cases of Chagas disease (acute and chronic) were registered; while in 2017 the closure report reports 126 acute cases and 738 chronic cases that were notified through the Epidemiological Bulletin of the General Directorate of Epidemiology, because only the patient is treated; there are no consistent actions to control the case. In general, the most affected age group and gender is between 25 and 44 years old, mostly men. The states with the highest number of reported cases were Veracruz (17.8%), Yucatán (10.3%), Oaxaca (10.5%), Morelos (9.2%), Chiapas (8.1%), Jalisco (5.9%), State of Mexico (5.2%). ¹⁰

To date, there is a passive attitude caused by the lack of knowledge of the magnitude of this disease in relation to the detection of cases, since only those in which a specific disease has developed are reported, and asymptomatic cases, which are approximately 70%, remain undiagnosed. ¹³



Graph1. Epidemiological Profile of Chagas Disease in Mexico, 2000-2017.
Source: General Directorate of Epidemiology, SSA. Statistical Yearbooks 2000-2017.

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Pathogenesis and Natural History of Disease.

The main transmission mechanisms are natural (90%), through transmitting insects (rural Chagas), transfusion (6%) (urban Chagas) and other less frequent mechanisms, especially transmission from mother to product (perinatal) ¹⁴ In the natural history of this disease, clinically the acute phase, the chronic asymptomatic (indeterminate) and the chronic symptomatic phase are present. The acute phase usually lasts two to three weeks and occasionally up to four months; it occurs in 5% of those infected, children under 10 years of age are the most affected; approximately 75% have signs and symptoms related to the apparent entry of the parasite into the body and also systemic manifestations. When the route of entry is in the ocular region, Romagna's sign is present in about 50% of cases, which consists of unilateral bipalpebral edema, not very painful, with a purplish appearance, with discreet pruritus, and is accompanied by preauricular, submaxillary and occipital lymphadenopathy. When the route of entry is in another region of the body, it is called inoculation chagoma (25%) and presents as a subcutaneous, purplish nodule with regional microadenitis. Systemic manifestations are fever without special features, asthenia, myalgia, arthralgias, hepatos and/or splenomegaly; occasionally, in endemic areas, this picture presents with respiratory or digestive manifestations. Less than 1% are complicated by meningoencephalitis, myocarditis or pericarditis; especially in children and the elderly with a fatal outcome. The chronic asymptomatic phase, also known as indeterminate, lasts between 10 and 20 years, is mainly diagnosed by serological methods and is clinically silent with very low parasitaemia, so parasitological methods are not very sensitive. In the chronic symptomatic phase, the most affected organ is the heart; myocarditis is present, with manifestations of congestive heart failure and cardiomegaly. Disease can occur in any hollow viscera, mainly in the digestive system (megaesophagus and megacolon) ¹⁵ To understand the clinical pictures of Chagas disease, it is essential to consider the great capacity of *T. cruzi* to invade any cell in the body, with the exception of the erythrocyte. The "target" cells of the parasite are neurons, myocardial and smooth muscle cells. In the first two he acts simultaneously. In the electrocardiogram, the data of neuronal destruction are assessed, while the echocardiogram identifies muscle destruction. The association of smooth and neuronal muscle destruction defines the presentation of megachagasic syndromes (esophagus, colon, rarely duodenum, stomach, jejunum, gallbladder, bladder and others). Some authors indicate that the indeterminate phase or asymptomatic chronic condition can last more than 30 years, although in general it is considered a persistence of 15 to 20 years. Patients in this phase do not present symptoms or signs compatible with the disease and are detected only by epidemiological and serological studies; These patients

constitute a significant risk in transmission, mainly in vector and transfusion, since the parasite persists in the individual. The main clinical picture depends on cardiac involvement. Cardiomyopathy means irreversible visceral involvement. This pathology manifests itself in most patients as dilated cardiomyopathy, but sometimes emerges as congestive heart failure, in which the patient presents progressive dyspnea, palpitations, tachycardia, pain; Sometimes there may be only one manifestation, such as tachycardia. The most frequent electrocardiographic trace in adults in the third or fourth decade of life is incomplete block of the right bundle branch of the bundle of His, with left anterior hemiblock and ventricular extrasystoles, while in younger people incomplete atrioventricular block is usual, which can evolve into complete block. ¹⁵

Diagnosis is made with parasitological methods indicated in the acute phase, and with serological and cabinet methods for the chronic phase. Parasitological examinations are direct examination, thick drop, and blood smear, which are used to observe blood forms; concentration methods such as Strout and microhematocrit are also useful. Other methods aimed at increasing the number of parasites include serodiagnosis, blood culture, and inoculation in animals. The serological tests recommended by the WHO are indirect enzyme-linked immunosorbent assay (ELISA), indirect immunofluorescence (IFI) and indirect hemagglutination (HAI). For cardiology study, electrocardiogram (ECG), chest x-rays, and echocardiogram are recommended. ¹⁶

Specific antiparasitic treatment only exists for the acute phase and two drugs are used, both with hepatotoxic and nephrotoxic effects; there are no pediatric presentations. Nifurtimox at doses of 8 to 10 mg/kg body weight per day for 60 days, and benznidazole at doses of 8 to 10 mg/kg body weight per day for 30 days. ¹⁶

For myocarditis, it is symptomatic mainly with antiarrhythmics, when pacemaker installation or even heart transplantation is necessary. For mega digestive transplants, surgery is indicated, cardiomyotomy is performed in the esophagus with the use of probes for dilation and in the colon, resection of the affected area. ¹⁷

CASE PRESENTATION

During the epidemiological surveillance activities carried out in the first-level unit, Villa Álvaro Obregón Family Medicine Clinic, attached to the ISSSTE, Southern Zone Regional Delegation, in the Álvaro Obregón Health District, a patient with probable Chagas disease in the asymptomatic chronic phase arrived from the outpatient clinic.

25/11/2024 Epidemiology Consultation.

F.T.R Female patient of 56 years old, married, pensioned, housewife, Originally from Tlaxcala, APP Infectious Interrogated and Denied, Chronic Degenerative Interrogated and Denied, Surgical Surgery Right Eye Pterygon 10 years

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ago, OTB 23 years ago, Lipoma Extraction Right Foot 15 years ago, Transfusions Denied, Traumatic Sprained Right Hand Wrist 3 years ago, Drug Addictions Denied, Denied Allergies, Tattoos 4 years ago, Heterosexual IVSA 18 years old, 3 sexual partners, (0 in last 12 months), Denies Insect Bites (Mostly bed bugs; although if you comment in Tlaxcala they abound and travels regularly 2 to 4 times a year), asymptomatic. Referred by the Mexican Institute of Social Security for having gone to donate blood to the C.M.N SIGLO XXI Blood Bank on 10/27/2024 with reactive results for TRYPANOSOMA CRUZI SICO: 3.86, with repetition in tube (T) 4.38 and bag (B) 2.93 by chemiluminescence method.

A 56-year-old female with a history of a reactive result **Trypanosoma Cruzi**, denies contact or a bed bug bite, refers to a history of travel to an endemic area, Tlaxcala, as a residence of origin, refers to asymptomatic, patient met the operational definition of probable case in asymptomatic chronic phase, it was decided to take and send serum for analysis to the Institute of Epidemiological Diagnosis and Reference and to regulate treatment, case reported to the health jurisdiction, with result received on December 5, 2024 IFI Reactive 1:32 and ELISA-T Reactive 1,660. An appointment was made on December 11, 2024 to deliver results and explain the conduct to be followed, requesting Blood Biometry, Blood Chemistry, General Urine Test, Liver Function Tests, Bilirubins, Chest Tele, Electrocardiogram and signing of Informed Consent for the Treatment of American Trypanosomiasis in Mexico City, which had to be sent together with the request for medication calculated at dose weight (Nifurtimox tablets of 120 mg) 8 mg/kg/day not exceeding $700 \text{ mg per day} = 8 \text{ mg} \times 82 \text{ kg every } 8 \text{ hours} = 656 \text{ mg} \times \text{day} = 3 \text{ tablets morning, 1 afternoon and 1 evening}$. On December 16, all the studies were collected and sent to the jurisdiction, without presenting any alteration, only as data the Electrocardiogram reported minimal changes in T wave in the lower face, without this being significant, the above to comply with the Current Guidelines and to be able to grant the drug, which is only authorized by the Federal Ministry of Health through the General Directorate of Epidemiology.

Medicine is received from the Secretariat on December 19; however, due to the Winter Vacation issues, the patient left the country on a trip, referring to returning at the end of January 2025, she is told of the importance of starting treatment as soon as possible. Medication was started on December 31, 2025 with the following schedule: (Nifurtimox TABLET of 120 mg) $8 \text{ mg/kg/day/60 days}$ not exceeding $700 \text{ mg per day} = 8 \text{ mg} \times 82 \text{ kg every } 8 \text{ hours} = 656 \text{ mg} \times \text{day} = 2 \text{ tablets morning, 2 afternoon and 1.5 at night}$, being monitored every day through telephone report. She was summoned on February 12 for evaluation of the first 15 days of treatment, where she mentioned having presented adverse reactions to the medication and have been tolerable: headache, nausea, vomiting, asthenia, fever; which have ceased with

medications such as metoclopramide and paracetamol, he reported that taking at night is the one that causes him many adverse symptoms, which is why the treatment was modified (Nifurtimox tablets of 120 mg) 8 mg/kg/day without exceeding $700 \text{ mg per day} = 8 \text{ mg} \times 82 \text{ kg every } 8 \text{ hours} = 600 \text{ mg} \times \text{day} = 3 \text{ tablets morning, 2 in the afternoon and 0 in the evening}$, referring to the two days of adequate tolerance. He was scheduled for follow-up with liver function tests on March 12 where he reported tolerance to the treatment, denying adverse reactions to medication; as well as results of liver function tests within normal parameters, continuing with the scheme.

On 31/03/2025 I conclude treatment, he goes for evaluation on 16/04/2025 today with control laboratory studies Bh: hemoglobin 14.6, hematocrit 49.8, platelets 350,000, blood chemistry: glucose 87, urea 19.3, creatinine 0.68, uric acid 3.7, cholesterol 216, triglycerides 125, renal function Cockcroft-Gault 145.83 normal urinalysis, electrocardiogram sinus rhythm, electrocardiographic changes in t-wave lower area, Chest X-ray normal, abdominal X-ray foot and decubitus intestinal gas non-specific pattern, no edema, no megacolon data, information was sent to jurisdiction, waiting for response for antibody titration in control blood every 6 months for two years, currently the patient is asymptomatic with completed scheme and under active epidemiological surveillance.

DISCUSSION

In most cases of Chagas disease there are no symptoms or signs of entry of the parasite, and they are asymptomatic; only 5% develop the acute symptomatic stage. The most frequently reported apparent pathognomonic signs are Romagna's sign and inoculation chagoma, accompanied by focused adenomegaly. Since 1979, A. Rassi points out that the sign of Romagna can be observed in 50% of cases; than the Chagoma inoculation in 25% and the other 25% for cases that do not present an apparent entry door¹⁸ The case presented showed an asymptomatic chronic clinical presentation, case was detected through epidemiological surveillance actions by laboratory. As indicated above, the diagnosis of *Trypanosoma cruzi* infection should be considered, since the experience of other countries indicates that 95% of cases of infection are asymptomatic, which implies that the infection is probably not being detected in risk areas in our country, with the consequent lack of application of prevention and control measures. As mentioned at the beginning, epidemiological studies mainly detect chronic asymptomatic cases (indeterminate phase), unlike the finding of acute cases, which are reported sporadically.¹⁹ In this regard, in 1976, Tellaeche reported 74 cases found as a result of the actions carried out by the National Commission for the Eradication of Malaria²⁰ In epidemiological studies carried out in Mexico, in Zacoalco de Torres, Jalisco, 530 individuals were studied and eight were found to be parasitologically positive,

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of which five were under 17 years of age ²¹ In the state of Oaxaca, in another study of 1,210 people in four localities, 111 HIV-positive patients were detected, with the highest frequency in the 6 to 14 year old group (5%) ²² In Veracruz (2007), Salazar, et al., in another study in children under 18 years of age, determined a 5.2% seropositivity rate in Tuxpan ²³

The results of these studies show a marked similarity with the epidemiological profile that has been determined in other regions of endemic countries, especially in relation to the age at which individuals are infected by vector transmission. Although the prevalence and distribution of the disease is unknown in Mexico, it is considered a health problem and there are definitely areas where the risk of infection is higher due to the presence and coexistence with the transmitter in human housing, the characteristics of the dwelling and the biological behavior of the parasite and the transmitter: existence of reservoirs. The WHO expert groups point out that the risk areas for vector transmission in most Latin American countries are located in rural areas, where there is a high proportion of housing in precarious conditions and a close coexistence with the vector, recalling the case presented has a residence of Tlaxcala origin and travels to this area 2 to 4 times a year: which makes it difficult to know exactly when the disease was transmitted.

With regard to transfusion transmission, the actions of the National Blood Transfusion Centre in blood banks and state centres contribute to elimination by regulating the compulsory screening of blood donors

CONCLUSIONS

In Mexico, actions are only carried out to confirm cases with severe pathologies, so it is of utmost importance to carry out actions for the early detection of cases, with emphasis on pediatric ages, with two purposes: to determine the active transmission of the infection and to carry out interventions to interrupt vector transmission and, on the other hand, to provide the appropriate antiparasitic treatment, before irreversible lesions occur.

The monitoring of treatment, the identification of possible adverse effects of antichagasic drugs and the verification of therapeutic results through laboratory tests are aspects of pharmacovigilance that need to be strengthened. The consolidation of entomological work, vector control and improvement in the quality of housing will make it possible to control intra-household transmission of Chagas disease, in the same way that surveillance, screening of pregnant women living in risk areas and universal screening of blood and organ donors will make it possible to eliminate congenital and transfusion transmission.

REFERENCES

- I. Palafox JL, Figueroa AH, Gómez JV. Tripanosomiasis americana o «mal de chagas». Otra enfermedad de la pobreza en <http://www.msx.opsoms.org/documentos/chagas/13.pdf>
- II. Chagas C. Nova tripanozomíaze humana. Estudos sobre a morfologia e o ciclo evolutivo do *Schizotrypanum cruzi* n. gen., n. sp., agente etiológico de nova entidade morbida do homem. Mem Inst Oswaldo Cruz. 1909;1:159-218.
- III. OPS/HDM/CD/425-06. Estimación cuantitativa de la enfermedad de Chagas en las Américas. Disponible en: <http://www.bvsops.org.uy/pdf/chagas19.pdf>
- IV. OMS/A62/17/2009. 62ª Asamblea Mundial de la Salud. Enfermedad de Chagas: control y eliminación, 20 de marzo de 2009. Disponible en: http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&gid=15377&Itemid=
- V. OMS/A63/17/2010. 63ª Asamblea Mundial de la Salud. Enfermedad de Chagas: control y eliminación, 22 de abril del 2010. Disponible en: http://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_17-sp.pdf
- VI. WHO. Sustaining the drive to overcome the global impact of neglected tropical diseases: second WHO report on neglected tropical diseases, January 2013. Disponible en: http://www.who.int/neglected_diseases/9789241564540/en/
- VII. OMS/OPS: Reporte sobre la enfermedad de Chagas. Grupo de trabajo científico. 17 a 20 de abril de 2005. Actualizado en julio de 2007. Buenos Aires, Argentina. www.who.int/tdr. Disponible en: http://whqlibdoc.who.int/hq/2007/TDR_SWG_09_spa.pdf
- VIII. Salazar-Schettino PM, Rojas-Wastavino GE, Cabrera-Bravo M, Bucio-Torres M, Martínez-Ibarra JA, Monroy-Escobar MC, et al. A revision of thirteen species of Triatominae (Hemiptera: Reduviidae) vectors of Chagas disease in México. J Selva Andina Res Soc. 2010;1:57-80.
- IX. Hashimoto K, Schofield CJ. Elimination of *Rhodnius prolixus* in Central America. Parasites & Vectors. 2012;5:45.
- X. Secretaría de Salud Subsecretaría de Prevención y Promoción a la Salud Centro Nacional de Programas Preventivos y Control de Enfermedades Programas de Enfermedades Transmitidas por Vectores. (2019). MANUAL DE PROCEDIMIENTOS PARA LA ENFERMEDAD DE CHAGAS EN MÉXICO.

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- XI. World Health Organization. [Sitio web]. Chagas disease (American trypanosomiasis). World Health Organization; 2018. Disponible en: [http://www.who.int/en/news-room/fact-sheets/detail/chagas-disease-\(american-trypanosomiasis\)](http://www.who.int/en/news-room/fact-sheets/detail/chagas-disease-(american-trypanosomiasis))
- XII. Secretaría de Salud CENAPRECE, S. (2020). Programa de Acción Específico de Control de Enfermedades Transmitidas por Vectores e Intoxicación por Veneno de artrópodos 2020.2024.
- XIII. Reporte del grupo de trabajo científico sobre la enfermedad de Chagas. 2005-2007 TDR/GTC/06 http://whqlibdoc.who.int/HQ/2007/TDR_SWG_09_spa.pdf
- XIV. Wendel S, Brener ME, Camargo A, Raíz A. Chagas Disease (American Tripanosomiasis): its impact on transfusión and clinical medicina. ISBT Brazil'92. 1992. p. 256.
- XV. Morales JR. Aspectos clínicos de la enfermedad de Chagas. Boletín de la Academia Nacional de Medicina de Buenos Aires. 1996;Sup:71-88.
- XVI. Salazar Schettino PM, Marín López A. Manual de Laboratorio para el diagnóstico de la infección por Trypanosoma cruzi. México: UNAM/SSA/OPS-OMS: 2002. p. 49. http://www.mex.ops-oms.org/documentos/publicaciones/pub_manualtrypanosoma.pdf
- XVII. World Health Organization. Control of Chagas disease. Geneva: WHO (WHO Technical Report Series n. o 905. 2002.
- XVIII. Rassi A. Clínica de la fase aguda. En: T cruzi e doença de Chagas, de Brener Z, Andrade Z, Ed. Brasil: Guanabara Koogan Río de Janeiro; 1979. p. 249-64.
- XIX. Tay L, Velasco G. Parasitología Médica. 7. a . ed. México: Méndez Editores S.A. de C.V.; 2002. p. 520.
- XX. Tellaeche LA, Velasco O, Zavala L. Boletín Informativo de la Dirección General de Investigación y Salud Pública. 1976.
- XXI. Tay J, Salazar-Schettino PM, Velasco M, Haro I de, García Yáñez Y, Gutiérrez Quiroz M. Estudio epidemiológico de la enfermedad de Chagas en el estado de Jalisco, República Mexicana. Rev Invest Salud Pública (Méx). 1979;21:145-9
- XXII. Salazar-Schettino PM, Tay J, Ruiz Hernández Al, et al. Seropositividad a Trypanosoma cruzi en cuatro grupos de población del estado de Oaxaca. Salud Púb (Méx). 1984;26:589-95
- XXIII. Salazar Schettino PM, Rojas Wastavino G, Bucio Torres MI, et al. Seroprevalencia de anticuerpos contra Trypanosoma cruzi y su asociación con factores de riesgo en menores de 18 años de Veracruz, México. Rev Panam Salud Pública. 2007;22(2):75-82.