

Case Report

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Laboratory-acquired acute Chagas disease: A case report

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Abstract

Accidental infection by *Trypanosoma cruzi* (*T. cruzi*) usually occurs through accident with a sharp instrument during handling of infected animals in research laboratories. This case report describes the evolution of a case of accidentally acquired acute Chagas disease (CD). A 46-year-old female with suspicious symptoms of acute CD received medical care after reported a sharp puncture accident, during a laboratory procedure with an animal contaminated with *T. cruzi*. The direct search for *T. cruzi* in blood smear was positive. Benznidazole (BZN) 400 mg daily was started. The patient evolved with prompt remission of symptoms and completed 70 consecutive days of BZN with no adverse reactions, achieving parasitological, serological, and clinical cure within 6 months.

Keywords: Acute Chagas disease; *Trypanosoma cruzi*; Laboratory accident; Benznidazole

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Introduction

Among the different transmission mechanisms of Chagas disease (CD), laboratory accident is considered uncommon. The clinical picture varies from a simple self-limited fever to manifestations of myocarditis or meningoencephalitis [1]. The severity of the disease is related to the biological characteristics of the *Trypanosoma cruzi* (*T. cruzi*) strain and the magnitude of the inoculum [2]. A review of the literature about occupational exposure showed that accidental sharps injuries represented situations with rising transmissibility profile [3]. Accidental transmission of human Chagas disease has been reported in endemic and non-endemic countries and approximately 70 well-documented cases of occupational infection by *T. cruzi* have been described, mainly in Latin America [3]. The largest number of laboratory accidents with *T. cruzi* occurred in bench laboratories, at research institutions that conduce studies using animals contaminated with *T. cruzi*. These accidents are probably under-reported, largely because the event goes unnoticed, due to an

asymptomatic or oligosymptomatic clinical condition, or due to the low interest in disclosing due to the fact that it translates insecurity, mismatching or technique inability of the laboratory service or from the researcher himself [4]. The profile of professionals who have accidents is usually master's and doctoral students, and young researchers and laboratory scientists. Risk factors include lack or misuse of personal protective equipment, non-compliance with standard precautionary measures, and, primarily, non-adoption of routine technical protocols [5]. If the infected individual becomes aware of the accident in a timely manner, adequate treatment can prevent infection. In this case, primary prophylaxis is recommended, starting the use of benznidazole at a dose of 7-10 mg/kg daily for 10 days [5]. When primary prophylaxis is not used and the individual develops infection, treatment with a trypanocidal drug is mandatory and must be carried out for a period of 60 days.

Case report

Clinical description

On August 31, 2020, a 46-year-old female sought medical attention, at the National Institute of Infectious Diseases of the Oswaldo Cruz Foundation, for suspected acute *T. cruzi* infection. She reported that on August 11, during a laboratory procedure, she had a needle stick injury in the right hand while handling an infected animal with Y strain of *T. cruzi*. She did not report bleeding or pain at that time. Thirteen days later, she noticed the appearance of an erythematous macula in the right palm and started to present intense asthenia, generalized myalgia, headache, fever, and pain in the right axillary hollow. Physical examination showed that she was in good general condition but with an "inoculation chagoma" in the palmar region (Figure 1). Benznidazole (BZN) 400 mg daily was started immediately.

Laboratory tests

Direct search for *T. cruzi* in blood smear was positive. Initial serology for CD showed non-reactive ELISA (index reactivity [IR] zero), non-reactive chemiluminescence (ChLIA), negative immunochromatographic assay (ICA) and indirect immunofluorescence (IFI) = 1/80. Hemogram showed normochromic and normocytic anemia, low hemoglobin (11.5 g/dl) and hematocrit (32.9%), leukopenia (total leukocytes/mm³ - 2550), and thrombocytopenia (platelets/mm³ - 79,000). Hepatogram showed an increase in liver enzymes (AST- 115 U/L, ALT-106 U/L) with high ferritin levels (1000 ng/ml), and normal troponin.

Cardiological exams

Electrocardiogram presented sinus tachycardia, bi-dimensional echocardiogram and Holter-24h were normal.

Follow-up

The patient evolved with prompt remission of symptoms and vanishing of the skin lesion. She completed 70 consecutive days of BZN with no adverse reactions. Direct search for *T. cruzi* by light microscopy was negative on the third day of BZN use. Weekly serial serologies showed that Elisa seroconverted (IR = 2.3) on the 34th day of etiological treatment, reaching the highest IR value on the 54th day, when these values decreased, becoming negative in the sixth month after treatment. IFI increased the titers (1/1280) on the 34th day of treatment, maintaining high titers until the 62nd day post-treatment. Unfortunately, we were unable to perform the IFI until the end of the follow-up. ChLIA and ICA remained unreactive throughout.

Discussion

The patient in question was a laboratory technician, working with manipulation and inoculation of animals contaminated with *T. cruzi*. It is important to emphasize that the professional was experienced and had been working with this procedure for some years. Although she noticed the sting during the inoculation process, the fact that she didn't bleed didn't worry her, which is why she didn't follow the standard procedure established in case of this type of accident [6]. The signs and symptoms, and changes in laboratory tests presented by the patient are common in acute Chagas disease, mainly due to the presence of fever. These symptoms were described in another study



Figure 1: Patient in the second week after the puncture-cutting laboratory accident. Right hand has a slightly hyperchromic macula in the ventral region. Normal left hand.

that involved a laboratory accident with *T. cruzi* [7]. Treatment of the acute phase of Chagas disease is mandatory and, depending on the parasite strain, the cure rate varies from 60 to 90%. One aspect that prevents completion of treatment within the indicated time is the very frequent adverse reactions of benznidazole [8], a fact that fortunately did not happen with this patient, allowing completion in the minimum time necessary.

Conclusion

The patient progressed satisfactorily with a dramatic positive response to BZN, achieving parasitological, serological, and clinical cure within 6 months. Elisa and IFI proved to be valid for diagnosis and post-treatment monitoring, while ChLIA and ICA were not able to detect acute CD. It is essential that the research laboratory has established protocols in the case of puncture-cutting accidents, so that students and staff are informed of these procedures for monitoring accidents and the conduct to be followed, which includes the immediate start of the use of BZN.

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