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Electrolyzed oxidizing water reduces parasitemia, tissue damage, and mortality of experimentally infected BALB /c mice with *Trypanosoma cruzi*

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Background: Chagas disease or American *trypanosomiasis* caused by the protozoan *Trypanosoma cruzi* belongs to the group of Neglected Tropical Diseases. It is an endemic disease in 21 Latin American countries, and it is also considered as an emerging disease in the USA and Europe, which causes the death of 10 000 people per year worldwide. There are two clinical stages of Chagas disease: acute and chronic. Only 30% of infected patients develop cardiopathies and/or dysfunctions of the gastrointestinal tract. The remaining 70% are chronic patients without clinical manifestations but with positive serology. In the acute stage, antiparasitic treatment with any of the only two drugs on the market (Nifurtimox and Benznidazole) is effective in 80% of cases. Only a few countries treat the patient in a chronic phase with trypanocidal drugs, and most focus on controlling cardiac symptoms rather than attacking the parasite. The use of electrolyzed oxidizing water (EOW) offers a new strategy to prevent or stop the cardiac consequences of *T. cruzi* infection, as it has been reported as an innovative high-level disinfectant capable of eliminating bacteria, viruses, fungi in 30 seconds, and spores in 15 minutes. In addition, neutral pH EOWs have been shown to be innocuous orally or parenterally in rats, mice and dogs. Objective: The aim of this study was to evaluate the effectiveness of an EOW as a trypanocidal treatment that prevents the establishment of the disease or controls the progression of heart disease in a murine model infected with *Trypanosoma cruzi*.

Methods: Six-to 8-week-old female BALB/c mice were inoculated intraperitoneally with 10,000 blood trypomastigotes of H8 *T. cruzi* strain, and treated orally, intramuscularly and intravenously every 24 hours with EOW (40 ppm) at 20 days postinfection (dpi) for five days. Parasitemia was determined, clinical signs were observed and mortality was recorded for 60 dpi. At 60 dpi euthanasia was performed and cardiac, splenic and lymph node indices were calculated. Other macroscopic alterations in the heart, spleen, esophagus, colon, intestines, skeletal muscle and nerve tissue were also registered.

Results: Intraperitoneal infection was successful in 100% of the inoculated population. In all infected groups, parasitemia was observed at 20 dpi. In treated animals, the peak of parasitemia was found earlier than in the untreated group. In addition, the quantification of parasites in blood was 2 to 5 times lower in EOW treated-mice than in non-treated ones, being the oral route with the largest difference. Moderate improvement in the physical state and health of animals treated with EOW was observed. Cardiomegaly and splenomegaly were avoided in mice receiving oral and intramuscular EOW treatment, respectively, whose cardiac and splenic indexes were very similar to the uninfected control group. Survival was 100% in the murine population receiving oral EOW treatment.

Conclusion: EOW efficiently inhibited the severity of Chagas disease in experimentally infected BALB/c mice, reducing clinical signs, parasitaemia, cardio-esplenomegaly and mortality. These outcomes may lead to the use of an effective innovative trypanocidal sustance against Chagas disease.

Speaker Biography

Minerva Arce Fonseca is currently working as an Researcher in Medical Sciences C and worked for the Laboratory of Molecular Immunology and Proteomics in the National Institute of Cardiology, Ignacio Chávez.

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