Diagnosis and Treatment

Diagnosis of Chagas disease is easiest during the acute phase through hemoculture or xenodiagnosis, (Reithinger, et al, 2010). However, once a patient enters the chronic phase, blood parasite levels are unlikely to be high enough for these techniques to be effective means of diagnosis so serological and molecular tests must be used (Reithinger, 2010). Serological tests, which include Enzyme-linked immunosorbent assay (ELISA), indirect hemagglutination assay (IHA), immunofluorescent antibody test (IFA), and radioimmunoprecipitation assay (RIPA), have high sensitivities but their specificities range from 60-100% so the World Health Organization recommends performing multiple tests in order to confirm a positive diagnosis (CDC, Chagas Disease, 2009; Reithinger, 2010; Verani, 2009). In addition, molecular tests such as PCR-based methods are available and have high specificities but low sensitivities (Reithinger, 2010).

Rapid tests have recently become available and our research team employed two on each patient, those being: Stat-Pak (Chembio Diagnostic Systems, Medford, NY); and Trypanosoma Detect (Inbios International, Seattle, WA).

Field Research

The survey component consisted of housing survey teams which went door to door in selected communities searching homes for triatomines, the insect vector of Chagas disease, infesting homes where there were infestations, and educating the home owners and their families on the dangers of Chagas disease and how to protect themselves against it. As part of the entomological searches we also collected any triatomines that were found so that they could be tested for T. cruzi parasites in the laboratory in Quito, and recorded the species, stage of development, and location where each insect was found for future analysis.

We also interviewed the home owners about the materials they had used to construct their houses, their animal husbandry practices, whether their homes had been fumigated, how recently, and by whom, and other general questions to gauge their living situation such as whether they had a latrine at home and how many people live in the home. Later this information will be used to help identify risk factors for the presence of domiciliary triatomines.

The Healthy Housing component focused on the social, cultural, and economic contributors to triatomine infestation and subsequent Chagas infections.

Project Goals

The problem that we were addressing with this research is that the epidemiology of Chagas disease and that of its transmission is not well understood in Ecuador; yet, it is estimated that 120,000 to 200,000 Ecuadorians are infected, often unknowingly, with the T. cruzi parasite and up to 25% of the Ecuadorian population is at risk of being infected (Black, Carla L., et al., 2007). In addition to the prevalence and housing survey data, we were also gathering samples in order to compare the results of the rapid screening tests to more reliable serological techniques to determine the sensitivity and the specificity of the rapid tests in Ecuador.

This is of utmost importance as there is speculation about the effectiveness of these tests in identifying the particular strain of T. cruzi that is present in Ecuador.

Results

The entomology component had data available at the end of the field work, since some of their data could be interpreted without laboratory processing. The leader of this component, Dr. Anita G. Villасис compiled and presented some general statistics on the entomology searches completed during the field research. In 13 communities in the Loja province of Ecuador, we searched 354 homes, 48 of which had triatomines, and 42 of those with triatomines had nymphs suggesting active reproduction in or around these homes (Center for Infectious Disease Research, 2010). The infestation index, which is calculated as the number of infested houses divided by the number of houses searched, ranged from 0.32-1% across the 13 communities, with an overall infestation index of 13.6%. The percent of community homes examined ranged from 50-100% with only 65.31% of the total number of houses in all 13 communities being examined.

There was still a great deal of laboratory processing to be done in Quito after the completion of the field work, even before the majority of the data analysis could be started. For example, the entomology component collected a total of 1678 triatomines, which were all taken back to the lab in Quito to be tested for the presence of T. cruzi in their guts (Center for Infectious Disease Research, 2010). In addition, the students in the laboratory component also cultured the venous blood samples to look for parasites circulating in the blood. After the first few months, parasitemia will spontaneously resolve and patients will enter the chronic phase of the infection, which in about 70% of patients is asymptomatic for life; however, about 30% of patients develop severe gastrointestinal or cardiac complications decades later (Berm, et. al., 2007).

References

