

# American trypanosomiasis (chagas disease) essay samples

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## **INTRODUCTION**

American trypanosomiasis (Chagas disease) is caused by the protozoan parasite *Trypanosoma cruzi* that can result in acute inflammatory skin changes (chagomas) and may eventually cause infection and inflammation of many other body tissues. It was first found in Brazil in the year 1909. It is however mainly found in rural parts of Mexico, Central America or South America. The parasites enter the mammalian host through the bug bite, or breaks in the skin, replicate in mammalian cells, and eventually reach other organs through the blood. The disease is also found to be spread from mother to child (congenital). Chagas disease has mainly three phases: acute, intermediate or indeterminate, and chronic. Their symptoms are hard to find and vary individually and hence poorly understood by health care professionals.

### **History of Chagas Disease.**

Carlos Chagas, was the man behind the discovery of Chagas disease. At the time of the discovery Carlos was working for the Oswaldo Cruz Institute in Brazil. Chagas discovered how the parasites were transmitted to Humans. Chagas was the first scientist to discover all the aspects of the disease including clinical manifestations. His mentor at that time was Orlando Cruz from where the parasite got its name.

Triatomine insects (kissing bugs) are widely found in the Americas and thus Chagas disease is called known as American trypanosomiasis. The insects infect a broad range of organisms throughout the Americas.

## **Causes of Chagas Disease**

Trypanosoma cruzi is the main parasite causing Chagas disease. The parasite infects mammals (Humans) through Bug bites or breaks in the skin. The Bugs (kissing bugs) deposit feces, through which the parasites enter the skin causing swelling and redness. They are also called as kissing bugs since the appearance on the skin is similar to that after prolonged kissing. In rare cases the parasite manages to enter the blood stream and settle in many organs, especially muscular tissue. The disease is more prevalent in humans who live in poor or primitive housing conditions. These include mud huts, mud walls etc. These conditions are ideal for Triatominae bugs and also enter domestic animals like cats and dogs.

## **Symptoms and Signs**

The range of symptoms in Chagas disease is varied and may sometimes include no symptoms to severe, acute and chronic symptoms.

### **Some of the acute symptoms include:**

- Swelling and/or redness at the skin infection site (termed chagoma)
- Rash
- Swollen lymph nodes
- Fever
- Head and body aches
- Fatigue
- Nausea, vomiting, and/or diarrhea
- Liver and/or spleen enlargement

- Romaña sign (unilateral painless edema [swelling] of tissues around the eye)

### **The chronic symptoms include:**

- Irregular heartbeats
- Palpitations
- Fainting (syncope)
- Cardiomyopathy (chronic disease of the heart muscle)
- Congestive heart failure
- Shortness of breath (dyspnea)
- Emphysema
- Stroke
- Sudden death
- Chronic abdominal pain
- Chronic constipation
- Dilated colon
- Difficulty swallowing

### **These symptoms may be present when the parasites are present around or within the tissues or organs.**

#### Diagnosis of Chagas disease

The acute phase of the disease is usually not diagnosed easily since the symptoms are mixed and common. Majorly the diagnosis is prevented since many of the patients come from a primitive living conditions.

There are many blood tests available to detect Chagas disease. Most of these are based on the Human antibody production against the infecting

parasite. Quite often the parasites are detected through blood smears under direct microscopic examinations. However these parasites are often confused with people suffering from Malaria, eishmaniasis, babesiosis, giardiasis.

Another full proof technique, approved by the US FDA, ELISA (Enzyme Linked immune assay). It detects antibodies formed against *T. cruzi* with high sensitivity. Other tests include indirect immunofluoresence, hemagglutination. These are less sensitive and specific, but used.

The above test include pathological testing using blood samples. There are methods through which the disease can be diagnosed by physical examinations. This includes any kind of rash, skin infection or lesions on the body surface. In some cases even hear rate monitoring is taken into consideration. Since Chagas has been involved in respiratory infection, certain respiratory test are also considered for diagnosis. Some studies also include gastro intestinal function testing in order to check whether basic functions of the disease are in normal condition. Moreover chronic Chagas is only diagnosed after sufficient amount of clinical evidence is established. Sepearte and sophisticated test are required for chronic Chagas.

## **Treatment of Chagas Disease**

The treatment for the disease depends on the age and phase of the disease. Acute phase of the disease is treated by using anti-parasitic drugs. Normally benznidazole (Rochagan, Ragonil) and nifurtimox (Lampit) are prescribed to eliminate or reduce the removal of the disease. Sometimes the use of these tend to be useless since parasites become drug-resistant. During initial or

intermediate phase of the drug, no anti-parasitic drug treatment is used. Chronic phase treatment using anti-parasitic drug treatment is controversial. Treatment during this phase is however not recommended, however it can sometimes be lifesaving. Surgically removing the affected organs and replacing them by transplantation is another advance method that most health care providers suggest for extreme chronic cases. On the other hand, several medications are available to treat Chagas disease.

## **Epidemiology**

Vaccines are not available to date, but better living conditions can prevent the onset of the disease. The principle goal is to prevent the vector (bugs) from establishing a domiciliary cycle in the home by making a home difficult for the bugs to invade or live in. Blood transfusions can often cause the spread of the disease. So in order to prevent the transfer of disease, many blood banks have come up with screening techniques for the disease. Risk of disease increases when living conditions are compromised. Areas such as Mexico and South America are more prevalent for the onset of disease due to lack of proper housing. The risk also increases for recipient of donated organs where screening of Chagas disease is not initiated. The risk is high in mothers where the disease can be spread to the fetus (congenital). The risk is very high for babies born with Chagas and mortality is sure, since immune system is not developed to an extent.

## **Current Trends in Chagas Disease**

Current studies show treatment using anti-parasitic drug (benznidazole) prevents the onset of cardiac disease in patients with chronic Chagas

disease. The use of benznidazole treatment in children in has found to reduce deaths and complications of disease. Research on vaccines is in progress, where studies on smaller mammals (mice) with mutant parasites (inactivated) have shown immunity. Other studies have shown to use mutant parasite DNA. Many studies are in the early stages of clinical trials for prevention of Chagas disease. New studies are in early clinical phases for populations which are immune compromised.

## **Statistical Data**

On a global scale, around 100 million people are at risk in acquiring chagas disease. Of the 100 million, more than half of the population come from populations with poor living conditions. More than 30% of the population of affected people are women and children. There are nearly 16 to 18 million cases of Chagas disease per year. Most of the deaths have occurred in patients suffering from chronic Chagas. The use of anti-parasitic drugs have helped save nearly 4. 5 million people suffering from Chagas disease. WHO states that nearly 50, 000 people die of Chagas every year worldwide with nearly 70% of the population located in Mexico, South America and Latin America.

## **Conclusions**

Chagas disease is mainly found in South and Central America. It is mostly prevalent in places where housing is of primitive nature. The parasite *Trypanasoma cruzi* is also present in domestic animals which are then passed on to humans through a cycle. The parasite has many sources to enter the human body and settle and multiply in different organs and tissue.

The acute phase of the disease is not easily diagnosed since it is often confused with other common diseases. The diagnosis is however sometimes complex, mainly in direct microscopic testing since it is confused with the Malarial parasite. Much advance techniques have evolved in the past ten years.

Treatment with anti-parasitic drugs has been the most beneficial to all patients suffering from Chagas disease. There is no current vaccination available for Chagas and current studies have only reached in pre-human stages. Lastly, Chagas disease kills more than 100 million worldwide, of which women and children are the highest in number.

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