Trypanosoma cruzi

Trypanosoma cruzi is a flagellated protozoan that causes Chagas disease. Transmission occurs via the bite of a triatomine bug, also called a kissing bug, which deposits feces on the surface of the skin and then subsequently bites the area. The bite of a triatomine bug is classically painless. Following the bite, the human host scratches the area which facilitates penetration of the parasite. This disease occurs predominantly in South America and occurs in an acute and chronic form. In the acute form, the disease typically goes unnoticed and can present as localized swelling at the site of entry called a chagoma. It can also be accompanied by mild enlargement of the liver and spleen and swelling of lymph nodes. The classic marker of acute Chagas disease is Romana's sign which is characterized by swelling of the eyelids near the bite or where bug feces was accidentally rubbed into the eye. Symptoms of the acute phase usually resolve spontaneously but the infection can persist and enter a chronic phase. Majority of patients with chronic Chagas disease never develop symptoms while 20-40% can develop symptoms such as damage to internal organs like the heart, esophagus, and colon. These organs are damaged due to cell death that occurs during the infective cycle which causes an inflammatory response, cellular lesions and fibrosis. Intracellular amastigotes classically damage intramural neurons which can lead to megacolon and megaesophagus. Disease can be diagnosed via visualization of the protozoa on blood smear. Acute cases are treated with nifurtimox.

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Pathophysiology

Protozoa
Propeller-protozoa
Trypanosoma cruzi is a flagellated protozoa, which is a unicellular eukaryotic organism.

Triatomine Bug
Tri-toe-mime Bug
Transmission occurs via the bite of a triatomine bug, also called the kissing bug, which deposits feces on the surface of the skin and then subsequently bites the area. Triatomine bugs are a subfamily of the Reduviidae bugs. The bite of a triatomine bug is classically painless. Following the bite, the human host scratches the area which facilitates penetration of the parasite.

Kissing bug
Bug with giant lips Kissing
Transmission occurs via the bite of a triatomine bug, also called the kissing bug, which deposits feces on the surface of the skin and then subsequently bites the area.

Painless bite
No Pain-bolt sign with Kiss
The bite of triatomine bugs is typically painless.

Predominantly in South America
Map of South America
T. cruzi is most common in Central America and South America. It is estimated that as many as 11 million people in these regions have Chagas disease, although some may be asymptomatic.

Symptoms

Chagas disease
Shotgun
Chagas disease is caused by the parasite T. cruzi. In the acute phase, individuals typically present with localized swelling at the site of entry. Symptoms of the acute phase usually resolve spontaneously but the infection can persist and enter a chronic phase which can cause damage to internal organs like the heart, esophagus, and colon.

Romana's sign
Romanian-flag over the eye
The classic marker of acute Chagas disease is Romana's sign which is characterized by swelling of the eyelids near the bite or where bug feces was accidentally rubbed into the eye.

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Dilated Cardiomyopathy

Dilated Heart with Mayo-party-hat

Dilated cardiomyopathy is a disease of the heart in which the heart becomes weakened and enlarged and is unable to pump blood efficiently throughout the body. This is the most common form of cardiomyopathy not due to ischemic causes.

Megacolon

Mega-colon

Megacolon is characterized by an abnormal dilation of the colon, typically accompanied by paralysis of peristalsis. Chagas disease can cause megacolon due to damage of Auerbach's plexus in the walls of the intestinal tracts. Destruction of this autonomic nervous system innervation leads to loss of smooth muscle tone and subsequent gradual dilation.

Megaesophagus

Mega-sarcophagus

Megaesophagus is characterized by abnormal dilation of the esophagus, typically accompanied by paralysis of peristalsis. Chagas disease can cause megaesophagus due to damage of Auerbach's plexus in the walls of the esophagus. Destruction of this autonomic nervous system innervation leads to loss of smooth muscle tone and subsequent gradual dilation.

Diagnosis

Blood smear

Glass slide with Blood Smear

Chagas disease can be diagnosed via blood smear with direct visualization of the parasite.

Treatment

Nifurtimox

Knife-fur

Nifurtimox is a drug commonly used to treat diseases caused by trypanosomes including Chagas disease. This drug is not effective for the symptoms caused by chronic infection. Side effects include skin disorder, brain toxicity, and GI discomfort.

Benznidazole

Benz-knight

Benznidazole is an antiparasitic medication used to treat Trypanosoma cruzi. It works by producing free radicals, which cannot be detoxified by this particular parasite. Side effects of this medication include rash and nausea.

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