Chagas’ Disease

A brief overview

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DNDi
Drugs for Neglected Diseases initiative
The disease description by Carlos Chagas, 1909
**T. cruzi life cycle**

**Triatomine Bug Stages**
1. Triatomine bug takes a blood meal (passes metacyclic trypomastigotes in feces, trypomastigotes enter bite wound or mucosal membranes, such as the conjunctiva)
2. Metacyclic trypomastigotes penetrate various cells at bite wound site. Inside cells they transform into amastigotes.
3. Amastigotes multiply by binary fission in cells of infected tissues.
4. Intracellular amastigotes transform into trypomastigotes, then burst out of the cell and enter the bloodstream.
5. Triatomine bug takes a blood meal (trypanmastigotes ingested)
6. Epimastigotes in midgut
7. Multiply in midgut
8. Metacyclic trypomastigotes in hindgut

**Human Stages**
2. Metacyclic trypomastigotes penetrate various cells at bite wound site. Inside cells they transform into amastigotes.
3. Amastigotes multiply by binary fission in cells of infected tissues.
4. Intracellular amastigotes transform into trypomastigotes, then burst out of the cell and enter the bloodstream.

**= Infective Stage**
**= Diagnostic Stage**
The burden of Chagas’ Disease

- 21 endemic countries in the Americas
- 1980s - 17 million cases
  - 4.8–5.4 million with clinical symptoms
  - Incidence of 700,000-800,000 new cases
  - 45,000 deaths - cardiac form of the disease

- 1990 - 2.7 million DALYs

- 2001 – 9.8 million cases
  - 586,000 DALYs

- 2006 – PAHO assessment
  - 7.45 million cases
  - Incidence of 55,585 new cases/ year (41,200 vectorial transmission and 14,385 congenital)
Clinical Phases and Evolution

Acute
- 2 - 4 months
- Asymptomatic or oligosymptomatic
- Direct examination

Indeterminate
- Positive serology / PCR
- Xenodiagnosis?
- PCR

Chronic
- Positive serology / PCR
- Heart disease (mild to severe) 20 – 30% indet. patients
- GI tract disease
- Neurological disease
- Life expectancy ↓ 9 years (av.)

Treatments available:
- Benznidazole 5-7.5 mg/kg/day
- Nifurtimox 8-10 mg/kg/day for 60-90 days