Leishmaniasis, Kala Azar (The Black Fever)

By Lawrence Hall

Etiologic agent

Protist obligate intracellular parasite,

- Phylum: Euglenozoa (genus Leishmania)
- Over 21 species that infect mammals. Examples: L. donovani, L. infantum, and L. chagasi (in the New World)

Transmission

The diseases methods of Transmission include:

- Vector-borne Insect bites from infected female sand flies, Phlebotomus papatasi
- Contaminated objects or blood to blood contact
- Mother to baby, through the placenta

Vectors

The female sand fly Phlebotomus papatasi, however there are over 500 known phlebotomine species with only about 30 have been found to transmit leishmaniasis.

Reservoirs

Mammals such as rodents, Canines, and humans

General characteristics and Virulence factors

- Two forms: Single flagella in postmastagote sage(vector), amastigote when it is in the human host (intracellular),
- lipophosphoglycan coat, mediates host cell immunity response
- Binds to liposome cell membrane and asexually multiplies until it lyses macrophage

Diagnosis and identification

- Isolation, visualization, and culturing of the parasite from infected tissue
- Serologic detection of antibodies to recombinant K39 antigen (Via blood test)
• Polymerase chain reaction (PCR) assay for sensitive, rapid diagnosis of Leishmania species
• CBC count, coagulation studies, liver function tests, peripheral blood smear
• Measurements of lipase, amylase, gamma globulin, and albumin
• Leishmanin (Montenegro) skin testing (LST) (not FDA approved in the United States)

**Signs and symptoms**

Cutaneous: less severe, usually only on skin. Appear 2 weeks-2 months, possibly up to a year

• -Dark skin sores, abdominal pain, weakness (fatigue) possibly silent

Visceral (Black Fever) “kala Azar”: more serious, fatal if left untreated (95% mortality rate) Symptoms appear 2 week-8 months, possibly longer

• -High fever that can appear off and on, weight loss, enlargement (swelling) of the spleen and liver, and abnormal blood tests.

• -People may have low blood counts, including a low red blood cell count (anemia), a low white blood cell count (leukopenia), and a low platelet count (thrombocytopenia).

**History of Leishmaniasis**

Leishmaniasis has a long history dating back as far as the first century AD and is supported by the evidence of pottery from Ecuador and Peru that displays depictions of skin lesions and facial deformities that are typical of cutaneous and visceral leishmaniasis. The Spanish conquistadores also noticed that ulcers resembled leprosy lesions and later labeled the disease, “white leprosy,” and “Andean sickness,” In Africa and India, reports in the mid-18th century describe the disease now known as visceral leishmaniasis, as “kal-azar” or “black fever.”

In 1756, Alexander Russell made an important advance in the discovery of Leishmaniasis after examining a Turkish patient. According to Russell, "After it is cicatrized, it leaves an ugly scar, which remains through life, and for many months has a livid color. When they are not irritated, they seldom give much pain.

The disease became known as Leishmaniasis after William Leishman, a doctor serving with the British Army in India. Developed one of the earliest stains of Leishmania in 1901. To this day is still predominate in India, Honduras, Bangladesh, Brazil, and parts of Africa. As a neglected tropical disease, it has always thrived in the world’s poorest populations where multiple infections among single individuals are common.
Treatment and Prevention

- Treatment, varies with individuals most Common;

-Sodium stibogluconate, anti-parasitic drug (1940’s), Miltefosine (Impavidio) newest and most effective anti-parasitic drug (1980’s) finally approved for use in India in 2002.

-Anti-fungal drugs that target specific activation sites or proteins. example: Amphotericin B

-Prevention is consisted the best method, as there is no vaccine.
  - Stay indoors dusk to dawn, Sand flies are more active during this time.
  - Wear long sleeve shirts when outside.
  - Use insect repellant and bed nets.

World Health Organization

- WHO, is attempting to eradicate Leishmaniasis, but faces several issues:
  - Lack of funding, is hardly an issue or large epidemic in the developed world.
  - Leishmania becoming more and more resistant to treatment from drugs.
  - Environmental issues that cause a perfect breeding ground for sandflies.
  - Mosquitoes potentially becoming another mode of vector transportation
Local and worldwide Epidemics

- Very rare in the United States, usually only found in Texas and Oklahoma. However, soldiers return overseas have been known to return with cutaneous Leishmaniasis.

- However, it is still a prevalent issue in the developing world.

With roughly 200 million at risk.

- 700,000-1,200,000 Cutaneous incidents yearly

- 200,000-400,000 Visceral incidents yearly

- According to WHO, over 200,000 deaths annually. The second largest parasitic killer disease behind malaria.
References:


• "Leishmaniasis | Kala-azar | Leishmania | MedlinePlus." *MedlinePlus Trusted Health Information for You*.