Lymphatic filariasis

By: Briana Zuniga

Disease: Lymphatic filariasis (elephantiasis); Etiological agent: caused by nematodes (roundworms) of the family Filarioidea. Here are 3 of the filarial worms: Wuchereria bancrofti, Brugia malayi, Brugi timori. (1)

Transmission: The mode of transmission is from person to person by mosquito bites. The mosquito bites a person with lymphatic filariasis the tiny worms will be in the blood and infect the mosquito. Then the mosquito is now a carrier and will infect others (2)

Reservoirs: Humans are reservoirs. (paho). There has been a connection between found in Macaques, leaf monkeys, cats.

General characteristics of MO: Wuchereria bancrofti: the microfilariae are protected and are approximately 245 to 300 micrometers. It takes months for the microfilariae to sexually mature and in the adult stage can live anywhere from 5 – 8 years. Adult males range from 2.5 – 4 cm while females range from 5 – 10 cm. The end of the roundworm is blunt and the others end is pointed. Brugia malayi: microfilariae range from 200 – 275 micrometers. The microfilariae of B. malayi are similar to W. bancrofti. They have nuclei at the tip the tail. Brugia timori: looks more like W. bancrofti. The symptoms of elephantiasis is only expressed the lower part of limbs. It has nuclei that extends to the tip of the tail. The microfilaria is larger at 310 micrometers than B. mayali. (3)

Signs and symptoms of disease: There are asymptomatic, acute and chronic conditions of the disease. Most people who are infected are asymptomatic meaning they show no signs outside the body of being infected. The asymptomatic infections will damage the lymphatic system, kidneys and immune system. For the acute infections there is local inflammation in lymph nodes, lymphatic vessels this will then lead to lymphoedema. The lymphoedema is caused as a response by the body to the parasite. This causes bacterial infections on the skin. In chronic conditions tissues start to swell, skin/tissue thicken, and there is scrotal swelling. This leaves people deformed and valuable to infections. (1)

Keys tests for identification: Most accurate way of determination is a blood test. Some of the parasites have “nocturnal periodicity” and they can only be seen in the blood from 10 PM – 2 AM. Blood is taken and examined in the lab in the nighttime. This is the time microfilariae are seen in peripheral blood. The blood night films can be tested by filtration or concentration techniques. An antigen detection test called ICT is simple and specific and can detect the infection in minutes. (5)

Historical information: Lymphatic filariasis occurs in the Nile region and there is proof of a pharaoh statue that has been present since 200 BC. There have been artifacts to support this claim as well. The first account of lymphatic filariasis symptoms was in 1588 – 1592. French surgeon Jean – Nicholas Demarquay was the first to observe microfilariae in 1863 and Otto Henry Wucherer also discovered microfilariae in 1866. Joseph Bancroft documented the
discovery of the adult worm in 1876. In 1877, Patrick Manson discovered microfilariae in mosquitos. George Carmicheal Low in 1900 discovered the true mechanism of transmission. (3)

**Virulence factors:** The pathogenic parasite can affect the immune respond of the host and bacterial and fungal infections are caused because the host is vulnerable. There is genital damage, lymphedema, and lymphatic dilation beyond adult filarial worms. The lymphatic worms remain fixed within the lymphatic vessels. The immune system during the non inflammatory will keep itself in a resting state through the production of contra inflammatory immune molecules such as Th2 – type T-cells and IgG 4 are blocking antibodies. This serves as an aggressive relationship with the parasite and the host responsiveness must be balance to have a relationship. (6)

**Control/Treatment:** A single dose of 2 medicines given annually, to the at risk population, is give to stop the spread of the infection. The medications are albendazole (400 mg) with ivermectin (150 – 200 mcg/kg) or diethylcarbamazine citrate (6 mg/kg). The medication has little to no effect on the adult parasites. They get rid of microfilariae from the blood and eliminate the spread from parasites to the mosquitoes. The treatment is given between 4 – 6 years to prevent the transmission cycle. This is to prevent the disease before it starts. (1)

**Prevention/Vaccine info/New trials:** 56 countries in 2012 have started wide treatments through MDA. Between the years of 2000 – 2012 more the 4.4 billion treatments were give to 984 million people in 56 countries and this has significantly reduced the transmission in certain places. At risk populations have dropped 43%. The WHO has strategies for mosquito control (1). Some good strategies are to sleep in an air-conditioned room, mosquito net, wear long sleeves and trousers, use mosquito repellent on the skin, and indoor residual spraying (2). Two pharmaceutical companies, GlaxoSmithKline and Merck & Co. Ink, have agreed to give as much of the drugs needed to extinguish the disease. The strategy is to stop the spread of infection before it happens and to ease the pain of those suffering (7).

**Local cases or outbreaks:** Lymphatic filariasis is a threat in the tropics and other underdeveloped countries. As of now you cannot get infected with the parasitic worms that cause the infection the United States. (8)

**Global cases or outbreaks:** 80% of people in Haiti are at risk of the infection. There are about 13.4 million people in the Americas at risk. The endemic regions are Brazil, Dominican Republic, Guyana and Haiti. 120 million people are infection and about 40 million are disfigured and not motile (9). Some other countries affected are the tropics and sub tropics of Asia and Africa (2). The graph shows the regions affected by Lymphatic filariasis and been given preventive medications.
Works cited:
   http://www.who.int/mediacentre/factsheets/fs102/en/

   Parasite – Lymphatic Filariasis. 6 May. 
   http://www.cdc.gov/parasites/lymphaticfilariasis/epi.html

   http://www.stanford.edu/group/parasites/ParaSites2006/Lymphatic_filariasis/


   http://www.filariasis.org/diagnosis.html

   http://www.filariasis.org/pathogenesis.html

   http://www.who.int/lymphatic_filariasis/disease/en/