Onchocerciasis
(River blindness)
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Outline

- Taxonomy
- Etiology
- History
- Transmission
- Treatment & Prevention
- Current efforts

Taxonomy

- Phylum: Nematoda
- Class: Secernentea
- Order: Spirurida
- Superfamily: Filarioidea
- Family: Onchoceridae
- Genus: Onchocerca
- Species: *O. volvulus*
What is Onchocerciasis?

- A skin and eye disease caused by onchocerca volvulus. (Blanks et al. 1999)
- Affects about 17.7 million people (WHO)

About *O. volvulus*

- Helminthic worm
- Male: 2-3 cm long
- Female: 60 cm long
- Adults found in subcutaneous tissues & nodules of host
- Longevity of 10 – 15 years (adults worms)

Distribution

- Figure 1: patient suffering from Onchocerciasis (WHO)
- Figure 2: Image of Onchocerciasis volvulus (adult worms)
- Figure 3: Distribution of Onchocerciasis
History

- One of the leading causes of blindness due to infection.
- **1874** – John O'Neill, discovered presence of *O. volvulus* microfilariae
- **1875** – O'Neill associated the microfilariae of *O. volvulus* with an irritating dermatitis called “craw craw” in Ghana.
- **1916** – Development of medicinal drug Suramin by Oskar Dressel.
- **1987** – Merck Mectizan Donation Program established.

Vector & transmission

- Vector is from genus *Simulium* (black fly).
- Main vector is *Simulium damnosum* in most of Africa
- *O. volvulus* is transmitted by the bite of an infected black fly.
- Black flies breed near fast flowing waters.
- Animal reservoirs have not been found.

About the black fly...

- Female adults are known as buffalo gnats
- The immature eggs are aquatic
- The life cycle includes 4 stages.
Life cycle of the black fly

- Figure 5: Stages of the black fly

Life cycle of *O. volvulus*

- Figure 6: Transmission of *O. volvulus* larvae

Symptoms & affects

- Appear after L3 stage
- Usually appear 9 months – 2 years after initial infecting bite.
- Serious visual impairment
- Nodule formation
- Skin rashes, lesions, intense itching
- Chronic infection may lead to lichenification.
Adult female worm produces thousands of larval worms. Death of microfilariae is toxic. Years of exposure may cause blindness and skin disfiguration.

Figure 7: Image of a patient with leopard skin.

Ocular symptoms caused by Wolbachia antigens. Can also cause inflammation of lymph glands.

Figure 8: Ocular lesions in a patient with leopardskin blinded by sclerosing keratitis.

Diagnosis:
- Palpating
- Skin snips
- Slit lamp exam
- PCR
..diagnosis

Figure 9: palpating  
Figure 10: skin snip

Figure 11: slit lamp exam  
Figure 12: nodules

Treatment

- Goal is to eliminate microfilarial stage of disease
- Suramin – only drug in clinical use that is effective against worms of onchocerciasis.
- Ivermectin – considered to be drug of choice, introduced in 1982
- Doxycycline
- No vaccine available.
Control efforts

- OCP – Onchocerciasis Control Program
- APOC – African Program for Onchocerciasis Control
- OCPA - Onchocerciasis Control Program of the Americas
- Merck Mectizan Donation Program
- Practical strategies (insect repellent etc.)

Conclusion

- Taxonomy
- Etiology
- history
- Transmission
- Treatment
- Prevention and current efforts

Works cited

- "Image #9703894" TDR Image Library. 22 May 2008.
- http://www.cdc.gov/parasites/ParasiteImages/A-F/Filariasis/OvolvulusLifeCycle.gif