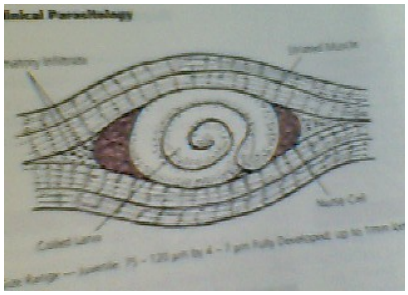
Chapter 6

Tissue nematodes

6.1 Tricnnella spilaris

6.1.1 Morphology

Encysted larva



Settle by coiling up in muscles fibers and become encysted. Striated muscle cell (nurse cell) surround coiled larva

6.1.2 Life cycle notes

Human infection is a result of zoonosis is initiated by consuming undercooked contaminated meat from striated muscle, digestion of meat releases Tricnnella larva in the intestines, matures to adult, mating occurs and female lay live larva, infant larva enter blood stream and travel to striate muscle where they encyst, Ggranuloma forms over time and calcify. Because human is not tradition host, completion of life cycle does not occurs and cycle ceases with encystations of larva.

6.1.3 Epidemiology

Cases reported in tropics but also world wide, parasite may be found in pig, deer, beer and rats. It’s resistant to colder climates or regions of the world

6.1.4 Clinical symptoms

Trichinosis is a great imitator because it mimics symptoms of other diseases, Vomiting , nausea, abdominal pain, diarrhea, headache, eosinophilic, blurred vision, cough and even death, muscular discomfort, edema, local inflammation, overall fatigue,

6.1.5 Laboratory diagnosis

History plays a role in diagnosis, examination of infected skeletal muscle, other finding are eosinophilic and leucocytosis and the elevated muscle is a suspect

6.1.6 Prevention and control

Thorough cooking of meat, proper storage of such meat decrease visibility of such organism and avoid feeding of pork scraps to beak the cycle.

6.2 Druncuculus medinensis

6.2.1 Morphology

Larva

Rhabditiform is the diagnostic 1st stage; tail makes about 1/3 of the body length

3rd stage larva stage reside in the intermediate host

Adult

Considered one of the largest nematode and anterior end coils on itself

6.2.2 Life cycle notes

Ingestion of drinking water contaminated with infected copepods initiate infection, 3rd stage larva emerges from the intestines, mature and penetrate connective tissue then to the subcutaneous tissue in the skin and lay live 1st stage larva, Site of larva deposit leads to formation of ulcers. Under appropriate condition, esp. in contact with cool fresh water, ulcer rapture and release larva, Copepods living in water consume this 1st stage larva and serve as intermediate host and ingestion of infected copepods repeats the cycle.

6.2.3 Epidemiology

Guinea worm is found in parts of Africa, India, and Asia. Copepods reside in fresh water located in step well where individual obtain drinking water and bathe, 1st stage escape from the ulcer. Standing water serves as a source of infection and the reservoir host includes dogs

6.2.4 Clinical symptoms

Allergic reaction as migration occurs, secondary bacterial infection develops
Development of ulcers and any attempt to remove adult female leads to toxic reaction

6.2.5 Laboratory diagnosis

Adult worm recovered by observing infected ulcers therefore, induce rapture of infected ulcers by immersing in cool water reveal 1st stage larva

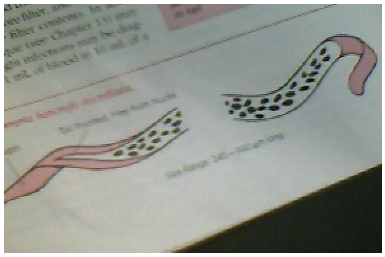
6.2.6 Prevention and control

Use properly treated water for consumption, prohibit drinking and bathing in the same water, cease drinking standing water the remove copepods in suspected water by filtration.

6.3 Wuchereria bancrofti

6.3.1 Morphology

Microfilaria



Size 240-300um in length, thin and delicate sheath surround the organism, numerous nuclei contained in the body, anterior end is blunt and round and the posterior end culminate to a point free from nuclei

Adult

White in color and assume threadlike appearance

6.3.1 Life cycle notes

Culex, Aedes and Anopheles sp. of mosquito spread the parasite, bite inject the larva

Larva migrate to tissue where they complete their development, adult worm may reside in the lymphatic and subcutaneous tissue. Fertilized female worm lay live microfilaria which takes residence either in the blood or the dermis, microfilaria exit the body via a blood meal by an appropriate arthropod vector. Vector serves as intermediate host.

6.3.1 Epidemiology

Found in tropics and subtropics area, vectors are mosquitoes. Breeding occurs in contaminated water and resident of endemic areas are at risk

6.3.1 Clinical symptoms

Eosinophilic is noted, enlarged lymph nodes especially in the inguinal region is noted

Fever, chill, granulomatous lesions, lymphangitis, lymphadenopathy, elephantiasis of legs, breast and streptococcus infections

6.3.1 Laboratory diagnosis

Examination of giemsa stained blood slides for microfilaria, Knott techniques may be employed while serological tests have been developed

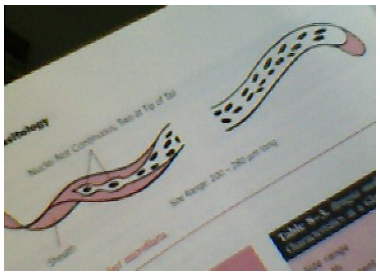
6.3.1 Prevention and control

Personal protection when entering endemic areas, destroying breeding areas of mosquitoes, practice good sanitation and educating inhabitant of endemic areas

6.4 Brugia malayi

6.4.1 Morphology

Microfilaria



Range 200-280um in length; possess sheath, a round anterior and numerous nuclei

Presence of two distinct nuclei in the tip of the pointed end or tail

Adult

White in color and assume threadlike appearance

6.4.1 Life cycle notes

Transmitted by Anopheles, Aedes, Mansonia or Armigeres, Bite inject the larva, larva migrate to tissue where they complete their development and the adult worm may reside in the lymphatic and subcutaneous tissue. Fertilized female worm lay live microfilaria which takes residence either in the blood or the dermis and the microfilaria exit the body via a blood meal by an appropriate arthropod vector

Vector serves as intermediate host.

6.4.1 Epidemiology

Found in areas where vector breeds, it is known to infect felines and monkeys

6.4.1 Clinical symptoms

Eosinophilic is noted there is enlarged lymph nodes especially in the inguinal region is noted, fever, chill, granulomatous lesions, lymphangitis, lymphadenopathy, elephantiasis of legs, breast and streptococcus infections

6.4.1 Laboratory diagnosis

Examination of giemsa stained slides, the Specimen collected at night –time (they exhibit nocturnal periodicity). Knott techniques may be employed while Serological tests have been developed

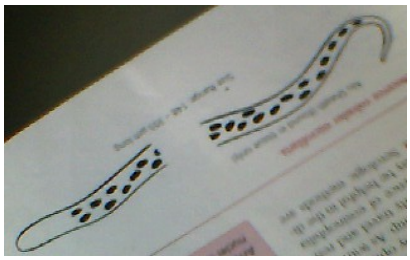
6.4.1 Prevention and control

Personal protection when entering endemic areas, destroying breeding areas of mosquitoes, practice good sanitation and educating inhabitant of endemic areas

6.5 Onchocerca volvulus

6.5.1 Morphology

Microfilaria



Range in length 148-355u in length, does not possess sheath and the body has numerous nuclei but not including the tip or pointed tail

Adult

Thin and wire-like in appearance and typically coil up in knots inside the infected nodules

6.5.2 Life cycle notes

Black fly of genus – simulium responsible for transmission of the parasite, bite inject the larva it migrate to tissue where they complete their development. Adult worm may reside in the lymphatic and subcutaneous tissue. Fertilized female worm lay live microfilaria which takes residence either in the blood or the dermis. Microfilaria exit the body via a blood meal by a appropriate arthropod vector

6.5.3 Epidemiology

Primarily found in Africa, Central America and the vector breeds in running water, particularly in stream and rivers. Person entering these areas are at risk of infections

6.5.4 Clinical symptoms

Localized symptoms from the development of infected nodules, severe allergic reactions. Infection of the eyes can cause eventual blindness (river blindness) and changes in skin appearance

6.5.5 Laboratory diagnosis

Giemsa stained slides from materials/ tissues collected from skin snips, in the eyes; they are best seen by an ophthalmologist. Patients travel and residence history and presence of eosinophilic is also diagnostic while Serological methods are also available

6.5.6 Prevention and control

Personal protection when entering endemic areas, destroying breeding areas of mosquitoes, practice good sanitation, educating inhabitant of endemic areas and the use of insecticides to eradicate parasites

6.6 Mansonella streptocerca

Occurs in west and central Africa, adult worm live in the dermis less than 1mm bellow the skin. Microfilaria is unsheathed, tail end is bent, nuclei extends to the tail tip and the insect vector is the culicoides sp. Streptocerciasis characterized by thickening of the skin, hypopigmnted macules, priritus and papules

6.7Mansonella ozzardi

Occurs in West Indies, central and South America and humans only known natural definitive host. Microfilaria is unsheathed and non periodic, Tail end is sharply pointed and no nuclei at the tail tip. The adult live in subcutaneous and connective tissues and the insect vector is the culicoides sp. Microfilaria found in the blood

Infection associated with cutaneous itching, priritus, articular pain, subcutaneous inflammation, enlarged inguinal lymph nodes, vague abdominal symptoms and high eosinophilia

6.8 Mansonella perstans

Occurs in tropical Africa and South America. The adult worm resides in the body cavities in the peritoneal next to the pleural cavity. Microfilaria found in the blood, they are unsheathed and non –periodic, tail end is blunt and nuclei extend to the tail tip. Insect vector is the culicoides sp. live adult appears to produce little or no host reaction but eosinophilia is common, purities, abdominal pain, urticara calarbar swelling on the arms shoulders, and face have been described.

6.9 Dictophyma renale

Isolated in man and in kidney of dogs and other mammals, reported in America and china .Adult worm is cylindrical in shape and a blood red in color, eggs are ellipsoidal, brownish yellow in color. It resides in the pelvis of the right kidney of many mammals where eggs are excreted in the urine, they develop in water, on ingestion of aquatic oligochaetes, larva hatch in the intestines. Infected larva may be taken up by tadpoles, frogs of fish which serves as paratenic host or transport host

Man acquires infection by ingesting raw or not properly cooked fish and causes hematuria and adrenal colic.

6.10 Gnathostoma spinigerum

Zoonotic infection, cases reported in Japan, Thailand, Malaysia, china, India and Vietnam, Worm may be curved ventrally at one or both ends, eggs are oval brownish and unsegmented, posses a transparent knob-like thickening at one end. Adult reside in the tumors or granulomatous lesions of the stomach walls of cat, dogs and other carnivores. Humans acquire infections by ingesting 2nd intermediate host or paratenic host or drinking water containing Cyclops. Deep cutaneous tunnels in which larva migrate may develop causing larva migrans or creeping eruption. Acute or chronic inflammatory reactions occur around invading larva

Diagnosis is established by demonstration of larva in surgical specimens, demonstration of IgE or IgG antibody by ELISA and Intradermal test using antigens of G. spinigerum.

6.11 Larva migrans

This is a syndrome caused by *Toxocara canis* (dog roundworm) and T. cati (cat roundworm), Larva hatch in the small intestines and penetrate and migrate to the liver May move to the lungs and other body parts, Other round worms are Angiostrongylus cantonensis, Gnathostoma spinigerum and Anisakis simplex where larva settle, they are attached by phagocytic cells, from lungs, to the intestines, in human body, they do not convert to adult worm

6.12 Other non pathogenic microfilaria

1. Gnathostoma doloresi
2. Gnathostoma nipponicum
3. Terdens deminutus
4. Capillaries philippinesis

5. Capillaria hepatica
6. Capillaria aerophila
7. Anisakis simplex
8. Oesophagostonum sp.
9. Trichostrongylus sp.
10. Thelazia callipaeda
11. Dirofilaria immitis
12. Brugia timori