

## *Human Helminth Infections in New Zealand*

Helminth, or worm, infections are a significant source of morbidity in the developing world. They can variously infect the blood and tissue with the group creating the biggest problems being the soil transmitted helminths, commonly known as intestinal worms.

In New Zealand, endemically transmitted worm infections are rare (*Enterobius* or pinworm infections excepted). This is due to a number of factors including controlled sanitation, climate and public health awareness and intervention. For instance, the soil transmitted worms require faeces/sewage to be spread on the ground so that the larval development stages can proceed and then either contaminate food such as vegetables, or penetrate skin. The pork, beef and fish tapeworms, so beloved of medical horror stories because of their size, and usually transmitted by food ingestion, are not considered endemic here. The Schistosomes do not have the correct snail intermediate host to allow local transmission although avian schistosomiasis is present in some NZ lakes and can give rise to a condition in humans popularly called 'duck itch'. This is however a self limiting disease and more of a nuisance than a problem

By far the majority of worms encountered in NZ have been imported; mainly by immigrants, but also tourists and returning Kiwi's. This is highlighted by the helminth isolates found by the Microbiology staff at LabPlus, Auckland, who have the contract for screening refugees. For the 2007-08 year, overwhelmingly the helminths detected came from refugee screening and included 143 *A. lumbricoides*, 148 *Trichuris*, 149 Hookworm, 17 *Strongyloides* larvae, 11 *Schistosoma mansoni*, 8 *Taenia*, 40 *Hymenolepis nana* and 8

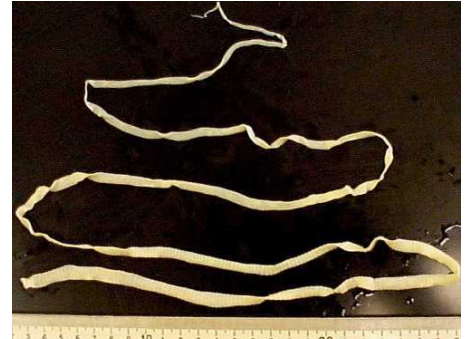
*Trichostrongylus*. Only 2 came from 'other' patients.

It is however important that laboratories do exclude helminths from travelers coming from 'risk' areas and from immigrants. Screening New Zealanders that have never travelled or perhaps have only travelled to other first world countries is very unrewarding. There is a perception however, particularly on web sites of dubious origins and in magazines advertising 'detox' remedies, that parasites, particularly worms, are common here. *This is totally misleading.*

Frequently I get referred suspected worm eggs or larvae or whole worms or parts thereof, for confirmation or identification. Tapeworm segments (always imported) require accurate identification as *Taenia solium*, the pork tapeworm, infection can potentially have serious consequences whereas the beef tapeworm, *T. saginata*, invokes more disgust that serious sequelae. A recent 'find' at a local community laboratory were segments of *Diphyllobothrium latum*, the fish tapeworm, found in the stool of a patient who had travelled through Eastern Europe where it is endemic in some places. The adult worm of this species can reach a length of 10 m or more and contain up to 3000 segments. Most patients are asymptomatic although symptoms and clinical disease may occur.

### ***Worms of clinical significance that are or have been endemic in New Zealand***

The human pinworm, *Enterobius vermicularis*, is a cosmopolitan helminth that is very common in New Zealand. At some stage almost every child will contract this worm, where the signs and symptoms of infection will be irritability and peri-anal itching. Young girls may present with vulval itching. Treatment is easy and should



Beef tapeworm (*Taenia saginata*)

include the whole household in order to break the cycle with asymptomatic or minimally symptomatic individuals (peri-anal itching is not always present in adults). Transmission of the worm eggs is usually hand-to-mouth or by a fomite - airborne route.

Other animals such as horses can also develop pinworm infection but these are host-specific species and will not affect humans.

### ***Toxocara canis and T. cati***

These are the dog and cat intestinal roundworm respectively and analogous in appearance to the human intestinal roundworm, *Ascaris lumbricoides*. They have a complex life cycle and are very common in puppies and kittens. Human infection is rare but young children who indulge in pica, or the eating of soil, and which has been contaminated with *Toxocara* eggs can develop clinical syndromes. Larvae hatch in the intestine and migrate, via the hepatic portal system to the liver and lungs. With dogs and cats they will eventually develop into adult worms in the gut, however, because humans are not the usual host, the larvae become trapped in various internal organs, die and a granulomatous reaction develops. Symptoms depend on the site and extent of organs affected. Fevers, hepatomegally and asthma are associated with liver and lung involvement (visceral larva migrans) and visual disturbances, retinal granuloma and endophthalmitis may

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occur with ocular infection (ocular larva migrans). Laboratory diagnosis is usually by ELISA based serology.

## **Trichinella spiralis**

*Trichinella spiralis* is a potentially very serious human parasite which has been reported as being endemically transmitted on rare occasions in New Zealand. The last reported case was in 2001 when two people from Whangamata were hospitalized with symptoms of trichinosis after eating contaminated pork from a domestic pig. Other cases (1997 and 1964) have involved the consumption of wild pork with parasite transmission involving cats, rats and feral pigs, and were also from the central North Island.

## **Ascaris suum**

Frequently whole roundworms that have been spontaneously passed, usually by children, are submitted to the lab for identification. Provided these patients have not been out of NZ within the past 24 months, it is almost certain that the worms will be *Ascaris suum*, the pig roundworm. *A. suum* is a very common infection in NZ pigs and is nearly identical morphologically to the human roundworm, *A. lumbricoides*.

There is usually a history of close pig or pig-farm association and infection, as with the human ascarid, is ingestion of the third-stage worm eggs. Although humans are not a normal host for *A. suum*, they can undergo the process of development to the intestine, however, a full life cycle and sexual maturity is not attained. Infections are usually solitary, symptoms of infection would be very rare and treatment is not indicated.

It is not generally possible to make a definitive identification with the worm alone, but if ascarid eggs were detected in the patients faeces then it would indicate infection with *A. lumbricoides*, and treatment would be required.

## **Cutaneous larva migrans (CLM)**

CLM is the term given to infection by the third-stage larva of an animal hookworm that penetrates the epidermis after maturation in the soil. It usually presents in returning travelers from tropical and sub-tropical countries although cases have been described from countries with a temperate climate.



The typical presentation is a raised serpiginous lesion, usually on the foot or lower leg, which represents the arrested development of the larva of an animal hookworm that finding itself in the wrong host, is unable to complete its life cycle. It thus ends up "wandering" under the epidermis, creating intense itching, the potential for secondary infection and much consternation to the patient. Treatment is by chemotherapy or cryotherapy. Three endemically transmitted cases have been reported from NZ. Although in each case the species of hookworm was not determined, only one species of canine hookworm, *Uncinaria stenocephala* has been recorded in the NZ literature.

## **Anisakiasis**

Anisakiasis is infection with larval nematodes belonging to several genera within the family Anisakidae. Humans are infected by eating raw, pickled, or salted fish contaminated with third or fourth-stage larvae. Marine mammals are the normal definitive hosts. When the larvae penetrate the stomach wall, they provoke gastritis, causing severe epigastric pain, nausea, vomiting, haematemesis, diarrhoeae, urticaria and chest pain. Once diagnosed, usually at endoscopy, treatment

involves removal of the worm and may require surgical resection.

One case has been reported in the NZ literature but with the consumption of raw fish becoming more common in NZ, further cases of this zoonotic parasite could be expected.

## **Fasciola hepatica - the liver fluke**

Liver flukes are parasitic in the bile ducts of mammals, especially ungulates. They are cosmopolitan in distribution. At a stage in their life cycle, cysts or metacercariae encyst on certain water plants, especially water cress. Infection occurs when animals (or humans) eat the plants with metacercariae attached. Clinical problems arise about one month later and are proportional to the number of metacercariae ingested. They may include RUQ pain, urticaria and myalgia. The liver enlarges and is tender. Jaundice may occur and eosinophilia is present. A few months later bile duct disease occurs.

Prevalence varies widely, is seasonal and dependant on local pasture conditions. Although found in NZ in certain locations, there are no published cases of endemically transmitted fascioliasis.

With the expansion of the dairy industry there is the potential for increased *Fasciola* distribution.

## **Echinococcus granulosus - hydatids**

Hydatids used to be a very serious parasitic disease in NZ with a high morbidity and significant mortality. Aggressive eradication measures were put in place and since 1970 there has been a large drop in the number of cases reported with now only a few each year; all of which would have contracted the disease in their childhood. As from 2002, NZ has been declared provisionally clear of hydatids and the occasional rare cases encountered nowadays are invariably in the aged and often an incidental finding.