

Summary

- *Taenia saginata* : infection only via beef with larvae, resulting in an adult intestinal worm
- Infection with *Taenia solium* larvae present in pork results in an adult intestinal worm: vague abdominal symptoms or asymptomatic
- Feco-oral infection via human feces containing *Taenia solium* eggs results in cysticercosis: epilepsy, subcutaneous nodules, nodules located in muscles, etc.
- *Taenia asiatica* : resembles *Taenia saginata*, but is transmitted via pigs. No cysticercosis in humans.

Life cycle



Taenia saginata. The adult cestode can grow to several meters in length. Copyright ITM

Eating insufficiently cooked infected beef (*Taenia saginata*) or pork (*T. solium*) leads to

infection with adult tapeworms. Humans are the natural final host and the only carriers of these cestodes, and thus also the only distributors of their eggs. The adult worms live in the small intestine and are several meters long. The pre-patent period is approximately 3 months.

A third species of human *Taenia* has been described in Asia (*Taenia asiatica*). The clinical importance of this has still to be determined. At present insufficient is known about *T. asiatica*. The adult worm is morphologically very similar to *T. saginata*. The life cycle of this cestode is different, however. Unlike *T. saginata*, which causes infections in the skeletal muscles of cattle, *T. asiatica* affects the liver, omentum, serosa and lungs of pigs. At present, *Taenia asiatica* does not seem to cause neurocysticercosis in humans, but more study is needed.

Clinical aspects

Below, the symptoms present due to infection with an adult worm are described.

Most carriers of adult worms are asymptomatic. The length of an adult worm is usually ≤ 5 m for *T. saginata* (however, it may reach up to 25 m) and 2 to 7 m for *T. solium*. Some people present nausea, anorexia or epigastric pain. The loose segments of *T. saginata* (not of *T. solium*) may actively creep outside through the anus, and cause local discomfort. Each segment contains approximately 60,000 eggs. *Taenia* may have a role in malnutrition (5 to 7 cm of worm has to be produced every day, for which food is needed), but only if there are also other reasons for malnutrition. In only 15% of patients peripheral eosinophilia is present. Note that while many humans can carry *T. solium* adult worms without any apparent effect, these people are the only source of eggs. When ingested, these eggs can produce larvae both in the natural host and in humans. The larvae are the cause of cysticercosis in both pig and human. Human-to-human transmission can therefore take place so that cysticercosis can occur in people who do not eat pork or who have no pigs in their surroundings.

Diagnosis of infection with an adult worm

Finding proglottids in the feces, or a history of motile proglottids crawling out of the anus is important.

Eggs are sometimes found in the stools. The eggs are sticky and easily get onto the peri-anal skin. They can be detected in the peri-anal region with a Scotch tape test. There is no morphological difference between the eggs of *T. saginata* and those of *T. solium*. Differentiation can be made by the proglottids: a uterus with 10 branches or less in the dangerous *T. solium* and a highly branched uterus (12 or more) in the harmless *T. saginata*. *Taenia* antigens may be found in the feces. Only rarely can the tapeworm's head be discovered. The undamaged scolex of *T. solium* bears two rows of hooks. The scolex of *T. saginata* is hookless. However, dysmorphic tape worms are sometimes encountered.

Treatment

- Niclosamide (Yomesan®) 4 tablets each of 500 mg will be taken together and chewed well. If the patient should vomit there is a theoretical risk that *T. solium* eggs will pass back into the stomach, activate and subsequently give rise to cysticercosis.
- Praziquantel (Biltricide®), in a very low dose (5-10 mg/kg), is also very effective. Praziquantel in a higher dose can sometimes provoke complications - such as sudden neurological symptoms - should cysticerci be present in the brain. This complication seems however extremely rare in endemic areas where praziquantel mass treatment is used to control schistosomiasis.

For successful treatment, the scolex must be destroyed and eliminated; a residual scolex can result in regrowth of the entire tapeworm. Some experts recommend purgative treatment to be associated with antihelminthic drugs to have more probability to obtain the scolex in the stool, but this method is far from being universally accepted.