Trichuris trichiura

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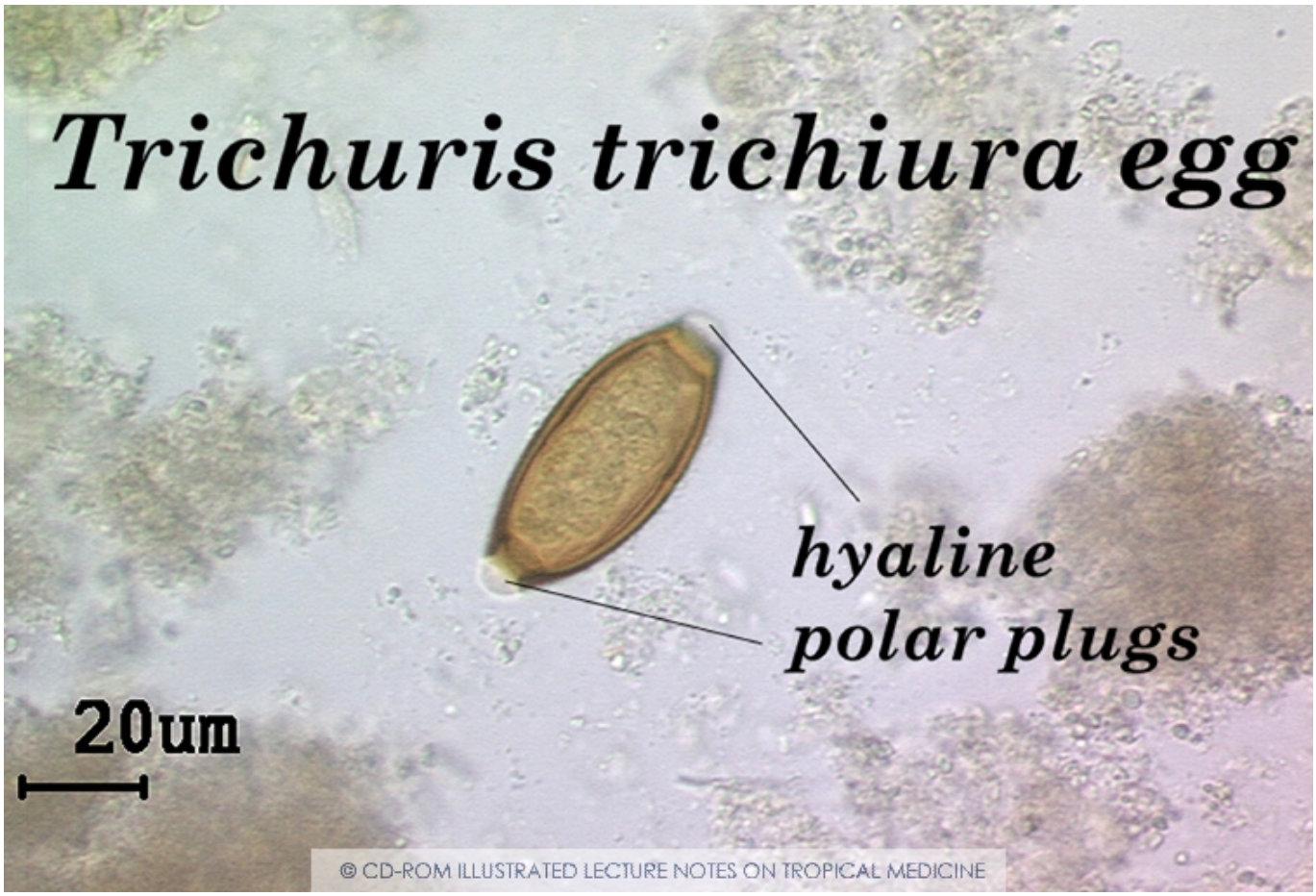
Summary

- Adult worms measure approximately 4 cm (sometimes seen in stool) – colon
- Faeco-oral transmission via eggs.
- Generally asymptomatic
- In severe infections diarrhoea and sometimes anal prolapse
- Role in bacterial dysentery or invasive amebiasis?

Life cycle



Trichuris trichiura egg with its typical polar caps, suggesting a lemon-shape. Copyright ITM

Trichuris suis, related to Trichuris trichiura, a nematode which frequently infects humans. Copyright ITM

Trichuris trichiura is a cosmopolitan nematode, but is rare in subarctic areas. This is an ancient parasite and this is demonstrated in that it also occurs outside the tropics is that eggs were found in Ötzi the iceman, a bronze-age mummy discovered in the Italian Alps, and in coprolites (fossilized faeces) in prehistoric salt mines in Austria.

The eggs are eliminated with the faeces. Infection is via the oral route, after obligatory maturation in the outside world. Eggs embryonate in the external environment for 10-30 days, depending upon temperature: slower when colder; no development above 37°C. It is possible that in nature (as opposed to the lab) much longer periods are possible. Many eggs remain viable in the soil for longer than a year; depending upon local humidity. In Bangladesh, a study of 2400 houseflies discovered

that 47% of the insects were carrying eggs (flies acting as mechanical transport vectors).

The embryonated eggs hatch after ingestion. It is likely that the hatching worm dissolved the polar caps with enzymes. The fate of the larvae after hatching the first 5-10 days is controversial. No studies have been done on humans. Serial necropsy of dogs infected with *T. vulpis* suggest that larvae first penetrate the mucosal duodenal epithelium, re-emerge into the lumen 8-10 days later and settle in the caecum. However, this data is questioned and it is unclear if this can be generalized to human infections. More study is required to answer some basic questions.

Larvae will undergo four molts. Egg laying begins about 2 months after infection. Experimental infection in human volunteers showed a somewhat longer prepatent period of 120-130 days. It is estimated that 5-22% of ingested embryonated eggs develop to patency. A female worm measures 3-5 cm and sheds between 3000-20,000 eggs per day. Since the uterus of a female worm contains approximately 60,000 eggs at any one time, this implies that between 5 and 30% of the eggs have to be replaced on a daily basis. The adult worm has a thin whip-like head with which it buries itself in the mucosa of the large intestine especially the caecum. The worm survives for 1-4 years on average, although extremes of 20 years are known.

Clinical aspects

Most infected humans remain asymptomatic. Only in severe infections (> 1000 worms; >10,000 eggs per gram of faeces) do symptoms occur: these include diarrhoea (dysentery type), malnutrition or anaemia. In undernourished children with chronic diarrhoea and tenesmus there is sometimes prolapse of the rectum, in which the worms can be seen on the prolapsed mucosa.

Diagnosis

Diagnosis is based on faecal examination. No concentration technique is necessary for clinically relevant infections. The Kato-Katz technique can be used to quantify egg numbers. Sometimes the worms can be seen on the rectal mucosa (rectoscopy or during anal prolapse). Normally there is no eosinophilia (since there is no larval migration).

Treatment

- Mebendazole 100 mg BD x 3 days, or 500 mg single dose (but less active: 65-70%)
- Albendazole 400 mg BD x 3 days (for cure rate above 90%)
- Ivermectine is also less active
- The combination treatment albendazole plus oxantel pamoate showed higher cure rates and higher

egg reduction rates than mebendazole or albendazole alone.
- The new tribendimidine drug has limited activity

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