

CASE REPORT

TAENIA SAGINATA INFECTION IN A 14-MONTH-OLD TODDLER

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Abstract. A 14-month-old female toddler presented with a 3-day history of passing gravid proglottids of *Taenia saginata*. Neither she nor her family members had a history of eating raw beef or other raw meat. Single doses of praziquantel and niclosamide were administered. To the best of our knowledge, this is the youngest described patient with *T. saginata* infection to date.

Keywords: *Taenia saginata*, taeniasis, cestodes, children

INTRODUCTION

Human taeniasis is an important food-borne parasitic zoonosis in Thailand caused by: *Taenia saginata*, *T. solium* and *T. asiatica* (Anantaphruti, 2013). A previous study found the prevalence of taeniasis to be higher in northern and northeastern (1-2%) than central Thailand (< 1%) and rare in southern Thailand (Department of Communicable Disease Control, 2001). *T. saginata* infections were more prevalent than *T. solium* infections in Thailand (Anantaphruti, 2013) and are transmitted by ingestion of raw or improperly cooked beef containing viable *Cysticercus bovis* infective larval stages in the muscle (Beaver and Jung, 1984). Poor personal hygiene is the most important

factor in transmission of taeniasis (Beaver and Jung, 1984). In Thailand, taeniasis is more common among males than females with the highest prevalence being among those aged 45-64 years (Radomyos *et al*, 1994). The youngest child ever reported to have taeniasis world-wide was a 2 year old (Charoenlarp *et al*, 1989). We report here a 14-month-old girl with *T. saginata* infection.

CASE REPORT

A 14-month-old girl residing in Bangkok was brought to the Hospital for Tropical Diseases, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand because of expulsion of gravid proglottids from her anus. Each gravid proglottid was creamy white in color and exhibited movement. Her mother stated she had passed proglottids twice previously, the first time was 15 days previously when a proglottid was seen in the feces in the diaper at a nursery (Fig 1A).

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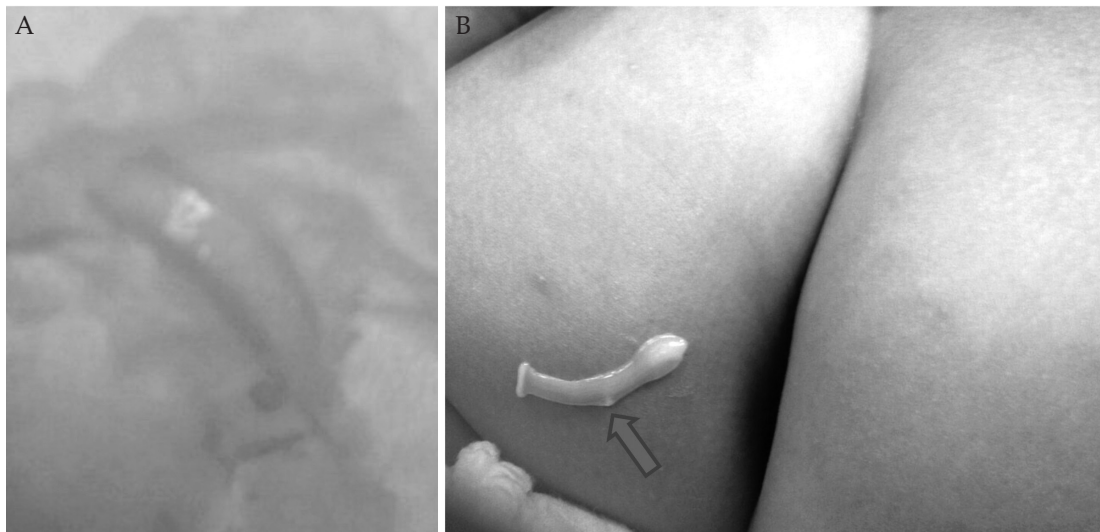


Fig 1—Expelled proglottid of *T. saginata*: in the diaper (A) and sticking the buttock (B) with actively repeating contractile movements and the uterus containing 18-32 lateral branches with a genital pore (arrow).

The second occurrence was 13 days previously, when the caregiver at the nursery observed a moving proglottid passing from the child's anus; the proglottid was discarded (Fig 1B). A video of the moving proglottid was made and sent to the child's mother.

Upon presentation to the hospital, the child's mother provided a segment of the proglottid placed in a vial with normal saline. The patient had no history of abdominal pain, nausea, vomiting, or weight loss. Her parents denied consumption of raw beef or other meat by any family members. The child stayed at the nursery of a university in Bangkok during the daytime. All the caregivers at the nursery denied a history of parasitic infections or consumption of improperly cooked or raw food.

The child's height was in the 25th-50th percentile and the weight was in the 50th-75th percentile. Her vital signs were all within normal limits. On examination, she

appeared well without icterus, abdominal distension or peritonitis.

Parasitological examination of the segment provided by the mother confirmed a gravid proglottid of *T. saginata*. A stool examination was performed but no eggs of any helminthes were detected.

The child was treated with a single dose of praziquantel (20 mg/kg) instead of niclosamide, the recommended treatment for taeniasis, because niclosamide is not available at the Hospital for Tropical Diseases. The patient's mother administered the drug once, but the treatment was unsuccessful because the child vomited immediately. Another attempt was made 2 days later with the same dose of praziquantel. The mother was advised to observe the child's stools for an expelled worm. Two weeks later, the child had not passed any parasites. A repeat stool examination still showed no parasites. The child was then given a single dose of niclosamide (50 mg/kg). It was a drug being used for a

taeniasis field study by Assoc Prof Paron Dekumyoy. Following the niclosamide, the child was given 10 ml lactulose which resulted in passing stool within 2 hours of ingestion. Still no worm expulsion was observed. Coproparasitoscopic studies were performed at the Department of Helminthology, Faculty of Tropical Medicine, Mahidol University, showing no eggs or proglottids in the feces.

DISCUSSION

Taeniasis can occur in any part of the world (Beaver and Jung, 1984). The parasite has developed a high degree of dependence on the human intestine which is the definitive host (Loos-Frank, 2000). At present, *T. saginata*, *T. solium*, and *T. asiatica* are the known causes of human taeniasis (Yamasaki *et al*, 2004). Clinical symptoms and signs are nonspecific and depend on the worm burden, location of infection, and reaction of the local tissue. Most infected people are asymptomatic, as in the present case, because of the low numbers of parasites. It is unusual for asymptomatic carriers to be aware they have a tapeworm unless they expell are proglottids or eggs. Heavy infections may be associated with abdominal pain, nausea, vomiting, diarrhea, weakness, and inflammation of the intestinal mucosa (Beaver *et al*, 1984; Miyasaki, 1991). Appendicitis and cholecystitis may uncommonly occur in taeniasis (Pawlowski and Schultz, 1972).

The proglottids found in the patient described here were long and rectangular-shaped. *T. saginata* and *T. asiatica* can be confused with each other due to their morphological similarities, but their intermediate hosts are different (swine for *T. asiatica* and cattle for *T. saginata*) (Ito *et al*, 2004). Microscopic examination of the gravid proglottid pressed between two

slides is the accurate method for diagnosis (CDC, 2013). The pattern and number of lateral branches of the gravid proglottid uterus allowed it to be distinguished from other species of *Taenia* (Miyasaki, 1991). The toddler's parents denied consumption of beef by the family, but the child could have chewed on minced pork. Interestingly, a previous study reported adult taeniid tapeworms expelled from local people in Southeast Asia appeared to be *T. saginata* even though the population primarily consumed pork (Fan, 1988).

The patient described here attended a university nursery from Monday to Friday and was with her parents each evening and on weekends. No pets were kept at home. The mode of transmission may have been accidental ingestion of contaminated food or drinking water containing cysticerci of *C. bovis*, which is usually 7-10 x 4-6 mm in size (Miyasaki, 1991). The child could have contracted infection by touching a contaminated surface or via a housefly or cockroach, which can transport the parasite's eggs, larval nematodes or larval insects (Maipanich *et al*, 2010, 2012, 2014). Thumb sucking and nail biting may increase the risk for infection.

Once a *C. bovis* cyst has been ingested, the scolex everts in the upper small intestine and attaches to the mucosa by four suckers (Miyasaki, 1991). New proglottids are then continuously generated at the neck to create the long, segmented body (strobila) (Beaver *et al*, 1984). The prepatent period is approximately 2.0 to 2.5 months, after which time the eggs and gravid proglottids begin to pass out with the feces (Beaver *et al*, 1984). In the present case, the gravid proglottids exited the body, but the eggs remained inside the body and were undetected during the stool examination. Only a single proglot-

tid was passed in the feces each time; six to nine proglottids are usually released in the stool per day among average patients (Miyasaki *et al*, 1991). The *T. saginata* adult in this patient was probably at the beginning of maturity and the small lumen of the small intestine in this child may have limited growth of many proglottids.

Diagnosis of taeniasis is made by a history of consuming raw or undercooked beef, expulsion of proglottids in the feces, characteristic clinical signs and symptoms, and relevant findings on parasitological examination. A diagnosis of *T. saginata* infection is made by discovering gravid proglottids in the stool that contain 18 to 22 uterine branches. Post-treatment expulsion of a worm containing the scolex without an armed rostellum also confirms the specific diagnosis (Beaver *et al*, 1984). Dislodgement of the scolex from the wall of the intestine was expected after treatment in this child but no scolex was seen.

The treatment of choice for taeniasis is a single (50 mg/kg) dose of niclosamide chewed thoroughly with 94.76% cure rate (Varma *et al*, 1990). Another effective treatment is praziquantel (5-10 mg/kg) (Groll, 1980). Benzimidazole carbamates, such as albendazole and mebendazole, are often used when the drug of choice is not available, but the cure rate is only 71.42% (Arambulo *et al*, 1978; Varma *et al*, 1990).

Beef inspection programs at slaughterhouses should be strictly conducted. Freezing the meat to -5°C for 4 days, -15°C for 3 days, or -24°C for 1 day can destroy the larvae (WHO, 1983; Craig *et al*, 1984). Appropriate treatment of taeniasis can eliminate the reservoir source for infection (Sotelo *et al*, 1986). It is important to distinguish accurately between *T. solium* or *T. asiatica* and *T. saginata* because the severity is different. *T. solium* is neurotropic

and myotropic, *T. asiatica* is hepatotropic and viscerotropic, and *T. saginata* is less clinically important (Ito and Craig, 2003).

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