

Case Report: A Symptomatic Case of *Hymenolepis diminuta* Infection in an Urban-Dwelling Adult in Malaysia

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Abstract. A case of *Hymenolepis diminuta* infection in a 43-year-old Malaysian male with persistent abdominal colicky pain is reported. Endoscopy revealed whitish worms in the lumen of the small intestine, which were identified as *H. diminuta* after microscopy. Patient was successfully treated with a single dose of praziquantel (25 mg/kg).

Hymenolepis diminuta is a common rat and mice tapeworm with a worldwide distribution throughout the world; however, it is rarely found in man.^{1,2} The tapeworm has an indirect life cycle in which it requires the obligatory intermediate host (arthropods) as in addition to the definitive host (rodents). Beetles (*Tenebrio* and *Tribolium*), fleas (*Ctenocephalides*, *Xenopsylla*, and *Pulex*), cockroaches, or caterpillars may serve as the intermediate hosts after ingestion of *H. diminuta* eggs excreted in the rodent's feces.¹ These eggs then develop into the cysticercoid larvae stage in the arthropod's body cavity. After ingestion of these infected arthropods by the rodents, the cysticercoids develop into adult worms and eggs are released in the stool.¹ In a study done by Pappas and Barley, transmission and dispersal of *H. diminuta* have also been observed via ingestion of eggs in feces of infected beetles by other beetles.³

On May 20, 2013, a 43-year-old Chinese male, who lives in an urban housing area in Selangor, was seen by a gastroenterologist at a private hospital for persistent abdominal colic for the past 2–3 months. The patient had no history of pruritus ani, vomiting, diarrhea, fever, or passing of worm during defecation. Before this, the patient had been to a few private clinics where abdominal ultrasound was done. Despite normal ultrasound, his symptom persisted. He later went to another private hospital and was diagnosed as constipation and was given lactulose. During his current presentation, the attending gastroenterologist performed a full blood count and an endoscopy. The full blood count revealed hemoglobin 13.9 g/dL, total leukocyte count $7.8 \times 10^9/L$, and total platelet count $293 \times 10^9/L$ (neutrophils 73%, lymphocytes 19%, monocytes 6%, eosinophils 1%, and basophils 1%). Images taken from the endoscopy revealed many small unidentified whitish worms in the lumen of the small intestine (Figure 1A). A worm was removed and sent to the Parasite Southeast Asia Diagnostic Laboratory, Department of Parasitology, Faculty of Medicine, University of Malaya, Kuala Lumpur, on the same day for further identification.

In the laboratory, the whitish worm was placed in a petri dish and subjected for microscopic examination. Scolex with four cup-shaped suckers was observed ($\times 40$ magnification) (Figure 1B). Numerous eggs were observed in the mature proglottids of the worm ($\times 100$ magnification) (Figure 1C). The eggs measured on average 70–80 μm and each contained six hooklets and was surrounded by a thin inner membrane and a thick outer shell ($\times 400$ magnification) (Figure 1D). Polar filaments were not seen in the eggs. On the basis of the characteristics of the eggs, they were identified as *H. diminuta*. On May 22, 2013, the patient was requested to provide his stool sample and of his family members. Similar eggs were seen on microscopic examination of the patient's stool sample after a concentration technique. Examination of stool samples from other family members was negative. The patient was prescribed with a single dose of praziquantel (25 mg/kg of body weight). Further stool examination carried out a month after treatment (June 20, 2013) was negative for eggs, and the patient remained asymptomatic.

Although uncommon, *H. diminuta* can cause infection in humans with prevalence ranging from < 1% to 6%. Human infection was highly reported among low-socioeconomic populations in tropical and subtropical countries.^{4,5} Nevertheless, human cases have also been identified in developed countries such as the United States and Europe as reviewed by Riley and Shannon¹ and Keller.⁶ Majority of the human cases were acquired through accidental ingestion of intermediate hosts containing *H. diminuta* cysticercoid larvae, as the eggs of this tapeworm are not infectious to humans.⁶ In fact, reports have shown that children are the ones frequently associated with *H. diminuta* infection rather than adults, probably due to the unhygienic eating habit.^{5,7,8}

In Malaysia, there have been only three human *H. diminuta* cases reported since 1978 and all were from rural and semirural areas.^{9–11} The first human case was an incidental finding after a large fecal screening involving oil palm workers.⁹ The latter two cases were reported in two female children aged 21–24 months with one child showing symptoms including abdominal discomfort and itchiness over the abdomen.^{10,11} To the best of our knowledge, this is the first detailed report of *H. diminuta* infection in an adult from an urban area in Malaysia.

Besides Malaysia, *H. diminuta* infection in humans have been sporadically reported in a few southeast Asian (SEA) countries including Thailand,⁸ Singapore,¹² the Philippines,¹

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