

Hymenolepis diminuta Infection in a Child Living in the Urban Area of Rome, Italy

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We report a case of *Hymenolepis diminuta* infection in an Italian child affected by tuberous sclerosis. Praziquantel is the drug of choice for the treatment of *H. diminuta* infection. However, considering the patient's neurological disease, we decided to use not praziquantel but niclosamide, which proved equally effective.

CASE REPORT

A 2-year-old boy living in the urban area of Rome, Italy, was referred to the Department of Tropical and Infectious Diseases of the University of Rome "La Sapienza" owing to the emission of tapeworm proglottids in his stool. In the previous 2 weeks, the patient had episodes of itching and nocturnal restlessness. His medical history was positive for tuberous sclerosis with no overt neurological complications other than seizures that were controlled with diazepam. The results of a physical examination were normal. No abnormalities were revealed by blood and urine analyses. Macroscopic and microscopic tapeworm examinations were suggestive of *Hymenolepis diminuta* proglottids. The parasitological examination of concentrated stool samples revealed spherical eggs, 70 μ m in diameter, with a striated outer membrane and a thin inner membrane and containing six central hooklets but no polar filaments (Fig. 1); they were identified as *H. diminuta* eggs and differentiated from *H. nana* eggs, which have a similar appearance but are smaller and have two evident polar thickenings, from each of which arise four to eight polar filaments. Owing to the possible convulsant effect of praziquantel, oral niclosamide (1 g for the first day, 500 mg/day for the following 6 days) was prescribed (1, 3). Parasitological stool examinations 7, 9, 15, and 30 days after the end of treatment were negative for *H. diminuta* eggs.

H. diminuta (rat tapeworm) is a rodent parasite for which arthropods act as intermediate hosts. Eggs ingested by the arthropods develop into cysticercoid larvae. Rodents become infected by ingesting the arthropods; humans, usually children, can accidentally be infected through the same mechanism. Rodents, particularly rats, are the definitive hosts and natural reservoirs of *H. diminuta*. Coprophilic arthropods (fleas, lepidoptera, and coleoptera) act as intermediate hosts. When an infected arthropod is eaten by the definitive host, the cysticercoids present in its body cavity develop into an adult worm,

whose eggs are passed in the stool. It has recently been reported that beetle-to-beetle transmission of *H. diminuta* occurs in natural environments and that eggs can be dispersed in the environment via beetle feces (13), thereby representing a source of additional infections and a mechanism of egg dispersal.

H. diminuta infection in humans is uncommon (5, 8, 18); only a few hundred cases have been reported (2, 7, 9–12, 15–17). *H. nana* is more commonly reported as a cause of human infection since its transmission does not require any intermediate host and it can be spread directly from person to person. In developed countries, *H. diminuta* infection is very rare and is limited to rural or degraded areas. In Italy, a human *H. diminuta* infection was last reported as long as 10 years ago (4, 14). Our patient lived in the urban area of Rome. Evidence of a source of infection (rat infestation) has been found in other human cases observed in developed countries. In our case, the house and its surroundings, as well as the places habitually visited by the child, were inspected but no evidence of the presence of rodents or other possible sources of infection were found.

The human form of *H. diminuta* infection is often asymptomatic, but abdominal pain, irritability, itching, and eosino-



FIG. 1. *H. diminuta* egg found in the patient's stool at a magnification of $\times 400$. The egg contains six central hooklets but no polar filaments.

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philia have been reported. Praziquantel is the drug of choice for the treatment of *H. diminuta* infection. In our case, considering the patient's neurological disease, we used not praziquantel but niclosamide, which proved to be equally effective (6).

We recommend that, in order to improve our knowledge of the epidemiology and transmission routes of this rare infection, any cases of *H. diminuta* infection be reported.

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