

Hymenolepis diminuta infection in a school-going child: A rare case report

Ramakrishnan Kalaivani, Lakshmanaperumal Nandhini, Kunigal Srinivasaiah Seetha

Mahatma Gandhi Medical College and Hospital, Puducherry, India

CASE STUDY

Please cite this paper as: Kalaivani R, Nandhini L, Seetha KS. *Hymenolepis diminuta* infection in a school-going child: A rare case report. AMJ 2014;7(9):379–381. <http://doi.org/10.21767/AMJ.2014.2136>

Corresponding Author:

R Kalaivani
 Assistant Professor
 Department of Microbiology
 Mahatma Gandhi Medical College and Hospital
 Puducherry, India 607402
 Email: Kalaimicro21@gmail.com

ABSTRACT

Hymenolepis diminuta (*H. diminuta*) is a common parasite of rats and mice. It is very rare among humans. The life cycle of this parasite is completed in two hosts. Human beings are accidentally infected due to ingestion of infected fleas. Most of the time human infections are asymptomatic. We report a case of *Hymenolepis diminuta* infection in a school-going 10-year-old girl from a coastal village in south Tamil Nadu. Demonstration of *H. diminuta* eggs in the stool is the important diagnostic tool. Absence of polar filaments confirms the *Hymenolepis diminuta*. Praziquantal is the drug of choice.

Key Words

Hymenolepis diminuta, rat tapeworm

Implications for Practice:

1. What is known about this subject?

Children are accidental hosts of *Hymenolepis diminuta*. It is very rare among human beings. We found only a few cases reported from countries like Australia, the United States, Italy, Spain, Jamaica, Thailand, and Indonesia.

2. What new information is offered in this study?

Though it is very rare among humans, our hope is that our study will act as an important stimulus to initiate more

community studies like this in the future, especially in a developing country like India.

3. What are the implications for research, policy, or practice?

Because of its rare incidence, this case of *H. diminuta* has implications for public health. As a preventive measure, eating contaminated grains and cereals needs to be avoided. With proper inspection of grains, cereals, and rodent control measures, along with proper sanitation and personal hygiene, these parasitic infections can be prevented without morbidity.

Background

Hymenolepis diminuta (*H. diminuta*) is primarily a rodent parasite called rat tapeworm. Though it is present worldwide, very few cases have been reported and only from specific countries.^{1,2} *Hymenolepis diminuta* infestation is most common among children.³ Most reported cases were asymptomatic. Common symptoms were mild diarrhea, abdominal pain, and vague gastrointestinal manifestations. Diagnosis is usually made by demonstration of eggs in the feces by microscopy.^{1,2,3}

Case details

A 10-year-old female presented to our clinic with a history of intermittent abdominal pain with loss of appetite. On examination, the child weighed 25kg and was 134cm in height, with mild pallor but no icterus. Her abdomen was soft with no organomegaly. Cardiovascular, respiratory, and central nervous systems were found to be normal. Her routine blood investigations were within normal limits except for eosinophilia, which is seen in parasitic infestations.

From the child's stool sample, we identified a spherical, thick-shelled, yellow coloured egg measuring 70µm in diameter, with six central hooklets without any polar filaments (Figure 1). We asked for two consecutive stool samples after a week. These stool samples also showed similar morphology of eggs. Thus, we finally diagnosed the child with *Hymenolepis diminuta* infestation. The absence of polar filaments is an important finding that differentiates this parasitic egg from *Hymenolepis nana* egg, which

measures 30–45µm in diameter, with four to eight polar filaments emanating from little knobs at either end of the embryophore.²

All the stool samples were processed by formal-ether concentration method by Ritchie.^{1,2} Samples were screened by both saline and iodine wet-mount preparations in a systematic manner.

Figure 1: *Hymenolepis diminuta* egg from a school-going child's stool sample (under 40X magnification)



The tablet Cysticide (Praziquantal) was prescribed. The patient tolerated the medication well without any adverse drug reactions. Following drug therapy, after 15 days two consecutive stool samples were received and subjected to microscopic examination. Both were found to be negative for ova and cysts. Screening for the siblings was also performed; these also showed no ova and no cysts. Health education regarding proper personal hygiene and sanitation was given to the family members as a preventive measure.

Discussion

Hymenolepis diminuta is rare in humans. It is more prevalent worldwide among rodents.⁴ Humans, usually children, are accidental hosts by ingestion of an infected intermediate host. Countries such as Australia, the United States, Spain, Italy, Malaysia, Thailand, Jamaica, and Indonesia have reported cases of *H. diminuta* infection.^{5–10} Reports from different populations have shown an incidence of 0.001–5.5 per cent *H. diminuta* parasitism.^{11,12} In a study by Chandler with 10,000 stool samples, 23 cases were reported.¹³ Aside from those cases, only a few cases in India have been documented.^{4,13–16} Foods such as grains and cereals contaminated with infected insects are the chief sources of infection.² Live beetle ingestion in Southeast Asia, especially in China, is an interesting mode of transmission of *H. diminuta*. In our case there was strong evidence of rats and insects dwelling around the residential area, therefore the source could have been the rats defecating at the larval stage.

Cockroaches, beetles, various species of fleas, and other arthropods are the intermediate hosts. Rats and mice act as the most common definitive hosts. The definitive hosts get infected by ingesting the intermediate hosts with cysticercoids, and thus adult worms develop in the small intestines of the definitive host where eggs are laid. Eggs are infective to man. The adult worm measures about 20–60cm in length. The scolex has four suckers and an unarmed rostellum. The strobila contains 800 to 1,000 proglottids. Mature proglottids contain an ovary at the centre and one testis on each side. The demonstration of *H. diminuta* eggs in the stool is the primary diagnostic tool.^{1–3} Most of the time this condition may be asymptomatic, but vague abdominal pain, extra intestinal manifestations like pruritus, irritation, and eosinophilia may be present.¹⁷ This child only had eosinophilia. Praziquantal is the drug of choice (15–25mg/kg single dose preferably in the morning). This is much simpler compared to five days treatment needed with niclosamide for eradication of *Hymenolepis species* parasitic infection.

Conclusion

We report this rare case of *Hymenolepis diminuta* infection due to its rare incidence in humans and its relevance to public health. As a preventive measure, eating contaminated grains and cereals needs to be avoided. With proper inspection of grains, cereals, and rodent control measures, along with proper sanitation and personal hygiene, these parasitic infections can be prevented without morbidity.

References

1. Garcia LS. Diagnostic Medical Parasitology. 5th ed. Washington, DC: ASM Press; 2007. Chapter 13, Intestinal cestodes; pp. 376–7.
2. Chatterjee KD. Parasitology: Protozoology & Helminthology. 13th ed. New Delhi: CBS Publishers & Distributors Private Limited; 2009; p. 169.
3. Parija SC. Textbook of Medical Parasitology, Protozoology & Helminthology. 2nd edition. New Delhi: All India Publishers & Distributors; 2010: p. 233.
4. Watwe S, Dardi CK. *Hymenolepis diminuta* in a child from rural area- case report. Indian J Pathol Microbiol. 2008 Jan-Mar;51(1):149–50.
5. Tena D, Pérez Simón M, Gimeno C, Pérez Pomata MT, Illescas S, Amondarain I, González A, Domínguez J, Bisquert J. Human infection with *Hymenolepis diminuta*: Case report from Spain. J Clin Microbiol. 1998 Aug;36(8):2375–6.
6. Marangi M, Zechini B, Fileti A, Quaranta G, Aceti A. *Hymenolepis diminuta* infection in a child living in the urban area of Rome, Italy. J Clin Microbiol. 2003 Aug;41(8):3994–5.

7. Kan SK, Kok RT, Marto S, Thomas I, Teo WW. The first report in *Hymenolepis diminuta* infection in Sabah, Malaysia. *Trans R Soc Trop Med Hyg.* 1981;75(4):609.
8. Tesjaroen S, Chareonlarp K, Yoolek A, Mai-iam W, Lertlaituam P. Fifth and sixth discoveries of *Hymenolepis diminuta* in Thai people. *J Med Assoc Thai.* 1987 Jan;70(1):49–50.
9. Cohen IP. A case report of *Hymenolepis diminuta* in a child in St. James Parish, Jamaica. *J La State Med Soc.* 1989 Mar;141(3):23–4.
10. Stafford E, Sudomo EM, Marsi S, Brown RJ. Human parasitosis in Bali, Indonesia. *South East Asian J Trop Medicine Public Health* 1980;11:319–23.
11. Lo CT, Ayele Y, Birrie H. Helminthans snail survey in Harerge region of Ethiopia with special reference to Schistosomiasis. *Ethiop Med J.* 1989 Apr;27(2):7–83.
12. McMillan B, Kelly A, Walkar JC. Prevalence of *Hymenolepis diminuta* infection in man in the New Guinea Highlands. *Trop Geogr Med.* 1971 Dec;23(4):390–2.
13. Chandler AC. The distribution of *H. diminuta* infections in India and discussion of its epidemiological significance. *Indian J Med Res* 1927; 14:973.
14. Sane SY, Irani S, Jain N, Shah KN. *Hymenolepis diminuta*: A rare zoonotic infection report of a case. *Indian Pediatr* 1984; 51:743–5.
15. Varghese SL, Sudha P, Padmaja P, Jaiswal PK, Kuruvilla T. *Hymenolepis diminuta* infestation in a child. *J. Commun Dis* 1998; 30:201–3.
16. Tiwari S, Karuna T, Rautaraya B. *Hymenolepis diminuta* infection in a child from a rural area: a rare case report. *J Lab Physicians.* 2014 Jan;6(1):58–9.
17. Patamia I, Cappello E, Castellano-Chiodo D, Greco F, Nigro L, Cacopardo B. A Human Case of *Hymenolepis diminuta* in a Child from Eastern Sicily. *Korean J Parasitol.* 2010 Jun;48(2):167–9.

ACKNOWLEDGEMENTS

We sincerely thank our SBV University management and our Honorable Vice-Chancellor (advisor) for their valuable motivation, support and for providing adequate funding. Prof E Michael (supervisor), and Diana La Torre, Notre Dame University for financial support, Dr Rauf and the FERAL team for financial support and collecting stool samples from field. Finally, we thank Dr Pani (consultant advisor) from QUEST International University, Perak, for his valuable guidance.

PEER REVIEW

Not commissioned. Externally peer reviewed.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

PATIENT CONSENT

The authors, *Kalaivani R, Nandhini L, Seetha KS*, declare that:

1. They have obtained written, informed consent for the publication of the details relating to the patient(s) in this report.
2. All possible steps have been taken to safeguard the identity of the patient(s).
3. This submission is compliant with the requirements of local research ethics committees.