Hymenolepiosis in a group of albino rats (*Rattus albus*): a study

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Abstract A study was carried out on adult albino Wistar laboratory rats to know the incidence of hymenolepiosis, a zoonotic disease which were brought for experiment purpose. Faecal samples of 95 rats examined for parasitic infection by simple floatation technique in which 32 were positive (33.68 %) for hymenolepiosis. Identification of species of *Hymenolepis* was done based on morphology of egg. The highest prevalence of *Hymenolepis diminuta* (23.15 %) was recorded followed by *Hymenolepis nana* (10.52 %). Heavy infection with *Hymenolepis* in rats draws attention in view of public health importance in contact persons.

Keywords *Hymenolepis nana* · *Hymenolepis diminuta* · Albino rats · Zoonosis

Introduction

Hymenolepiosis, is a disease caused by cestode parasites *Hymenolepis diminuta* and *H. nana* that are potentially zoonotic. Generally hymenolepiosis is associated with gastrointestinal disturbances in intended host. *Hymenolepis*

diminuta's definitive hosts are rodents. Rarely, man becomes infected due to accidental ingestion of infected beetles.

Hymenolepis nana is common in man and rats and is a unique tape worm with a direct life cycle where the eggs eaten by human or rodents develop to cysticercoids within the villi and develop to adults in the lumen (Palmer et al. 2011). *Hymenolepis nana* was reported to be a common cause of pediatric diarrhoea in urban slum dwellings in India (Mirza and Samantray 2002) and an important cause of infant mortality particularly in rural area of Mexico (Martinez-Barbosa et al. 2010). Highest prevalence occurs in human in poor areas and in institutions due to the possible direct faeco-oral and human–human transfer. Studies were carried out in different parts of world to identify and determine the prevalence and associated risk factors of gastrointestinal parasites of laboratory animals especially the rats (Goswami et al. 2011; Guddissa et al. 2011; Paramasvaran et al. 2009) and in human beings (Tena et al. 1998; Maranzi et al. 2003; Watwe and Dardi 2008; Yakoob and Hadi 2009; Martinez-Barbosa et al. 2010). Since, rodent's endoparasites are frequently causing zoonotic problem, the present study was carried out to observe the incidence of hymenolepiosis in naturally infected adult albino laboratory Wistar rats.

Materials and methods

The study was conducted on 95 adult albino Wistar laboratory rats that were procured to study the pharmacokinetics of drugs by Department of Veterinary Pharmacology and Toxicology, NTR College of Veterinary Science, Gannavaram. Faecal samples of rats were collected in sterile wide mouthed screw cap bottles and were examined

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macroscopically for the presence of tape worm segments followed by microscopic examination by simple faecal floatation technique using 33.3 percent zinc sulphate solution as described by Soulsby (1982). Identification of parasitic eggs was carried out by their morphology (Palmer et al. 2011).

Results and discussion

Macroscopic examination of faeces revealed no tape worm segments. Microscopic examination of concentrated faecal samples revealed the presence of eggs of *Hymenolepis* Spp. Egg of *H. nana* (Fig. 1) was oval shaped with hexacanth embryo surrounded by two smooth membranes, the outer thin and clean and the inner with two polar thickenings each bearing 4–8 filaments. The egg of *H. diminuta* (Fig. 2) was spherical and same as that of *H. nana* except with a thicker outer membrane and the polar thickenings without filaments (Palmer et al. 2011). Thirty-two (33.68 %) rats were infected with species of *Hymenolepis*. Of these twenty-two (22.15 %) were positive for *H. diminuta* and ten (10.52 %) for *H. nana*. The present finding was in accordance with Guddissa et al. (2011) reporting 33.93 % prevalence of cestodes in rats at Ethiopian Health and Nutrition Research Institute (EHNRI), Addis Ababa and the most prevalent being *H. dinminuta* (26.79 %) followed by *H. nana* (7.1 %). However Muznebin et al. (2009) reported highest prevalence of *H. dinminuta* (72.92 %) and *H. nana* (56.25 %) than observed in the present study. Goswami et al. (2011) also reported high prevalence of *H. diminuta* infection (24 %) in albino laboratory Wistar rats.

In an another study Waugh et al. (2006) recorded low level of infection of *H. diminuta* (3.8 %) out of nine species of gastrointestinal helminths recovered from rats in Jamaica whereas Kataranovski et al. (2011) reported *H.*

Fig. 1 Egg of *Hymenolepis nana* in unstained mount ($\times 1,000$)

Fig. 2 Egg of *Hymenolepis diminuta* in unstained mount ($\times 400$)

diminuta infection (30.5 %) as most prevalent among seven helminth species identified in rats (*Ratus norvegicus*) in the Belgrade.

Despite heavy infection with *Hymenolepis*, all rats in the present study appeared healthy (Claveria et al. 2005; Goswami et al. 2011) suggestive of well established host parasite relationship though infection could be associated with slow growth and pot bellied condition (Owen 1992). The reason for high prevalence of hymenolepiosis in experimental albino rats could be due to the housing conditions of rats in cages leading to increased faeco-oral transmission or contamination of cereal foods with infested beetles as was also opined by other authors (Muznebin et al. 2009; Palmer et al. 2011) which in turn readily facilitate parasite transmission to human and other susceptible animals when there is a close contact (Fan 2005). All experimental rats were dewormed to improve the quality of research animals and to reduce the risk of contact person's infection. The results of the study emphasized that care should be taken while handling the laboratory rats in addition to the maintenance of hygienic conditions of animal house as they are natural reservoir of parasitic infections of public health importance and also contact persons should be aware of the risk of parasitic zoonosis from these animals.

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