

INTESTINAL INTUSSUSCEPTION DUE TO CONCURRENT INFECTIONS WITH *Hymenolepis nana* AND *Dentostomella translucida* IN AN AFRICAN GIANT RAT (*Cricetomys gambianus*). A Case Report

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ABSTRACT

A rare case of intestinal intussusception due to multiple worm infections (*Hymenolepis nana* and *Dentostomella translucida*) was observed in an African giant rat (*Cricetomys gambianus*, Waterhouse, 1840). The condition was observed as an incidental finding before an experimental dissection of the animals in the Department of Veterinary Anatomy, University of Agriculture Abeokuta, Nigeria. The rat was anorexic and depressed with rough hair coat, and died before the commencement of the experiment. Grossly, the intussusception was 7 cm in length and 27 cm caudal to the stomach and 81cm to the ileo-caecal junction. The affected part of the small intestine was moderately distended with worms and the associated mesenteric blood vessels were engorged. Microscopically, worms (*H. nana* and *D. translucida*) were observed in the lumen of the intestine with severe cellular infiltration mostly eosinophils, neutrophils and macrophages. Eggs of both worms, at different stages of development and a focus of attachment of the worms were observed on the intestinal mucosa. The zoonotic implications of these worms were discussed especially *H. nana*. This report appears to be the first reported case of intestinal intussusception due to multiple helminth infections in an African giant rat.

KEYWORDS: *Hymenolepis nana*, *Dentostomella translucida*, Intestinal intussusception, African giant rat.

INTRODUCTION

The economic impact of Gambian rats as a source of food in Africa has been emphasized in the literature. They are considered rather tasty and a delicacy for the rich. They are hunted and even raised on farms for their meat (Ajayi, 1977a). These rodents not only serve to keep insect populations at bay, but also act as dispersal agents of seeds from one place to the other due to their mode of feeding (Ajayi, 1977a, b; Bobe & Mabela, 1997). They are also considered as pests in urban areas where they may infest the sewers (Ajayi, 1977a, b). In rural areas, these animals may destroy farm crops and build burrows in the soil which lead to soil desiccation and loss of plant crops. They are often used for experiments where they provide a lot of information on rodent physiology and behavior amongst others experimental purposes (Ajayi, 1977a). They are also becoming useful in some areas for detecting land mines, as their acute sense of smell is very effective for detecting explosives (Weinstein, *et al.*, 1992). Various parasitic infections of this species have been documented in the literature including cestode cysts identified as *Taenia serialis* in *C. gambianus* (Claude *et al.*, 2005) and several parasitic worms inhabiting the gastrointestinal tracts, mostly identified as strongyloides (Dipeolu & Ajayi, 1976; Bamidele & Ogunriade, 1980; Weinstein *et al.*, 1992). Several other parasites have also been reported in the small intestine such as *Xenopsylla cheopis*, *Aspicularis tetraptera*, *Ixodes rarus*, and *Ornithonyssus bacoti*. *Hymenolepis spp.* while *Aspicularis tetraptera* was found in the rectum and colon (Dipeolu & Ajayi, 1976; Bobe & Mabela, 1997).

Hendrix & Robinson (2006) described as the mouse pinworm of Gerbils found in the small intestine. Reports on these worms associated with intestinal intussusception in this specie, to the best of our knowledge, are rare in the literature. Intestinal intussusception is the telescoping of the proximal segment of the intestine into the distal segment with all the associated mesentery (Gelberg, 2007). In this report we described a case of intestinal intussusception associated with multiple helminth infections caused by *H. nana* and *D. translucida* in an African giant rat.

CASE PRESENTATION

The subject was one of the six adult-sized African giant rats (*C. gambianus*), which was observed to be in good condition when it was purchased. The animals were purchased from the local hunters in the nearby villages around Abeokuta metropolis. They were meant for experimental purpose in the Department of Veterinary Anatomy University of Agriculture Abeokuta, Nigeria. They were kept in captivity for 2 days and given pelletized rat feed with water. During this period of captivity, a male adult sized rat was observed to be anorexic and depressed with rough hair coat, and died before the commencement of the experiment.

Faecal sample was collected for analysis. The parasites recovered were counted and identified using stereomicroscopy according to the method of Hendrix & Robinson (2006). Parasite identification was carried out in the Department of Veterinary Parasitology, University of Agriculture Abeokuta, Nigeria. Tissues for histopathology were taken from the different segments of the intestine and fixed in 10% buffered formalin. They were then dehydrated, embedded in paraffin wax, sectioned at 5 µm and stained with heamatoxylin and eosin.

At necropsy, the small intestine presented an intussusception of approximately 7 cm in length (Fig. 1). The condition was about 27 cm caudal to the stomach and 21 cm cranial to the ileo-cecal junction. The whole length of the intestine (duodenum-caecum) was moderately distended and dilated due to numerous worms in the intestinal lumen. The intussusceptum and intussuscepti portions of the intestine and the cranial adjacent portion were markedly dilated and the associated mesenteric blood vessels were engorged. The intussuscepti portion was loosely attached to the contiguous structures by mild fibrinous exudate. The intestinal lumen contained numerous worms.

Parasite count and examination revealed more than 86 cestode worms of *H. nana* (Fig. 2) and 20 nematode worms of *D. translucida* consisting of 13 females and 7 males (Fig. 3).

Microscopically, there was moderate degeneration and necrosis of mucosa epithelial cells in the intussuscepti and intussusceptum portions of the small intestine. There was moderate mucosa epithelia cells hyperplasia with the caecum showing a few eggs at different stages of development and severe goblet cells hyperplasia (Fig. 4). The lamina propria revealed severe oedema and marked polymorphonuclear cells infiltration, mostly eosinophils, neutrophils, lymphocytes and macrophages. A focal area of depression, associated with the loss of villi along the

intestinal mucosa, which appears to be a focus of attachment of the worm's head, was also observed (Fig. 5). The submucosa was moderately oedematous and congested.



FIG. 1. SMALL INTESTINE SHOWING INTUSSUSCEPTION WITH *H. nana* AND *D. translucida* IN THE INCISED SEGMENT



FIG. 2. STEREOMICROGRAPH OF *H. nana*.



FIG. 3. STEREOMICROGRAPH OF *D. translucida*.

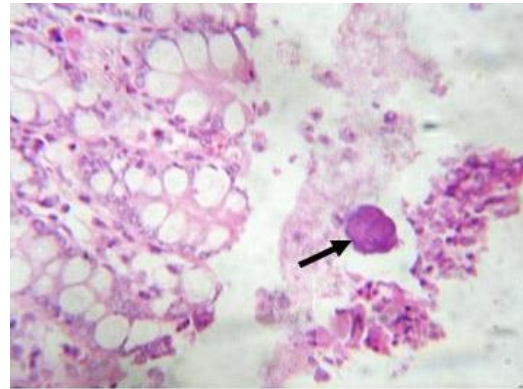


FIG. 4. HISTOLOGY OF THE CEACUM SHOWING GOBLET CELL HYPERPLASIA AND *D. translucida* EGG DIVIDING (ARROW).

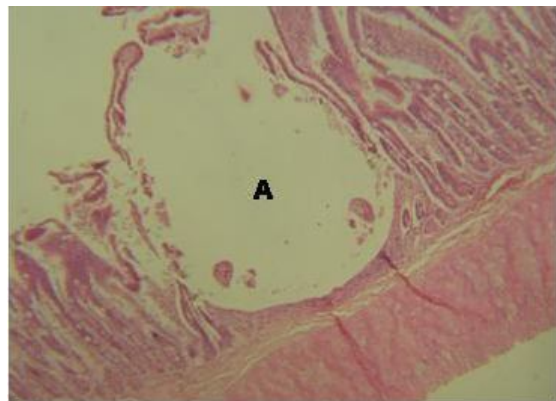


FIG. 5. HISTOLOGY OF THE SMALL INTESTINE SHOWING A FOCUS OF ATTACHMENT OF *H. nana* IN THE INTESTINAL MUCOSA (A).

DISCUSSION

The infection of African giant rats with *H. nana* and *D. translucida* observed in this report supports earlier observations Claude *et al.*, 2005; Hendrix & Robinson, 2006). However, the concurrent infection and the intussusception observed in this report were not described in their reports. The clinical signs of anorexia and rough hair coat might have been due to the worm burden as reported by Adedokun *et al.*, (2001).

Reports on intestinal intussusception associated with two parasitic infections in games are rare in the literature. This might be due to the fact that dead remains of games from natural causes are rarely available for post mortem examination and in instances when they are caught by the local hunters, they are usually meant for local consumption (Ajayi, 1977b). The present report, to the best of our knowledge, appears to be the first reported case of intestinal intussusception in African giant rats associated with multiple parasitic infections.

The pathogenesis of intussusception in domestic animals has been attributed to those conditions that cause irritability and hypermotility of the intestine such as conditions that cause enteritis, parasites, foreign bodies and neoplasm (Gelberg, 2007). In the study, the parasitic infections due to *H. nana* and *D. translucida* might have been responsible for the irritability and hypermotility of the small intestine that eventually caused the intussusception.

H. nana is a parasite with potential public health hazard or zoonotic significance in African giant rats. Incidences of human infection have been documented in the literature especially in immunocompromised subjects (Wilson & Schantz, 1991). Auto infection by *H. nana* occurs when eggs hatch in the small intestine of the host and subsequently infect that host (Hendrix & Robinson 2006). Moreover, human may become exposed to infection because of the mode of evisceration and consumption of inadequately cooked meat or by eating vegetables and fruits contaminated with excretions of carrier rats.

D. translucida, also known as the gerbil pinworm is not frequently reported as other rodent pinworms. *D. translucida* also to the best of our knowledge appears to be the first reported case of this organism in African giant rats. It has a direct life cycle and is transmitted by ingestion of infective eggs from faeces of infected animals (Hendrix & Robinson, 2006). The parasite has been found in the golden hamster, as well as the gerbil and has no known zoonotic significance (Hendrix & Robinson, 2006). It however contributed to this rare case of intussusception in this rat.

In conclusion, reports of intestinal intussusception in African giant rats, due to multiple helminth infections seemed to be very rare in the literature. This report appears to be the first reported case of intestinal intussusception in African giant rats due concurrent infections with *H. nana* and *D. translucida* as the authors of this report finds no reference to this condition in these species.

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