

Cysticercosis in a Wistar Albino Rat

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Abstract

The present study was conducted to know the cause for multiple cysts in the liver of laboratory rat used for experimental purpose in research work. A male Wistar albino rat about 22 weeks of age showed the presence of numerous cysts in liver. The cyst along with normal liver tissue was collected in 10% of formalin and processed for histopathology. Gross examination of liver showed white to yellowish cyst of 0.2 to 0.6 cm diameter, on incision, fluid or purulent exudates and larvae was seen. Histopathological examination revealed well-developed cyst wall with inner layer composed of cytokeratin along with thick connective layers mainly of fibrous tissue. The hepatocytes were damaged with severe infiltration of eosinophils and plasma cells surrounding the cyst. The larva showed the presence of an outer acellular eosinophilic cuticular layer and underlying subtentacular layer along with scolex containing hooks and suckers. Thus, based on the gross and histopathological examination, the accidental finding of cysts was confirmed to be *Cysticercus fasciolaris* infection in Wistar albino rat and it also indicated that the infection might be transmitted through water or bedding materials. Hence, it is necessary to give much emphasis on the quality of laboratory rodents used for experimental purposes and also for water and bedding materials used in future. Further, it is important to take safety and precautionary measures in laboratory animal house to avoid spread of zoonotic diseases to humans.

Keywords: Cysticercosis, histopathology, Wistar albino rat

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INTRODUCTION

Rodents like rat and mice are the most commonly used experimental animal in biomedical and scientific research [1]. It can spread a variety of zoonotic diseases to humans working in the laboratory animal house and also the personnel handling the animals. Hence, it is necessary to know regarding the common zoonotic diseases transmitted by animals and to take necessary safety and precautionary measures during handling experimental animals. *Cysticercus fasciolaris* is the larval form of the cestode, *Taenia taeniformis*, a tape of the cats. The metacestode of the parasite lives in the liver of the rodents, an intermediate host [2]. The wild rats, is the most common species affected with cysticercosis [3]. The wild rats ingest the eggs, hatch in small intestine and migrate via the portal circulation into the liver, where they develop into cystic larvae [2]. The laboratory rats and mice are being used for various research works and their quality is important

to produce the reproducible and repeatable results, so as to be accepted by the global research community. In this study, an accidental finding of numerous cysts in the liver was observed in the Wistar albino rat and investigated to know the cause.

MATERIALS AND METHODS

A male Wistar albino rat, weighing 225 g, aged about 22 weeks was presented for postmortem examination. On gross examination, numerous cysts of different sizes were observed. The liver tissue with cyst area along with normal tissue was collected in 10% formalin. The tissues were processed routinely for paraffin embedding, sectioning at 5 µm thickness tissue sections were prepared using rotatory microtome and stained with haematoxylin and eosin as described earlier [4]. After staining, the sections were dehydrated in increasing ethanol concentrations, cleared in xylene, mounted in DPX (SRL India Limited, Mumbai) and were

examined under light microscope (Nikon, Japan) for histological changes.

RESULTS

The rat was apparently healthy without any clinical signs, and conducted post-mortem examination. On gross examination, liver showed numerous cysts of white to yellowish colour with 0.2 to 0.6 cm diameter (Figure 1). The cysts were filled with fluid containing larvae, in some cyst, purulent exudates and with larvae inside were observed on incision. Histopathological examination of the liver revealed intact parasite larva surrounded by fibrous connective tissue capsule of the cyst.

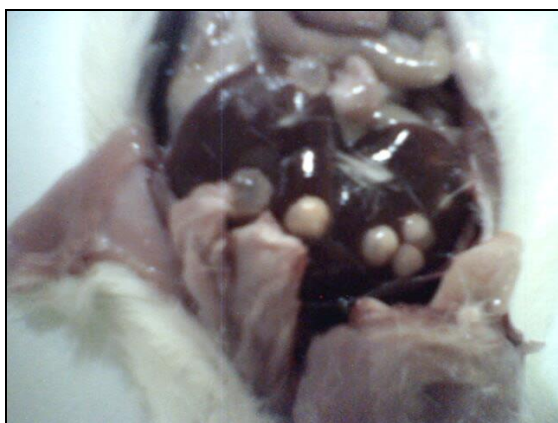


Fig. 1: Rat Liver Showing White to Yellowish Fluid Filled Cysts Containing *Cysticercus fasciolaris*.



Fig. 2: Histopathology of the Liver Showing Intact *Cysticercus fasciolaris* Inside the Fibrous Tissue Capsule. Haematoxylin and Eosin Stain, Scale bar = 100 μ m.

The parasite showed the presence of an outer acellular eosinophilic cuticular layer and underlying subtentacular layer along with scolex containing hooks and suckers

(Figure 2). It also lacks a neck and contains numerous proglottids. Liver revealed loss of hepatocytes surrounding the cyst and severe infiltration of inflammatory cells mainly eosinophils, lymphocytes and plasma cells were observed. The liver revealed well-developed cyst wall with inner layer composed of cytokeratin along with thick connective layers mainly of fibrous tissue (Figure 3).

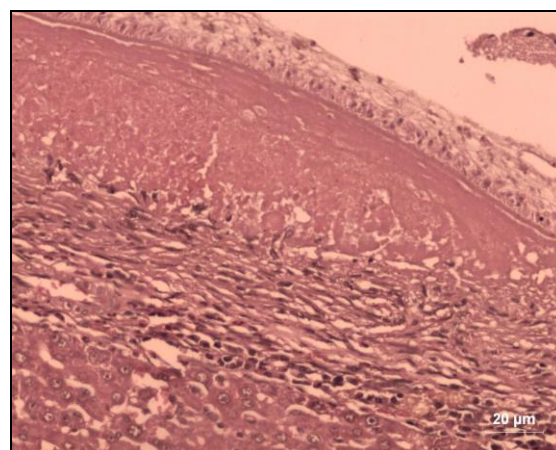


Fig. 3: Histopathology of Liver Showing Fibrous Capsule and Eosinophilic Infiltration Around the Parasite. Haematoxylin and Eosin Stain, Scale Bar = 20 μ m.

The cyst layer showed the presence of thick fibrous connective tissue layer surrounding the larvae. Hepatocytes revealed mild vacuolar degeneration with vacuoles in the cytoplasm. Based on the lesions and larval morphology, it was confirmed as Cestode parasite *Cysticercus fasciolaris* in rat.

DISCUSSION

In this study, the multiple cysts in liver were diagnosed as *Cysticercus fasciolaris* based on the morphology and pathological examination and concurred with previous reports [1–3]. *C. fasciolaris*, whose definitive hosts are carnivores in the family's Felidae and Canidae, commonly seen in wild rats (*Rattus norvegicus*), mainly occurs through contamination of feed and bedding materials by the embryonated eggs [2]. The larva in the cyst was lacking neck and containing numerous proglottids which concurred with the previous studies [3, 5, 6]. The larval morphological characters observed in this study corroborated with the previous reports [2, 3]. The liver histopathology of the cyst wall containing the fibrous tissue and severe

infiltration of inflammatory cells, mainly eosinophils and plasma cells were characteristic and indicated the verminous hepatitis. The changes observed in the liver histology were in agreement with various studies reported [2, 3, 5, 6].

The parasitic infection in experimental rats indicated that the infection might be transmitted through the water or bedding materials and concurred with the previous report [2]. Rodents are used for various experimental purposes in research work and the quality of laboratory animals should be taken care to avoid various parasitic diseases. The laboratory animals' quality is important so as to enable us to get the reproducible and accurate results in the research studies using rodents. The laboratory animals may also transmit the various zoonotic diseases to the personnel working in the animal houses.

Hence, it is necessary to have safety and preventive measures for the personnel working in the laboratory animal house or handling the animals. Thus, the quality of rodents and materials used for keeping them should be monitored at regular intervals to avoid this type of parasitic infections. Sanitation and hygienic measures adopted in the laboratory animal house is very important to have better and accurate research results in future. Further, the researchers should be aware of the spontaneous lesions in rodents and to accurately do outcome interpretations of their experiments.

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