

**INTERACTIONS BETWEEN *CYSTICERCUS FASCIOLARIS* AND COMMON RATS****SHASHI KIRAN**

Department of Zoology

D.A.V (P.G) College, DEHRADUN (UK) INDIA

Email : shashisolanki@outlook.com

**Received :** 18.08.2017; **Revised :** 15.09.2017; **Accepted :** 13.10.2017**ABSTRACT**

The objective of this study was to determine the relationship of *C. fasciolaris* with common rats. *Cysticercus fasciolaris* is the larval stage of *Taenia taeniaeformis*. Development of metacestodes (*Cysticercus fasciolaris*) occur in the liver of rodents. An urban and a sylvatic cycle occurs. A total of 40 liver specimens of rats were examined. Histopathological examination revealed the presence of multiple hepatic cysts, and the *C. fasciolaris* larva was surrounded by granulation tissue.

Large and separated fibroblasts in different orientations with some neoplastic changes were seen in advanced hepatic cysticercosis. The bladder involved the larva and large chamber containing the small chamber and opalescent fluid. The scolex of the mature larva is distinctly large, bearing four lateral distinct suckers, a rostellum armed with double, and alternating rows of hooks.

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KEY WORDS: Common Rats, *Cysticercus fasciolaris*, Fibrosarcoma.**Introduction**

*Taenia taeniaeformis* is a parasite with a cosmopolitan distribution which is found in the small intestine of cats and related carnivores. The intermediate host is rodents and occasionally lagomorphs.

*Cysticercus fasciolaris* is a larval and cystic stage of *Taenia taeniaeformis*. The *C. fasciolaris* is commonly found in the liver of intermediate hosts, which are infected through contaminated food and water. Rodents act as a reservoir of pathogens that can be transmitted to human and may cause outbreaks of disease often with high mortality and morbidity. There are some sporadic cases reported in human from Argentina, Czechoslovakia, Denmark and Taiwan<sup>4,7</sup>. In an intermediate host, the *C. fasciolaris* cysts were found in different structural forms and they can be recognized by multiple hepatic cyst. The objectives of this study were to determine the *C. fasciolaris* morphology using light microscopy (LM) and its effects on liver histology.

**Materials and Methods**

The study includes rats collected from

different places viz. Grain shops, Bakeries, Slums, and posh areas of Dehradun city, Uttarakhand, India. Total 40 rats were collected. Sampled rats were killed by inhalation of mild dose of ether and dissected for liver examination. Tissues specimens from the infected liver that involved cysts were collected and punctured with the help of fine needles to collect larvae. Collected larvae and cyst liver were fixed over night in 10% neutral buffered formalin. The diameter of the cyst was also measured. The specimens were processed for histopathology, and stained. The slides were observed under the light microscope.

**Results and Discussion**

The results showed that 60% of commensal rats were having multiple hepatic cysts. (Fig. 1). Some of these structures were found in diameter of less than 5mm, liver with these size of cysts are of age less than one month of infection and larvae did not develop yet. In cases of more than one month of infection cysts were bigger and more clearly seen with developed larvae with scolex (Fig. 2). The scolex bear four lateral distinct suckers and rostellum armed with double and alternating

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Fig.1 : Multiple cystic liver

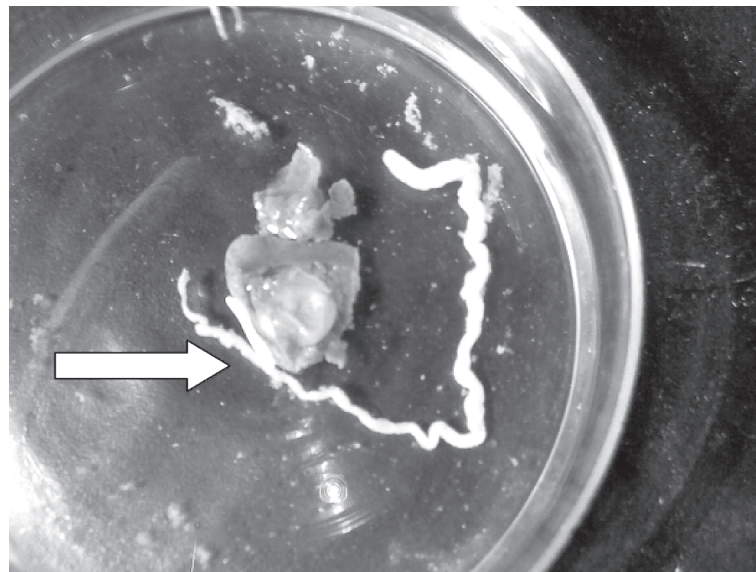


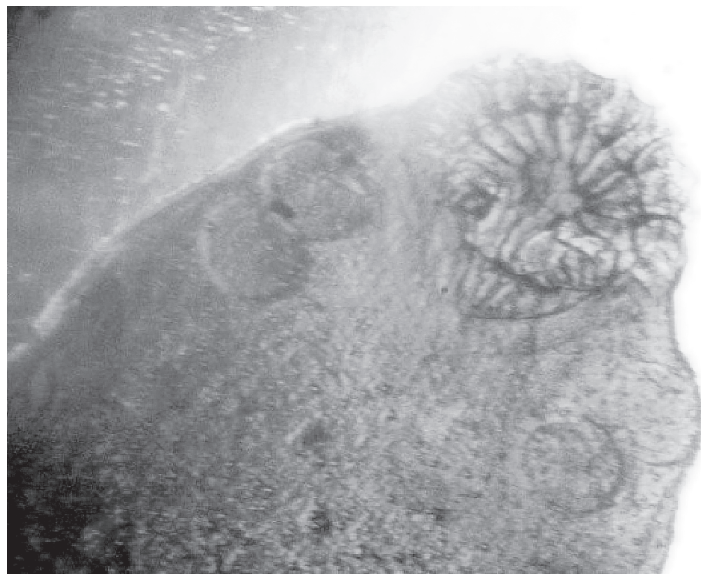
Fig. 2 : *C. fasciolaris* and opened cyst

rows of hooks<sup>6</sup>.

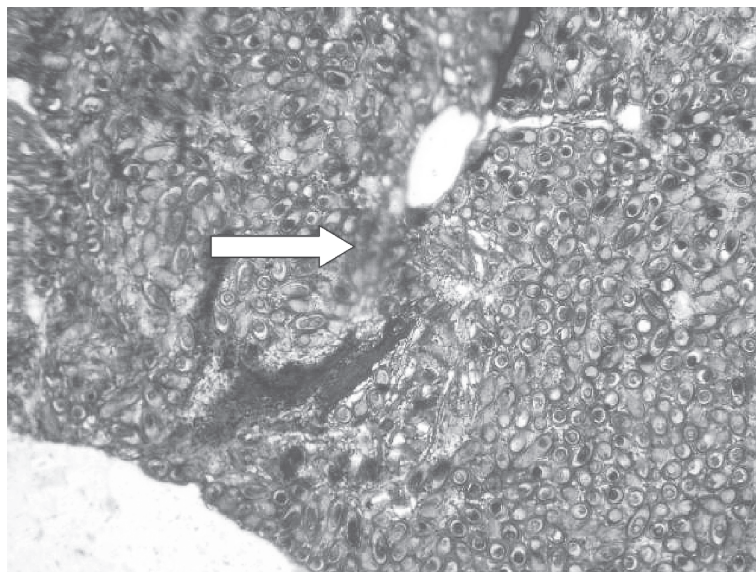
The mature larvae showed complete morphological features with four suckers and hooks in two rows (Fig. 3). These suckers and hooks play roles of fixation of young *T. taeniaeformis* in the host's intestinal mucosa<sup>1,8</sup>.

Infected liver with *C. fasciolaris* showed visible solitary cysticercus granulomas and

seizures or multi cystic structures with 2-4 mm in size, randomly in different lobes, with encysted larvae of whitish to yellow color. The large cyst surrounded by slightly pale zone, while other areas of liver showed normal morphological structures. The microscopic observation showed that there were two stages of inflammatory reactions according to the cystic age which include acute and



**Fig. 3 : Scolex of *C.fasciolaris* 400X**



**Fig. 4 : T.S of liver showing inflammatory cells 400x**

chronic inflammations. When the hepatic cysts are within 5mm in diameter, the acute inflammatory reaction surrounded the cyst and it has recognized the inflammation which showed polymorph nuclear cells, scanty of Kupffer cells and eosinophils(Fig.4). In case of chronic stage, infection was of more than one month shows the hepatic cyst with diameter of more than 5mm, and zone of inflammation around

the cyst include granulation tissues infiltrated with Kupffer cells, scanty lymphocytes and fibroblast. The presence of immune related activity in the liver of rats infected with *T. taeniaeformis* larvae is in accordance with data which demonstrate the capacity of taeniid parasites to stimulate the immune response to an invasive larval stage<sup>3</sup>.

Granulation tissue with congested blood



vessels, large and separated fibroblast in different orientations were seen in advance hepatic cysticercoids. The hepatic cyst appeared to contain two chambers, the small one larvae chamber directly surrounded and covered the larvae, which is very thin with membranous structure. On other hands, the large chamber was filled with an opalescent fluid, it contains both the small chamber and larval fluid. Larvae were visualized attached to the hepatic tissue. This may induce the inflammation in the hepatic tissue<sup>1,2,5</sup>. The long standing of larvae in the hepatic tissue can give a

long period of irritation between the rough surface of larvae and the hepatic tissue. The irritation might stimulate and promote the hepatic cells around the cyst to develop carcinogenic behavior and the chemical reaction between the larvae and hepatic tissue may induce the cellular changes which finally develop into fibrosarcoma<sup>1</sup>. The hepatic lesions observed in cystic liver were characterized by vacuolation in the cytoplasm of the hepatocytes, invasion of the Kupffer cells and proliferation of the inflammatory cells in and around the bile duct that replaced normal hepatocytes.

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