

## Parasitological and pathological study of the *Cysticercus fasciolaris* that are naturally infest white mice

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### Abstract

The study was conducted on the presence of *Cysticercus fasciolaris* in white mice. One hundred and fifty (150) white mice were obtained and sacrificed, and examined grossly for presence of cysts in their internal organs, the cysts were examined parasitologically and pathologically.

The results showed that (7.33%, 11 mice) have 1-3 cysts (3-6 mm) in diameter at the liver parenchyma, incision made on the cyst to obtain the larvae that have been defined after staining as having characteristics corresponding to the *cysticercus fasciolaris* of the adult parasite *taenia taeniaeformis* which inhabited the small intestine of the domestic cats, histopathological examination showed a cyst composed of two layer enclose the larvae and compressing on the adjacent hepatocytes.

### دراسة طفيلية ومرضية للإصابة الطبيعية باليرقات الشريطية *Cysticercus fasciolaris* في الفئران البيضاء

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### الخلاصة

دراسة طفيلية ومرضية للإصابة باليرقات الشريطية *Cysticercus fasciolaris* في الفئران البيضاء. ومن أجل ذلك اختير (150) فأراً أبيضاً وبعد تشريحها فحصت عيانياً بحثاً عن وجود أكياس في أعضائها الداخلية وفي حالة وجوده يتم فحصه طفيلياً ومرضياً.

أظهرت النتائج بأن (7.33%، 11 فأراً) من الفئران مصابة بـ (1-3) كيس بقطر (3-6 ملم) في أكبادها، وتم أخراج اليرقات بعد عمل شق في جدار الكيس وبعد صبغها أظهرت صفات ومميزات مشابهة ليرقات *Cysticercus fasciolaris* وهو الطور اليرقي للديدان البالغة المسماة *Taenia taeniaeformis* الذي يتواجد في أمعاء القطط الأليفة. وأظهر الفحص المجهرى بأن جدار الكيس مكون من طبقتين، وتحيط باليرقات الملفوفة داخله و يضغط على الخلايا الكبدية المجاورة.

### Introduction

*Taenia taeniaeformis* is a tape worm found in the small intestine of the cat and its relatives, the stoat, lynx and fox being also among its definitive hosts (1).

The adult worm apparently cause little damage and it has been described as causing sever digestive disturbance, the *Cysticercus fasciolaris* that develop in the liver of the intermediate host (mice and rat and also rabbit), appears to be fairly harmless, in rat even it occurs in large number, it has been associated with malignant growth in the liver of rat (2).

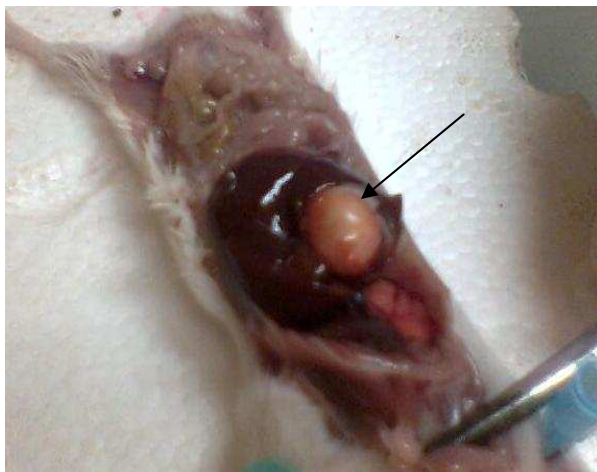
## Materials and Methods

- 1- Animals: one hundred and fifty (150) white mice provided from the national center for drug observation and researches\Baghdad were sacrificed and examined grossly for presence of cyst in the internal organs, the cyst if found were examined.
- 2- Parasitologic examination: the cyst was opened and the parasite was obtained and examined under the dissecting microscope and preparing of glass slide according to (3).
- 3- Pathological study: the organ that contains the cyst was put in 10% neutral buffered formalin and histopathological slides were prepared according to (4).

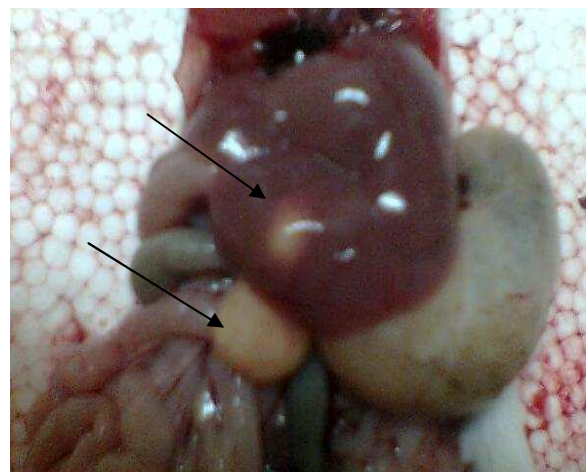
## Results

Thirteen (13) mice showed a cyst shape in the liver and eleven (11) of these cysts were positive for presence of the tape worm.

- 1- Clinical examination: the infested mouse revealed distended abdomen, palpation of the abdominal wall revealed hard nodules that are slightly movable, and in some cases the nodule slightly visible through the abdominal wall.
- 2- Gross examination: the liver showed 1-3 chick peas like cyst, (3-6mm) in diameter with yellowish colour, either embedded in the liver parenchyma, protruded or pendulated from the liver surface (Fig:1,2). when the cyst opened by an incision in the wall the fluid escape and the small tape worm (4-15 cm) long appeared (Fig:2,3), by the aid of dissecting microscope the tape worm appeared to has a rostellum and scolex with vesicles filled with fluid at the end of the worm (Fig:5,6).
- 3- Microscopic examination of the tape worm showed that the head of the worm consist of four suckers and two rows of taeniid shape hooks (17) (Fig:7-9), and the scolex followed by a strobila which is already segmented without internal organs and the end segment of the worm was distended to form vesicle (Fig: 10,11).
- 4- Microscopic examination of the tissue section revealed a cyst in the liver parenchyma consist of two compressed layers of highly proliferative fibrous connective tissue, and inflammatory cells mainly lymphocyte and macrophages with few eosinophile (Fig:12-14) blood vessels are congested and there are many sections of the parasite inside the cyst that consist of several immature segment surrounded by integument. Atrophied hepatocytes around the cyst with various stage of degeneration.



**Fig (1) showed cyst grossly on the liver surface**



**Fig (2) showed cyst grossly impeded and another one pendulated on the liver surface**



**Fig (3) the gross appearance of the cyst like chick peas (3-6mm)**



**Fig (4) gross appearance of the tape worm (15 cm)**



**Fig (5) revealed gross appearance of the head of the tape worm**



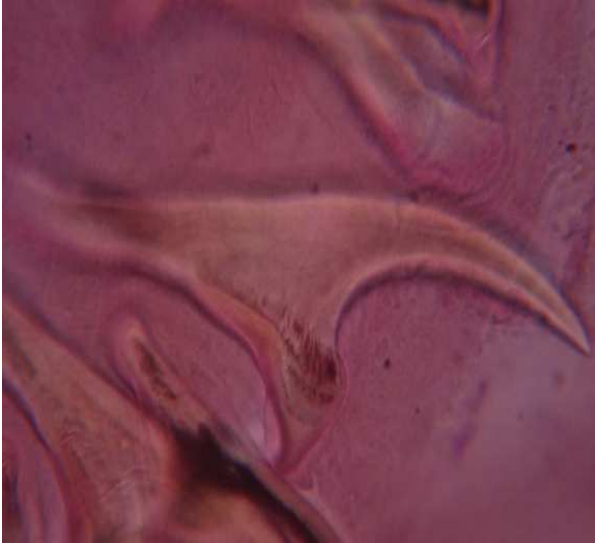
**Fig (6) revealed gross appearance of revealed the end vesicle of the tape worm**



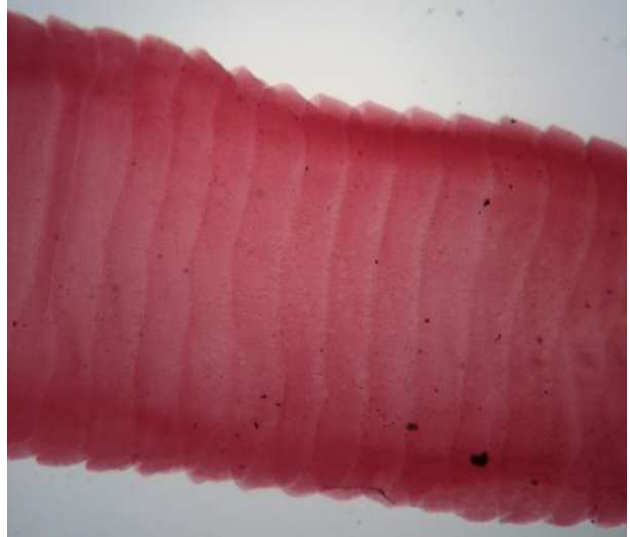
**Fig (7) microscopic view of the scolex that contain 17 hocks (two rows) (Carmin stain x40)**



**Fig (8) microscopic view of the scolex revealed the four suckers and the two row of hocks (Carmin stain x40)**



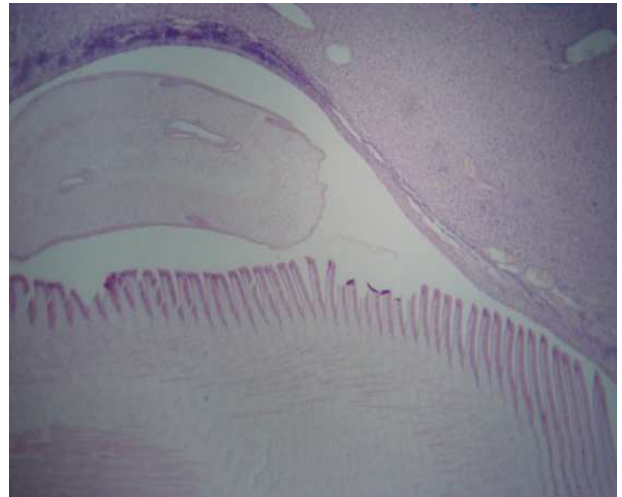
**Fig (9) microscopic view showed the characteristic taeniid hooks (Carmin stain x40)**



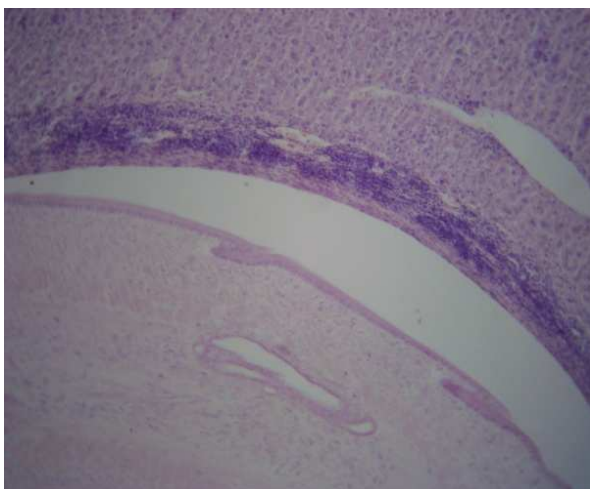
**Fig (10) microscopic view showed the segmented part of the worm (Carmin stain x40)**



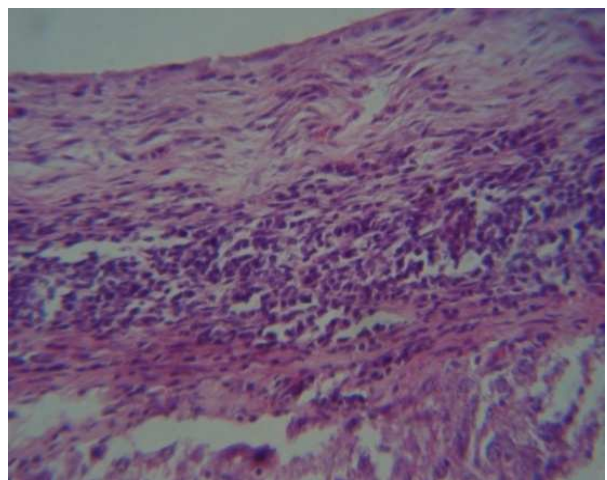
**Fig (11) higher magnification of the segmented part (Carmin stain x40)**



**Fig (12) histological section revealed two folds of the worm surrounding the cyst in the liver parenchyma(H&E x40)**



**Fig (13) histological section revealed folds of the worm surrounding by the cyst in the liver(Carmin stain x40)**



**Fig (14) histological section revealed the wall of the cyst that consists mainly of fibrous connective tissue and inflammatory cells (Carmin stain x40)**

## Discussion

The presence of the parasite in 7.33% of the mice indicate the presence of the eggs in the ration that the mice fed, in a previous that refer to the presence of bladder worm in the liver of nine mice during a pathological study carried out on mice.

The larval stage of the parasite was diagnosed according to the presence of the characteristic taeniidean hocks, which was confirmed as a double rows of hocks. This metacestoda was corresponding to *cysticercus fasciolaris* of the adult cestode *Taenia tainaeformis*, which inhabit the small intestine of the domestic cats (3,5,6).

The pathological effects exerted by the cyst lodgment in the liver parenchyma showed atrophied and compressed hepatocyte due to space occupying cyst (8-10). The tissue reaction around the cyst, which composed of double layer of fibrous collagen deposite, represented defense mechanism to limit the enlargement of the cyst, and such encapsulation promote the initiation of malignant growth(6,11).

Another study is needed to complete the life cycle of the parasite and the pathological lesion result from it.

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