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Short communication for MJVR

A CASE STUDY OF *Capillaria hepatica* INFECTION IN WILD RATS IN KELANTAN, MALAYSIA

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ABSTRACT. Nematode eggs in liver tissues of two wild rats were recorded at the Regional Veterinary Laboratory, Kota Bharu from 2014 to 2015. A total of 15 (2014) and 48 (2015) wild rats were examined by the laboratory for routine screening of zoonotic pathogens such as *Leptospira* sp. and others. On histological examination of the haematoxylin and eosin (H&E) stained liver tissues, masses of parasitic nematode eggs were observed. The shell of the eggs is striated with shallow polar prominences at either end. Numerous mini-pores can be seen on the outer shell as well. The eggs were identified as *Capillaria hepatica* (*C. hepatica*) nematode eggs, which causes hepatic capillariasis in rodents and numerous other mammal species, including humans. The wild rats were also shown to harbour *Salmonella enteritidis* from the intestine, *E. coli* from the lung and liver but none had leptospirosis by PCR. The purpose of this report is to highlight a common nematode of wild rats that is *Capillaria hepatica* infection in wild rats in Kelantan diagnosed by the

Kota Bharu Regional Laboratory, in order to create the awareness on concurrent parasitic infections which may cause reduced immunity thereby creating higher risk for other zoonotic pathogens such as leptospirosis.

Keywords: parasitic eggs, *Capillaria hepatica*, liver, wild rats

SHORT COMMUNICATION

Capillaria hepatica is a parasitic nematode which causes hepatic capillariasis in rodents, numerous other mammal species, and occasionally humans (Spratt *et al.*, 2001; Nabi *et al.*, 2007). Human infection primarily results from zoonotic transmission. *C. hepatica* has been found in temperate and tropical zones and infestation rates of wild-caught rats of up to 100% have been reported (Claveria *et al.*, 2005). The life cycle of *C. hepatica* may be completed in a single host species. Humans are usually infected after ingesting embryonated eggs in fecal-contaminated food, water, or soil. In humans *C. hepatica*

causes hepatic capillariasis, a serious liver disorder (Ferreira *et al.*, 1993) causing loss of liver cells and thereby loss of function (Roberts *et al.*, 2009), septal fibrosis and cirrhosis of the liver (Gomes *et al.*, 2006). The eggs become encased by granulomatous tissue, with large sections of the parenchyma becoming replaced by these egg masses (Ferreira *et al.*, 1993). *Capillaria hepatica* can also cause hepatomegaly. Infections of *C. hepatica* can present with several clinical symptoms including abdominal pain in the liver area, weight loss, decreased appetite, fever and chills, hepatitis, ascites and hepatolithiasis (Ferreira *et al.*, 1993). This parasite can be fatal in humans, as transmission and survival of the parasite depend on death of the definitive host in order for the eggs to reach soil and water to embryonate. The present communication is intended to highlight a common nematode of wild rats that is *Capillaria hepatica* infection in wild rats in Kelantan diagnosed by the Kota Bharu Regional Laboratory, in order to create the awareness on concurrent parasitic infections which may cause reduced immunity thereby creating higher risk for other zoonotic pathogens such as leptospirosis.

A total of 63 rats were trapped from local wet markets namely; Pasar Besar Siti Khadijah Kota Bharu where 15 rats were trapped in 2014 and Pasar Besar Wakaf Bharu where 48 rats were trapped in 2015. The rats were transported in cages to the Kota Bharu Regional Veterinary Laboratory. Blood was collected in EDTA

and plain tubes before they were euthanized using chloroform and immediately necropsied. Gross examination of organs was followed by collection of specimens from lung, kidney, liver, spleen and intestines for histopathology, bacterial, and viral examination.

For histology, the liver specimens were fixed in 10% neutral formalin and routinely embedded in paraffin. Five micrometer sections were stained with H&E. Other tests were conducted to determine any concurrent zoonotic infections such as bacterial or viral. The liver and kidney specimens were also sent to the Veterinary Research Laboratory which is a Reference laboratory for detection of the *Leptospira* sp. DNA by using PCR technique.

Results from the histological examination of 63 wild-caught rats from the Kota Bharu area showed the presence of *Capillaria* eggs in 2 of the rats as seen from its liver tissue. Histopathology examination of liver tissue showed intralesional parasitic eggs with granulomatous hepatitis. Figures 1 and 2 show the masses of *Capillaria* eggs in the liver sections. The eggs measure about 48-66 μm \times 28-36 μm in accordance to Li *et al.* (2010).

These results suggest that wild rats from wet markets are highly infected with parasitic and other pathogens due to exposure from the unhygienic environment. This is dangerous as the rats linger at the place where the human get their supplies of food for daily consumption. The raw food or food supplies will be contaminated

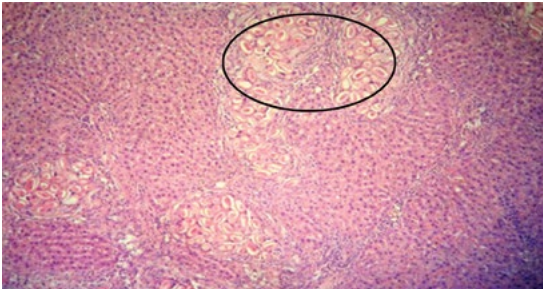


Figure 1: H & E staining, 200x magnification showing eggs in liver tissue.

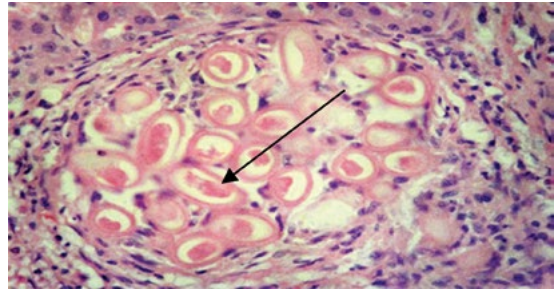


Figure 2: H & E staining, 400x magnification showing sectioned eggs of *Capillaria hepatica* in rat liver tissue.

with their faeces and urine. Besides, when the infected rats die and decompose, or are eaten by predators such as cat, the eggs will be released to the environment and embryonate and become infective. The cycle continues when embryonated eggs are eaten by a new host (rodent, cat and or human). Humans are usually infected after ingesting embryonated eggs in fecal-contaminated food, water, or soil. The information from this preliminary survey of pathogens in wild rats indicates that capillariasis occurs in wild rats and its importance as a zoonotic parasite should be noted. Incidentally, specimens were found to be negative for leptospirosis by PCR technique. However, *Salmonella enteritidis* and *E. coli* was isolated from lung and liver. Overall, surveys such as this should be conducted regularly to elucidate any pathogens that may emerge under various environmental and geographical locations. In this study, the wet market rats were studied but there is a need for conducting such studies in housing areas or suburban human dwellings as zoonotic diseases can be harboured and spread.

This information is helpful to aid in disease control and vermin control for the Department of Health and the Department of Veterinary Services.

In conclusion, *Capillaria hepatica* and its eggs in liver are common in rodents worldwide. *C. hepatica* can cause a serious liver disorder in its hosts including humans and animals. A better understanding of *C. hepatica* and hepatic capillariasis would help humans to better combat the disease.

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