

Case reports

First report of hepatic cysticercosis in a rook (*Corvus frugilegus*) (Passerifomes, Corvidae)

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ABSTRACT. Cysticercosis is an infection with the larval (cysticercus) stage of *Taenia* spp. that it is seen as cysts in various human and animal tissues. In this study, pathologic findings of hepatic cysticercosis in a rook (*Corvus frugilegus*) is described. To our knowledge, there is no report on hepatic cysticercosis in rook and this study shows that rooks may play a role as intermediate hosts in the transmission of parasitic infections.

Key words: hepatic cysticercosis, gross and histopathological findings, rook (*Corvus frugilegus*), Iran

Introduction

The rook (*Corvus frugilegus*) is a member of the Corvidae family in the passerine order of birds. Rooks are migratory species, especially in the shortage of foods, so they can act like vectors for a wide range of microorganisms [1,2]. A very high incidence of *T. gondii* (18%) in rooks (*Corvus frugilegus*) has been recorded that the cysts of this protozoa were found in the heart, brain, sex organs, skeletal muscle and liver [3].

There are few studies about prevalence of parasites of rook (*Corvus frugilegus*) in Iran [2,4]. In this study for the first time, the pathologic findings of hepatic cysticercosis in a rook (*Corvus frugilegus*) is described.

Case report

In October 2012, liver of a rook (*Corvus frugilegus*) was referred to Department of Pathobiology, School of Veterinary Medicine, Shahrekord University, Iran because of multiple focal lesions. On gross examination, numerous white and cystic foci measuring 2 mm in size were observed throughout the affected liver (Fig. 1). For histopathological study, tissue samples were taken from the hepatic lesions and fixed in 10% neutral



Fig. 1. Formalin fixed liver with small, white and cystic lesions

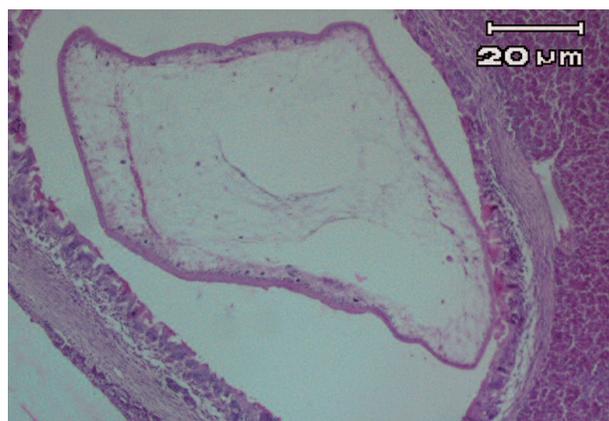


Fig. 2. Section of a cystic larva is surrounded by inflammatory cells and fibrous connective tissue (hematoxylin and eosin, ×10)

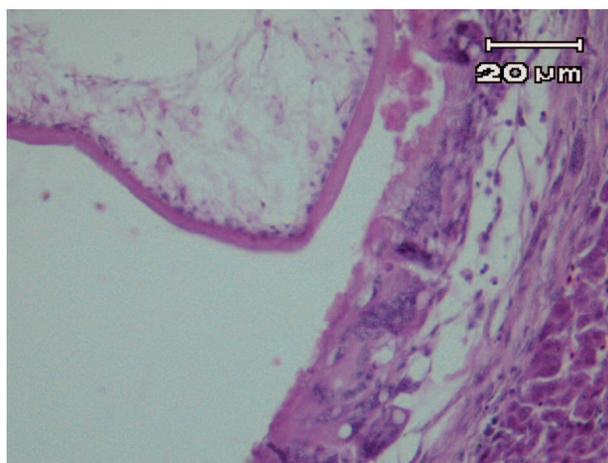


Fig. 3. The cuticle and subcuticular tissues of the larva are surrounded by giant cells and fibrous connective tissue (hematoxylin and eosin, $\times 40$)

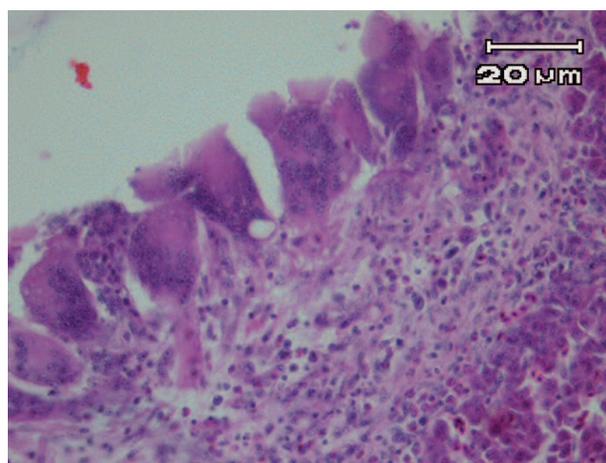


Fig. 5. Some giant cells and red blood cells of rook with nuclei (hematoxylin and eosin, $\times 40$)



Fig. 4. Note the section of larva head (protoscolex) in the affected liver (hematoxylin and eosin, $\times 40$)

buffered formalin. They were processed and embedded in paraffin. Sections of 5 μm thickness were cut and stained with haematoxylin and eosin.

Histopathological examination of the affected liver revealed multiple focal granulomatous inflammation scattered throughout the liver. Sections of an unidentified *Taenia* species larva were observed in the central part of the lesions (Fig. 2–4). A large number of macrophages, giant cells and eosinophils (Fig. 3,5) were seen around the larval sections. These structures were surrounded with fibrous connective tissue.

Discussion

The metacestodes or larval stages of *Taenia* spp. tapeworms are the cause of cysticercosis in various farmed and wild animals and in humans. Adult tapeworms are found in the small intestine of

carnivore definitive hosts such as humans, dogs, and wild canids [5]. On the basis of the gross and histopathological findings reported here, the liver lesions were diagnosed as hepatic cysticercosis. This finding due to larval stages of various *Taenia* spp. has been reported in man [6–8], monkey [9], cattle [10], sheep [11,12], goat [12], zebu [13], pig [14], rabbit [15], mouse [16], and rat [17,18].

To our knowledge, there is no report on hepatic cysticercosis in avian species including rook (*Corvus frugilegus*) in the world. For avian tapeworms, intermediate host may be an insect, crustacean, earthworm, slug, snail, or leech depending upon the species of tapeworm [19].

Conclusions

In this case based on pathological evidences, the mature parasite of the cysticercoid larva could not be identified. For the first time, this study shows that rooks (*Corvus frugilegus*) may play a role as intermediate hosts in the transmission of parasitic infections to other birds, animals or man and need further studies.

References

- [1] Strugnell B.W., Dagleish M.P., Bayne C.W., Brown M., Ainsworth H.L., Nicholas R.A.J., Wood A., Hodgson J.C. 2011. Investigations into an outbreak of corvid respiratory disease associated with *Pasteurella multocida*. *Avian Pathology* 40: 329-336.
- [2] Halajian A., Eslami A., Mobedi I., Amin O., Mariaux J., Mansoori J., Tavakol S. 2011. Gastrointestinal helminths of magpies (*Pica pica*), rooks (*Corvus frugilegus*) and Carrion Crows (*Corvus corone*) in

- Mazandaran province, north of Iran. *Iranian Journal of Parasitology* 6: 38-44.
- [3] Uterk I., Hejlek K., Nezval J., Folk C. 1992. Incidence of *Toxoplasma gondii* in populations of wild birds in the Czech Republic. *Avian Pathology* 21: 659-665.
- [4] Eslami A., Meshgi B., Rahbari S., Ghaemi P., Aghaebrahimi-Samani R. 2007. Biodiversity and prevalence of parasites of rook (*Corvus frugilegus*) in Iran. *Iranian Journal of Parasitology* 2: 42-43.
- [5] OIE Terrestrial Manual. 2008. Cysticercosis: 1216-1226.
- [6] Boopathy Vijayaraghavan S. 2004. Sonographic appearances in cysticercosis. *Journal of Ultrasound in Medicine* 23: 423-427.
- [7] Sathyanarayanan V., Sambhaji C., Saravu K., Razak A., Polnaya A., Rao S.N. 2011. A rare case of hepatic cysticercosis. *Asian Pacific Journal of Tropical Biomedicine* 1: 141-142.
- [8] Sickel J.Z., Fultz P.J., Penwarden B., Laczin J. 1995. Hepatic cysticercosis. Report of an unusual case. *Journal of Clinical Gastroenterology* 20: 160-163.
- [9] Sulaiman S., Williams J.F., Wu D. 1986. Natural infections of Vervet Monkeys (*Cercopithecus aethiops*) and African Red Monkeys (*Erythrocebus patas*) in Sudan with taeniid cysticerci. *Journal of Wildlife Diseases* 22: 586-587.
- [10] Kebede N. 2008. Cysticercosis of slaughtered cattle in northwestern Ethiopia. *Research in Veterinary Science* 85: 522-526.
- [11] Nourani H., Pirali Kheirabadi K.H., Rajabi H., Banitalebi A. 2010. An unusual migration of *Taenia hydatigena* larvae in a lamb. *Tropical Biomedicine* 27: 651-656.
- [12] Oryan A., Goorgipour S., Moazeni M., Shirian S. 2012. Abattoir prevalence, organ distribution, public health and economic importance of major metacestodes in sheep, goats and cattle in Fars, southern Iran. *Tropical Biomedicine* 29: 349-359.
- [13] Cornaglia E., Lo Schiavo A. 1985. Massive hepatic cysticercosis in the zebu. *Bolletino Scientifico della Facolta di Zootechnia e Veterinaria, Università Nazionale Somalia* 5: 101-106.
- [14] Fan P.C., Chung W.C., Lin C.Y., Wu C.C. 1990. The pig as an intermediate host for Taiwan *Taenia* infection. *Journal of Helminthology* 64: 223-231.
- [15] Sobtyasiak Z., Bednarski M., Pickarska J. 2007. Cysticercosis pisiformis in rabbit livers. *Medycyna Weterynaryjna* 63: 1255-1257.
- [16] Balk M.W., Jones S.R. 1970. Hepatic cysticercosis in a mouse colony. *Journal of the American Veterinary Medical Association* 157: 678-679.
- [17] Al-Jashamy K. 2010. Scanning electron microscopy and histological morphology of *Cysticercus fasciolaris*, which induced fibrosarcomas in laboratory rats. *Annals of Microscopy* 10: 44-48.
- [18] Hanes M.A. 1995. Fibrosarcomas in two rats arising from hepatic cysts of *Cysticercus fasciolaris*. *Veterinary Pathology* 32: 441-444.
- [19] McDougald L.R. 2003. Internal parasites. In: *Diseases of poultry*. (Ed. Y.M. Saif). Iowa State Press: 931-972.

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