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Research Note

An unusual migration of *Taenia hydatigena* larvae in a lamb

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Abstract. The liver and lungs of an four month old, female dead lamb was referred to Veterinary clinic of Shahrekord, Iran by a sheepherder due to outbreak of an unknown disease that caused four deaths in the livestock over a period of one week. Post-mortem examination of the liver showed a massive infection of *Taenia hydatigena* larvae. Diffuse, spiral and haemorrhagic tracts made by migrating larvae were seen throughout the liver. Large brown to red areas of haemorrhages also appeared on the liver cut surfaces. All the recovered *T. hydatigena* larvae from migratory canals and hepatic surfaces were all immatures. There was no mature cyst formation. No evidence of pulmonary involvement was found. Histopathological examinations of the liver revealed numerous sections of migratory tracts filled with red blood cells, fibrin and tissue debris. Sections of *T. hydatigena* larvae were observed at the ends of migratory canals. Hepatocellular degeneration, necrosis, fatty change and infiltration of mixed inflammatory cells, including lymphocytes, plasma cells and macrophages were associated with these tracts. This article reports outbreak of an unusual and severe hepatitis cysticercosa with striking hepatic lesions that caused mortality in a livestock.

Taenia hydatigena has been reported in the small intestines of a large number of hosts including dogs, cats, mice and wild carnivores, like the wolf and the fox throughout the world (Payan-Carreira *et al.*, 2008; Senlik, 2008). The intermediate hosts are domestic and wild ruminants particularly sheep (Kara & Doganay, 2005). Cynomolgus monkey was reported incidentally as intermediate host too (Tsubota *et al.*, 2009). Normally, infection with *T. hydatigena* is not very pathogenic in dogs. However, its larvae migrate through the liver tissue and cause hemorrhagic and fibrotic tracts known as hepatitis cysticercosa (Kara & Doganay, 2005). Migration of cysticerci in the liver may result in condemnation of the liver at slaughter (Jepson & Hinton, 1986) or heavy infections and traumatic hepatitis in young lambs result in death (Radfar *et al.*, 2005).

In the authors' experiences, cysticercus of *T. hydatigena* and a few migratory tracts of this larva are commonly seen in the offal of sheep and goats slaughtered in Iran. This article reports outbreak of an unusual and severe hepatitis cysticercosa with striking hepatic lesions caused mortality in a livestock.

The liver and lungs of an four month old, female and dead lamb was referred to Veterinary clinic of Shahrekord by a sheepherder due to outbreak of an unknown disease caused four deaths in the livestock

over a period of one week. The organs were examined grossly and for histopathological examinations, samples of the liver were taken and fixed in 10 per cent buffered formalin and processed according to the standard histological techniques for paraffin embedding. Tissue sections 5 µm thick were done and used for conventional haematoxylin–eosin staining.

Post-mortem examination of the liver showed a massive infection of *T. hydatigena* larvae. Diffuse, spiral and haemorrhagic tracts made by migrating larvae were seen throughout the liver (Fig. 1, 2, 3). Large brown to red areas of haemorrhages also appeared on the liver cut surfaces (Fig. 3). There was no mature cyst formation and all recovered *T. hydatigena* larvae from migratory canals and hepatic surfaces were at immature stage (Fig. 4, 5). No evidence of pulmonary involvement was found. Histopathological examinations of the liver revealed numerous sections of migratory tracts filled with red blood cells, fibrin and tissue debris. Sections of *T. hydatigena* larvae were observed at the ends of migratory canals (Fig. 6). Hepatocellular degeneration, necrosis, fatty change and infiltration of mixed inflammatory cells, including lymphocytes, plasma cells and macrophages were associated with these tracts.

Taenia hydatigena (Oryan *et al*., 1994; Sharifi & Hadi-Zadeh Tasbiti, 1994; Hosseini & Habibi, 2000; Dalimi *et al*., 2006) and its metacestode (Oryan *et al*., 1994) are the most common parasites in dogs and sheep respectively, from different parts of Iran. To the best of our knowledge, there is no reported study on the prevalence of *T. hydatigena* and its metacestode in our area but the authors have commonly observed cysticercus of *T. hydatigena* and a few migratory tracts of this larva in the offal of sheep and goats. In this study, there was severe hepatitis cysticercosa but no evidence of pulmonary involvement. This is in contrast with findings of Alparslan *et al*. (2006). These investigators have reported acute hepatitis cysticercosa and pneumonitis cysticercosa in a one month old lamb (Alparslan *et al*., 2006). Grossly, cysticercus of *T. hydatigena* is generally seen attached to the omenta, the mesenteries, liver and peritoneum (Payan-Carreira *et al*., 2008; Senlik, 2008). The most frequent unusual locations are in the lungs, the kidneys and the brain. Less common locations have been reported to occur in the ovaries, uterine tubes, uterus, cervix and vagina. Recently, this cysticercus has been reported inside the chorion-allantoic membrane of a goat's foetus (Payan-Carreira *et al*., 2008).

All the recovered *T. hydatigena* larvae from migratory canals and hepatic surfaces were immature stage and this is compatible with the finding of Manfredi *et al*. (2006). These findings indicate that acute cysticercosis caused death of infected animals before completing developmental stage of the larva and cyst formation.

In our study, the microscopic lesions of liver were similar to the others (Blazek *et al*., 1985; Pathak *et al*., 1982). The authors did not find any trematode, nematode and pentastomid larvae in the liver of the lamb at macroscopic and microscopic level. We identified the cause of lesions as *T. hydatigena* larvae migration based on circumstantial evidence, location and morphological characteristics of gross and microscopic lesions. However, for definitive identification of metacestodes to a speices level, they have to be fed to its final carnivorous hosts and the obtained adult tapeworms studied.

In this study, hepatic lesions of the cyticercosis are caused by migrating cysticerci, most probably that of the larvae of *T. hydatigena*. So to prevent economic losses, sheep and goats must be prevented from ingesting proglottids or eggs of *T. hydatigena* passed in the faeces of the dog and other final hosts in pastures or feeding areas.

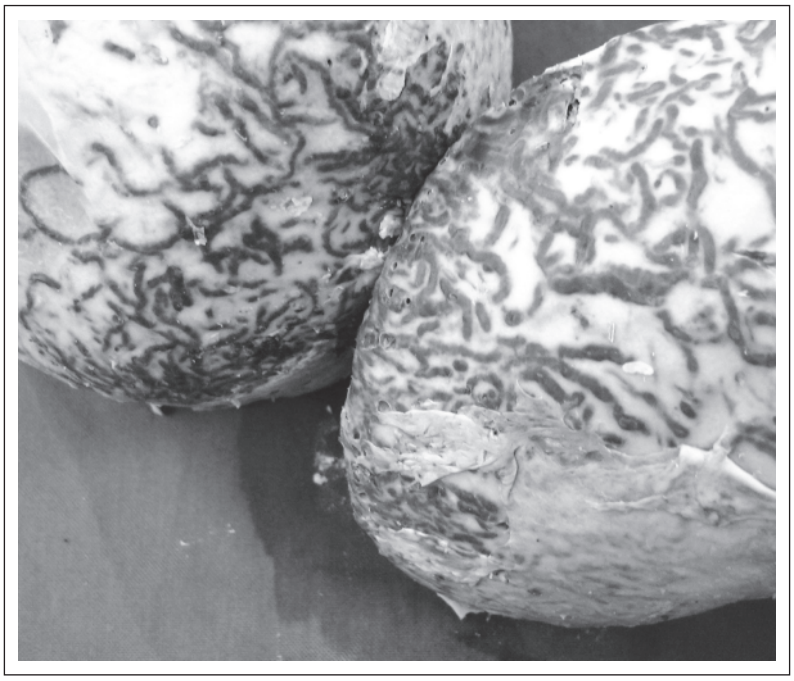

Figure 1. Fixed liver, parietal surface and partly removed hepatic capsule. Massive haemorrhagic tracts of migrating *Taenia hydatigena* larvae

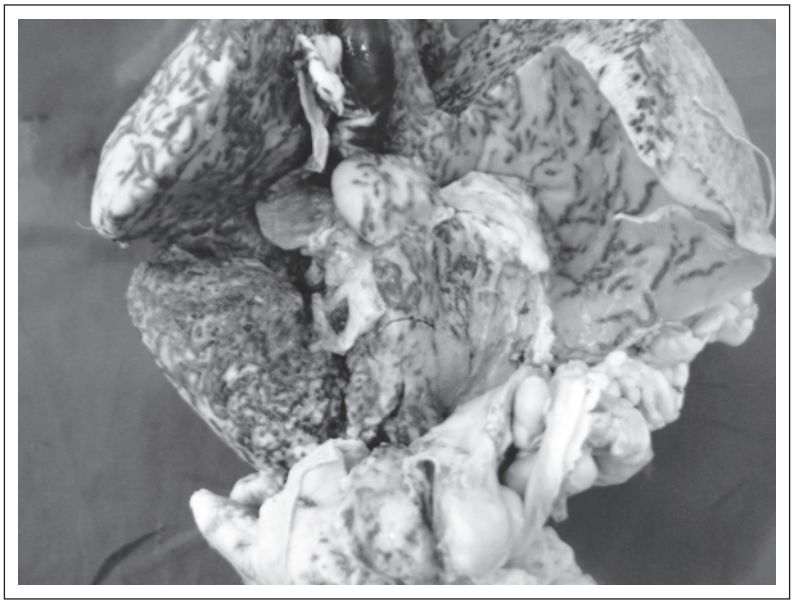

Figure 2. Fixed liver, visceral surface. Note diffuse migration of the larvae

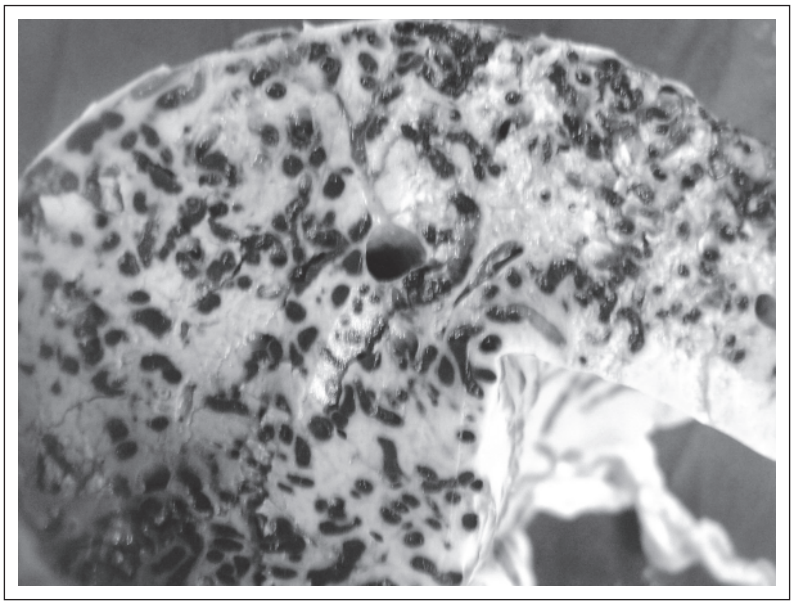

Figure 3. Fixed liver, cut surface. Transverse section of migration tracts

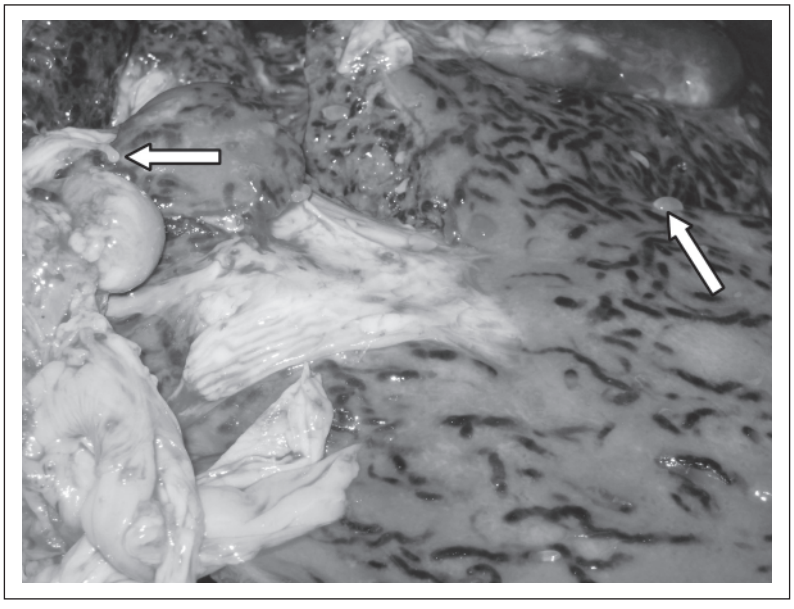

Figure 4. Liver before fixation. Note some *Taenia hydatigena* larvae (arrows) on the hepatic surface

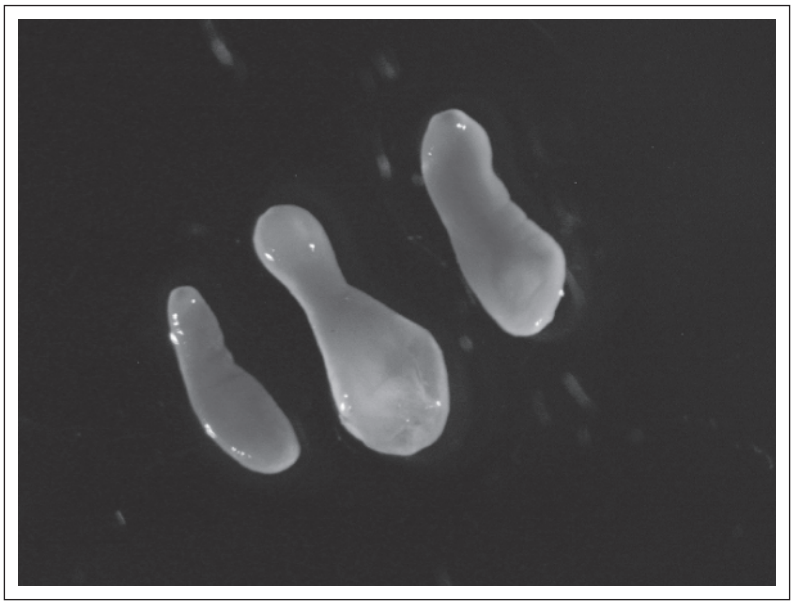

Figure 5. Note three recovered *Taenia hydatigena* larvae

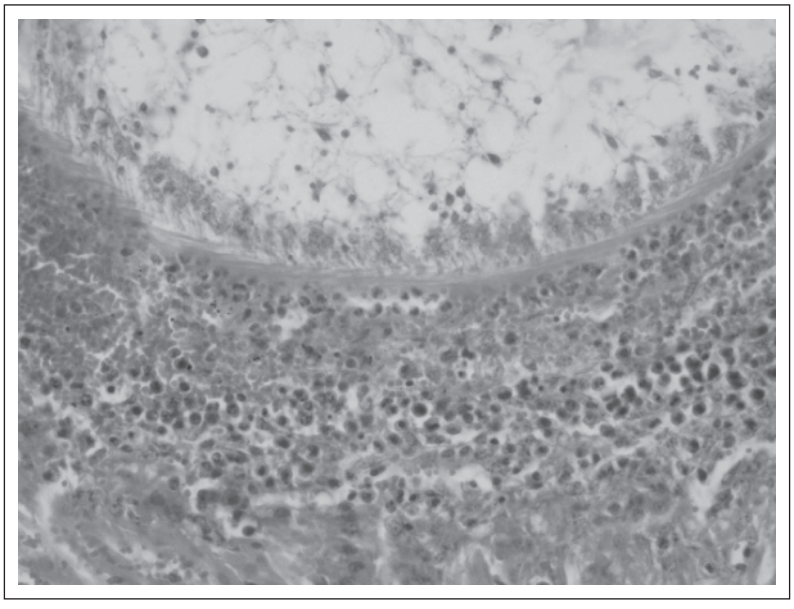

Figure 6. Section of the larva was surrounded by mononuclear inflammatory cells (haematoxylin and eosin, x400)

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