

# ECVP/ESVP Summer School in Veterinary Pathology

Summer School 2014 – Mock Exam

## CASE 6 Prairie dog liver capillariasis eggs and adults

Histologic Description	Points
Style	0,5
Approximately 60%(0,5) of liver parenchyma is expanded to substituted by multifocal to coalescing multinodular (0,5) inflammation (0,5) and necrosis (0,5) associated with parasite eggs and adults	2
<b>Multi nodular inflammation association with</b>	
<b>EGG DESCRIPTION</b>	
Oval 70x40 microns	0,5
Two polar plugs Bioperculated eggs	1
Thick anisotropic shell 3-4 micron thick	1
Interpretation as Capillaria	1
<b>Inflammatory cells associated with or surrounding eggs</b>	0
Prevalence of reactive macrophages and multinucleated giant cells	1
Followed by mature lymphocytes and plasmacells	1
Lesser numbers of Neutrophils	0,5
Eosinophils	0,5
Peripheral deposition of collagen (fibrosis)	1
<b>Peripheral hepatocytes with distinct cell borders and intensely eosinophilic cytoplasm (0,5) (coagulative necrosis) 0,5</b>	1
<b>Atrophy of adjacent hepatocytes</b>	1
<b>ADULT DESCRIPTION</b>	0
Transversal sections of organisms with digestive (0,5) and reproductive tracts (0,5) characterized by coelomyarian/polymyarian musculature (0,5) interpreted as adult nematodes 0, 5	2
Nematode excrements	0,5
Necrosis of hepatocytes adjacent to adults (parasite migration/tracts)	0,5
Lymphocytes and plasmacells surrounding adults	
Hemorrhages/hyperhaemia	0,5
Hepatic microvesicular lipidosis	0,5
Biliary hyperplasia	0,5
<b>Morphologic Diagnosis</b> Severe (0,5), multifocal to locally extensive (0,5), subacute to chronic (0,5), necrotizing (0,5) and granulomatous (0,5) and eosinophilic (0,5) hepatitis with intralesional Capillaria eggs and adults	3
<b>Etiology</b> <i>Capillaria hepatica</i>	2
	20

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**HD:** Approximately 60-70 % of liver parenchyma, is effaced by large, multifocal to coalescing, poorly demarcated nodules. These nodules contain elevated numbers of ovoidal structures (0,3 mm in length), with translucent thick (2  $\mu$ m) , two polar plugs (bioperculated eggs) containing embryos at different maturative stages. Surrounding eggs, hepatocytes with indistinct cell borders and uniformly lightly eosinophilic cytoplasm (coagulative necrosis) with interspersed degenerated PMN neutrophils and eosinophils are detectable. Bundles of spindle cells, with central, oval hyperchromatic nucleus (fibroblasts, fibrocytes), admixed with collagen (fibrosis) are visible around necrotic centers. Elevated numbers of plasmacells, lymphocytes, large macrophages, and less numbers of giant (up to 50  $\mu$ m) multinucleated (up to 15) cells are present at the nodular periphery (granulomas). Occasionally, transversal sections of organisms with digestive and reproductive tracts (adult worms) characterized by coelomyarian/polymyarian musculature can be seen in the liver parenchyma surrounded by fibrocytes and inflammatory cells. Hatched larvae, 0,4 mm in length, (ascarid larvae /larvae migrans), are also visible dispersed in the liver parenchyma. In the areas less affected by necrosis, almost all of the hepatocytes have lightly basophilic cytoplasm (cloudy swelling) or clear cytoplasmic vacuoles (hydropic degeneration). In the portal spaces, numbers of variable sized biliary ducts with epithelial cells with central round hyperchromatic nucleus and lightly basophilic cytoplasm (biliary hyperplasia) are also present surrounded by foci of fibrosis (portal fibrosis). In the surface of hepatic serosa, bundles of fibrocytes with interspersed plasmacells, lymphocytes and scant macrophages are also detectable.

**E:** *Capillaria hepatica* (Adults and larvae) + *Toxocara canis*/*Toxarcaris leonina*

**ED:** Hepatic capillariasis/Hepatic ascariidiosis

## CAPILLARIA

### General Discussion:

- [Capillaria](#) sp., which are aphasmid nematodes, parasitize diverse epithelium of a wide range of hosts.
- Some unique features of aphasmids include:
  - Stichosomes (a series of glands along the esophagus)
  - Bacillary or hypodermal bands: Pore-like structures on the body surface.
  - Eggs in many genera are bioperculate (bipolar plugged), barrel-shaped, and thick-shelled.
  - Aphasmids lack a pair of sensory papillae (phasmids) on the caudal end that is not identifiable in histologic section.
- *Capillaria hepatica* is primarily a disease of **wild rats and mice** but has been reported in many mammalian hosts, including the dog, cat, vole, chipmunk, groundhog, squirrel, mole, shrew, opossum, weasel, fox, skunk, raccoon, porcupine and man.



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- Rats infected with *Capillaria hepatica*, which leads to septal hepatic fibrosis +/- cirrhosis, are used as models for testing antifibrosing drugs

**Pathogenesis:** Eggs and excreta deposited in the liver cause tissue destruction, resulting in fibrosis

**Lifecycle:** Larvae are ingested, hatch and migrate to the liver > adults live in liver parenchyma and produce eggs > eggs develop only upon exposure to oxygen when the host is eaten by a predator or dies and decomposes > eggs pass in the feces of the predator > passed eggs embryonate and develop into infective larvae

**Typical Gross Findings:** Hepatomegaly with multiple to coalescing white or yellow patches and nodules

### Typical Light Microscopic Findings:

- Multiple hepatic granulomas surrounding bioperculate eggs and/or adult nematodes
- Features of this nematode:
  - Stichosome
  - Bacillary or hypodermal bands
  - Coelomyarian/polymyarian musculature, but may be inapparent