



Diagnostic Exercise

From The Davis-Thompson Foundation*

Case #: 79 Month: April Year: 2017

Answer Sheet

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Clinical History: 4-year-old Hereford cow found dead.

1. Describe the macroscopic changes:

Liver: On transverse section of the liver there is a large, yellow, firm and well-demarcated area of coagulative necrosis, surrounded by a thin, red to purple halo.

Kidney: The renal cortex and medulla are diffusely dark-brown to black, with a reddish renal pelvis.

2. Describe the microscopic changes:

Liver: Focally extensive hepatic coagulative necrosis, surrounded by a rim of inflammatory cells, mainly composed of viable and degenerate neutrophils. Blood vessels often contain fibrin thrombi. Variable numbers of large gram-positive bacilli, many of them with sub-terminal spores, single or in clusters, are commonly seen on the inner side of the inflammatory rim, throughout the necrotic focus and in the lumen of thrombosed vessels. Beyond the main necrotic area, moderate to severe hepatic centrilobular necrosis is also observed.

Kidney: Severe hemoglobinuric nephrosis, affecting both proximal and distal convoluted tubules, characterized by degeneration and coagulation necrosis of tubular epithelium. Protein casts in the lumen of convoluted tubules and eosinophilic intracytoplasmic droplets in epithelial cells of these tubules are also seen.

3. Morphologic diagnoses:

Liver: Necrotizing hepatitis, coagulative, focally extensive; or hepatic coagulative necrosis, focally extensive.

Kidney: Hemoglobinuric nephrosis; pigmentary nephrosis.

4. Name the disease: Bacillary hemoglobinuria.

5. Etiology: *Clostridium haemolyticum* (formerly known as *Clostridium novyi* type D).

6. Main predisposing factor: *Fasciola hepatica*

7. Pathogenesis: Migration of *Fasciola hepatica* (or other causes of hepatic damage) causes necrosis of the hepatic parenchyma, producing local anaerobiosis, allowing the germination of latent spores of *C. haemolyticum* present in the cytoplasm of Kupffer cells and the production of toxins (mainly beta toxin) and the generation of hepatic necrosis and hemolysis.

References:

1. Brown D, Van Wettere A, Cullen J. Hepatobiliary System and Exocrine Pancreas. Pathologic Basis of Veterinary Disease, 6th Edition. 2016. James F. Zachary. Bacillary hemoglobinuria, page 458.
2. Cullen J, Stalker M. Liver and biliary system. Jubb, Kennedy & Palmer's Pathology of Domestic Animals, 6th Edition. 2016. M. Grant Maxie, Vol 2. Bacillary hemoglobinuria, page 317.
3. Navarro M, Dutra F, Uzal F. Bacillary hemoglobinuria. Clostridial Diseases of Animals. 2016. Francisco A. Uzal, J. Glenn Songer, John F. Prescott and Michael Popoff. Chapter 22, pages 265-274.

*The Diagnostic Exercises are an initiative of the **Latin Comparative Pathology Group (LCPG)**, the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the CL Davis website (http://www.cldavis.org/diagnostic_exercises.html).

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