



Diagnostic Exercise

From The Davis-Thompson Foundation*

Case #: 84 Month: September Year: 2017

Answer Sheet

Contributor: Santiago S. Diab, DVM, Diplomate ACVP. California Animal Health and Food Safety Laboratory. University of California, Davis.

Clinical History: Approximately 100 out of 240, 3-week-old backyard chicks died within a 2-week period without showing any clinical signs of disease. These chicks were purchased without a vaccination history at day 1 or 2 of life and were not vaccinated by the owner after purchase.

Necropsy Findings: On necropsy, 7 out of 7 chicks had swollen, pale kidneys. Ureters were filled and distended by tan, chalky material (Figure 1). Additionally, 1 out of 7 chicks had widespread deposition of white, chalky material in the pericardium (Figure 2).

Gross and microscopic images:



Figure 1



Figure 2

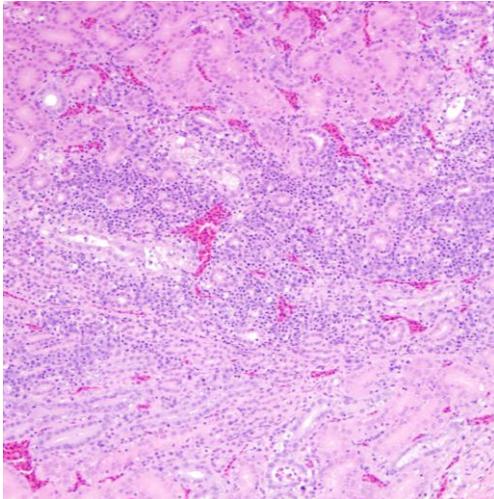


Figure 3. Kidney, H&E stain 200x

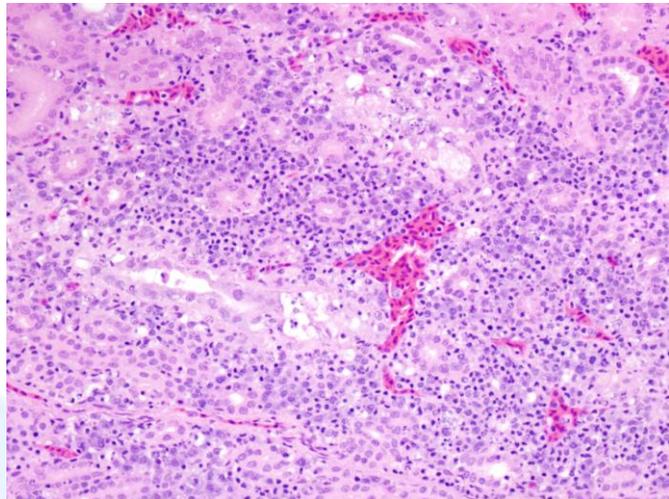


Figure 4. Kidney, H&E stain 400x

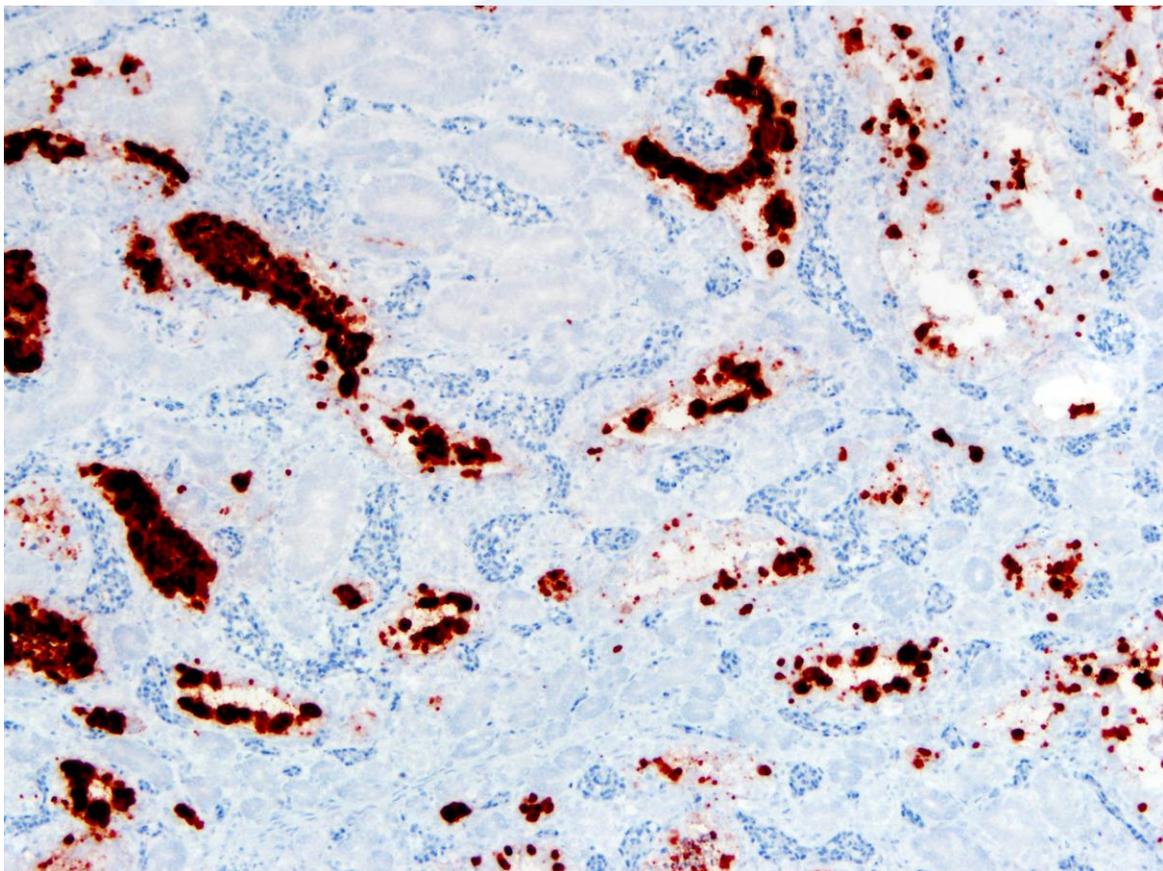


Figure 5. Positive IHC for Infectious Bronchitis Virus (IBV).

Gross morphologic diagnosis and possible causes: Renal (Figure 1) and pericardial (Figure 2) gout. Gout is typically secondary to renal failure. Uric acid is the waste product of protein metabolism and renal failure leads to increase of uric acid in the blood

(hyperuricemia) and to visceral and/or articular gout. Causes of renal failure include dehydration, urolithiasis (uroliths clogging the ureters), toxic problems (e.g. salt toxicity) and infectious agents (e.g. infectious bronchitis virus).

Microscopic morphologic diagnosis (based on the pictures shown): Nephritis, interstitial, lymphoplasmacytic, multifocal (caused by Infectious Bronchitis Virus; see comments below). Note: Gouty nephrosis was also present in all chicks but it is not evident in the two images shown in this exercise.

Possible cause/s: At low magnification (Figure 3), interstitial mononuclear infiltrates in the kidneys of backyard chickens could be neoplastic (i.e. lymphoma as seen in Marek's disease or Avian Leukosis Virus) or inflammatory. At higher magnification (Figure 4), in this case, the mononuclear interstitial infiltrate was lymphoplasmacytic, with a considerable number of plasma cells, which suggests an inflammatory response to an infectious agent rather than neoplasia. This, coupled with the clinical history of high mortality in 3-week-old chicks highly suggested infection with a nephrogenic strain of infectious bronchitis virus (IBV).

Comments: Immunohistochemistry for IBV was strongly positive in the kidneys of all chickens (Figure 5) and only weakly positive in the respiratory tract of a few chicks, indicating a marked nephrotropism of this particular viral strain. IBV was further confirmed by virus isolation from an organ pool and qRT-PCR. IBV sequencing results showed this strain to be 97% identical to the IBV isolate GA/11323/2011 and 95% identical to the IBV isolate CA/1737/04. Renal/visceral gout in these chicks was therefore considered secondary to renal failure due to infection with this highly virulent strain of infectious bronchitis virus. Dehydration due to "illness" likely contributed to the development and severity of the renal/visceral gout.

Infectious bronchitis virus (IBV) is a highly contagious disease of chickens that may manifest with respiratory signs, reduced egg production, poor egg quality, and/or high mortality. In California, the Cal99 variant of IBV has been associated with respiratory disease and increased organ and carcass condemnation since 1999, but only recently with nephritis and nephrosis. Since there are multiple serotypes of IBV and immunization with only one antigenic type produces little or no protection against the other unrelated serotypes, genotyping of IBV field isolates is important to not only monitor the emergence of new variants, but also to evaluate the role and extent of protection of the commercial vaccines currently available. This is yet another example of the importance of monitoring for highly contagious infectious diseases in backyard chicken flocks, as these pathogens may spread quickly, the large commercial poultry industry and the local, state, and national economies.

References:

- Nephritis Associated with Infectious Bronchitis Virus Cal99 Variant in Game Chickens. M. França, P. R. Woolcock, M. Yu, M. W. Jackwood, and H. L. Shivaprasad. Avian Diseases, 55(3):422-428. 2011.
- Molecular and Serologic Characterization, Pathogenicity, and Protection Studies with Infectious Bronchitis Virus Field Isolates from California. Mark W. Jackwood, Deborah A. Hilt, Susan M. Williams, Peter Woolcock, Carol Cardona, and Robert O'Connor. Avian Diseases, 51(2):527-533.
- Outdoor ranging of poultry: a major risk factor for the introduction and development of High-Pathogenicity Avian Influenza. G. Koch" and A.R.W. Elbers. Department of Virology, Central Institute of Animal Disease Control (CIDC-Lelystad), Wageningen. University and Research Centre, P.O. Box 2004, NL-8203 AA Lelystad, The Netherlands.

*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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