CONTROL ID: 2016971

TITLE: Use of Iba1 Immunohistochemistry in the Diagnosis of Hepatic Histiocytic Sarcoma in a Dog: A Case for Kupffer Cell Neoplasia?

ABSTRACT BODY:

Narrative: Common sites of origin of histiocytic sarcoma complex in dogs include the skin, subcutis, joints, lymph node, spleen, lung, and bone marrow. Iba1 expression has been reported in subdural (Ide 2011) and ocular histiocytic sarcoma but not in other sites. A 7-year-old male neutered border collie presented with chronic weight loss and a 2 day history of vomiting and anorexia. CBC and chemistry demonstrated an albumin of 1.7 (2.6-4.2) and mild signs of cholestasis. Coagulation times were mildly elevated. Following diagnostic imaging and a short hospitalization the dog developed severe hemoabdomen and was euthanized. At postmortem examination approximately 90% of the left lateral liver lobe was expanded and effaced by coalescing, tan to yellow, firm, irregularly defined nodules. Similar nodules, ranging in diameter from 1 to 3cm, were found throughout all lobes. Additional findings included multifocal dark red nodules up to 2.5cm in diameter expanding the spleen, and enlargement of hepatic lymph nodes up to 3cm in diameter. Cytology of the hepatic nodules demonstrated pyogranulomatous inflammation with atypical histiocytes. Histopathologically, neoplastic cells filled hepatic sinusoids and formed unencapsulated, poorly demarcated, infiltrative, moderately cellular nodules composed of ill-defined packets. Cell morphology varied from spindle to polygonal to round with indistinct borders and moderate to abundant, pale, eosinophilic, often foamy cytoplasm. Nuclei were pleomorphic and ranged from spindle-shaped with clumped to marginated chromatin to round/oval nuclei with coarse chromatin and one to two distinct nucleoli. Mitoses averaged 20 per 10 HPF and were occasionally bizarre. Scattered neoplastic cells were multinucleate and no erythrophagocytosis was seen. Similar neoplastic cells effaced the hepatic lymph nodes and were seen in only 2 of the splenic nodules. Micrometastases were seen in the lung and tracheobronchial lymph node. Morphologically the neoplasm was preliminarily diagnosed as a poorly differentiated sarcoma. Histiocytic sarcoma (HS) was diagnosed based on neoplastic cells' cytoplasmic expression of Iba1. Results were supported with follow-up immunohistochemistry (IHC) using CD3, CD18, and CD20. Experimental IHC was attempted using 2 clones of anti-mouse CLEC4F antibody but staining was nonspecific. Investigation to rule in or rule out a dendritic cell origin is ongoing. The findings in this case illustrate the value of Iba1 in the diagnosis of HS in the canine liver. The large hepatic tumor burden, combined with the absence of a clear extrahepatic primary neoplasm, raise the possibility of primary hepatic HS.

CURRENT CATEGORY/DISCIPLINE: Pathology

AUTHORS/INSTITUTIONS: K. Kim, R. Bauer, Louisiana Animal Disease Diagnostic Laboratory, Vanderbilt University, Baton Rouge, Louisiana, UNITED STATES;
K. Kim, R. Bauer, Department of Pathobiological Sciences, Louisiana State University, Baton Rouge, Louisiana, UNITED STATES;

AWARDS: Graduate Student Poster Presentation|Graduate Student Oral Presentation|AAVLD/ACVP Pathology Award

Trainee Letter: K Kim Role and Significance.pdf

CONTROL ID: 2022100

TITLE: Sudden Death Associated with Pulmonary Hemorrhage in Racehorses in New Mexico: 2010-2014

ABSTRACT BODY:

Narrative: New Mexico has a thriving horse racing industry that has an important role in the state's economy. The majority of racing and wagering involves thoroughbred horses, but quarter horses are raced as well. The industry in New Mexico has had a history of being dangerous for horses and riders. New Mexico racetracks averaged 3.5 horse fatalities per

1,000 starts from 2007 to 2011, versus a United States average of 2.0 horse fatalities per 1,000 starts from 2008 to 2010. To investigate why there were high numbers of race horse fatalities in New Mexico, the New Mexico Racing Commission (NMRC), the agency with oversight of the racing industry in New Mexico, began requesting necropsies of horses that had inexplicably died during training or racing. Horses with musculoskeletal breakdowns or other known causes of death were not submitted for necropsy.
From 2010 to 2014, 17 postmortem examinations on racehorses seized by the NMRC were performed. The death of 12 of these horses was attributed to severe pulmonary hemorrhage (PH). The horses had a history of weakness, incoordination, and collapse followed by rapid death. There were 8 quarter horses and 4 thoroughbred horses. The vast majority of horses (11) were male. Five quarter horses were 5 years of age or younger and 3 were six years of age or older. All 4 of the thoroughbred horses were older than 6 years of age. The gross lesions included diffusely dark red, congested and hemorrhagic lungs that did not collapse when the thorax was opened. The lungs often had variable numbers of pleural hemorrhages, hemorrhage in the subpleural septa, and rib impressions on the parietal surface of both lungs. The trachea contained varying amounts of hemorrhage, and there were often large volumes of blood that exuded from the nares on the transport trailer and on the cooler floor. The microscopic lesions were severe congestion of the alveolar capillaries with extensive acute hemorrhage and edema within almost all of the alveoli, the airways, and the subpleural septae. There were multifocal pleural hemorrhages microscopically. There was almost no evidence of previous episodes of pulmonary hemorrhage in these horses. However, the marked acute hemorrhage in the lungs of the affected horses could have obscured any subtle evidence of pre-existing subacute or chronic hemorrhage. Toxicology testing of all of the horses was performed on urine and blood collected by representatives of the NMRC. Although the authors were not privy to the toxicology results of the individual horses due to the confidentiality of the NMRC's investigations, abnormal or illegal drugs were not reported to be present in these horses. No gross or microscopic lesions were found in the heart of these horses. The cause of the fatal PH in these horses has not been determined.

CURRENT CATEGORY/DISCIPLINE: Pathology

AUTHORS/INSTITUTIONS: J. Ragsdale, N. Takacs, R. Taylor, Veterinary Diagnostic Services, New Mexico Department of Agriculture, Albuquerque, New Mexico, UNITED STATES;

AWARDS:

Trainee Letter:

CONTROL ID: 2020944

TITLE: Abortion in a Miniature Donkey Associated with a Gammaherpesvirus Similar to *Equid Herpesvirus-7*

ABSTRACT BODY:

Narrative: Fetal tissues and placenta from a third trimester miniature donkey abortion were submitted to the Washington Animal Disease Diagnostic Laboratory for abortion diagnosis. Microscopic examination of formalin-fixed tissues revealed multifocal necrotizing placentitis. Several cells within the necrotic foci contained large, eosinophilic, intranuclear inclusions. Virus isolation from fresh frozen placenta identified a cytopathic, syncytia-forming virus. Polymerase chain reaction from the cultured virus using degenerate universal herpesvirus primers amplified a 699 base pair portion of the DNA polymerase gene. The PCR amplicon had 97% nucleotide identity with the DNA polymerase gene of *equid herpesvirus-7* (EHV-7), also known as *asinine herpesvirus-2*, a gammaherpesvirus. Additionally, the amplicon had complete identity with short sequences of asinine herpesviruses that have been associated with interstitial pneumonia in donkeys. EHV-7 has previously been isolated from nasal secretions

of normal donkeys and mules, but to the authors' knowledge, this is the first report of abortion associated with EHV-7.

CURRENT CATEGORY/DISCIPLINE: Virology | Pathology

AUTHORS/INSTITUTIONS: T. LeCuyer, J. Evermann, T. Baszler, G.J. Haldorson, Department of Veterinary Microbiology & Pathology, Washington State University, Pullman, Washington, UNITED STATES;
T. LeCuyer, D. Bradway, J. Evermann, T. Baszler, G.J. Haldorson, Washington Animal Disease Diagnostic Laboratory, Washington State University, Pullman, Washington, UNITED STATES;
A. Rink, Nevada Animal Disease and Food Safety Laboratory, Sparks, Nevada, UNITED STATES;

AWARDS: Trainee Travel Award|Graduate Student Oral Presentation

Trainee Letter: aavld letter.lecuyer.pdf

CONTROL ID: 2008207

TITLE: Investigation of Serum Amyloid A Levels in Fetal Heart Blood in Aborted Equine Fetuses

ABSTRACT BODY:
Narrative: Serum amyloid A (SAA) is a highly conserved-acute phase protein synthesized predominantly by the liver and triggered by infection, inflammation, stress, neoplasia, trauma and toxins. SAA is well recognized and used in human medicine for diagnosis, prognosis and assessment of health. Increased levels of SAA are seen with inflammation, infections, surgical trauma in horses and, bacterial infections, arthritis, and septicemia in foals. A recent study showed that SAA levels are elevated in mares with ascending placentitis. However, to the authors' knowledge, SAA levels in equine fetal heart blood have not been reported. In this pilot study, SAA levels were measured in aborted equine fetuses. Blood from 65 aborted equine fetuses was obtained and, serum was separated and stored in -80C until use. A commercial SAA ELISA kit was used in total 65 serum samples in which 25 represented the abortion cases where an infectious disease process was identified (1st group) and, 40 cases represented the abortion cases where no infectious disease process was identified (2nd group) by the pathologists. SAA was elevated (ranging from 4 to 40 µg/ml) in 19 cases (including 3 EHV-1 and 1 leptospirosis cases) out of the first group. In the remaining 6 cases (which 5 cases were reported as focal placentitis), SAA levels were found to be very low (between 0 and 1 µg/ml). In 34 cases of the second group, SAA levels were near zero, whereas in 6 cases SAA levels were elevated (ranging 5,8 to 40 µg/ml). Because small molecules (oxygen, glucose, lactose, fatty acids and amino acids), but not large molecules, have been shown to cross placental barriers and, the equine fetus can produce large molecules such as immunoglobulin (e.g., fetal antibodies against leptospira), our results suggested that SAA was fetal origin and produced by the fetus as a response to infection. Preliminary data suggested that SAA testing can be used as a marker for further investigation of cases where a definitive diagnosis has not been made and learn more about fetal-pathophysiology and immunology.

CURRENT CATEGORY/DISCIPLINE: Bacteriology/Mycology | Pathology

AUTHORS/INSTITUTIONS: E. Erol, C. Jackson, S. Locke, N. Kelly, C. Carter, Veterinary Diagnostic Laboratory, University of Kentucky, Lexington, Kentucky, UNITED STATES;
D. Horohov, Department of Veterinary Science, University of Kentucky, Lexington, Kentucky, UNITED STATES;

AWARDS:

Trainee Letter:

CONTROL ID: 2008253

TITLE: Lesions Associated with *Eucoleus* sp. in the Non-Glandular Stomach of Wild Urban Rats (*Rattus norvegicus)*

ABSTRACT BODY:
Narrative: This study describes the histological lesions in the non-glandular stomach associated with *Eucoleus* sp. infection in a wild, urban population of Norway (*Rattus norvegicus*) and black rats (*R. rattus*). Over a 1-year period, 725 rats were trapped in Vancouver, Canada and autopsied. A subset of 183 Norway rats and 15 black rats was examined for *Eucoleus* sp. infection in the mucosa of the upper gastrointestinal tract including ventral tongue, oropharynx, esophagus and non-glandular stomach. Additionally, non-glandular stomachs were examined for six distinct categories of histological lesions. The apparent prevalence of *Eucoleus* sp. in the upper gastrointestinal tract of Norway rats was 43% (79/183). Only one black rat was infected (1/15; 7%). Detailed statistical analysis was applied to Norway rats only. Among Norway rats, infection with *Eucoleus* sp. was significantly associated with hyperkeratosis, mucosal hyperplasia, keratin pustules and submucosal inflammation in the non-glandular stomach ($P<0.05$). *Eucoleus* sp. infection and/or related stomach pathology was present in 135/183 (74%) of rats. The odds of being affected by *Eucoleus* sp. or associated stomach pathology were greater in heavier (OR = 1.06, 95% CI = 1.00 – 1.12) and sexually mature rats (OR = 4.64, 95% CI = 1.23 – 17.10). These findings suggest that gastrointestinal *Eucoleus* sp. infection is common in wild urban rats and induces a substantial host response. The impact of these lesions and infection on individual rats and the population as a whole requires further investigation.

CURRENT CATEGORY/DISCIPLINE: Pathology | Parasitology

AUTHORS/INSTITUTIONS: J.L. Rothenburger, F.A. Leighton, Department of Veterinary Pathology, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, CANADA;
C.G. Himsworth, Animal Health Centre, British Columbia Ministry of Agriculture, Abbotsford, British Columbia, CANADA;
C.G. Himsworth, School of Population and Public Health, University of British Columbia, Vancouver, British Columbia, CANADA;
M. Lejeune, Alberta Region, Canadian Wildlife Health Cooperative, Calgary, Alberta, CANADA;
P.M. Treuting, Department of Comparative Medicine, School of Medicine, University of Washington, Seattle, Washington, UNITED STATES;
F.A. Leighton, Headquarters, Canadian Wildlife Health Cooperative, Saskatoon, Saskatchewan, CANADA;

AWARDS:

Trainee Letter:

CONTROL ID: 2022775

TITLE: Identifying Vaccinal-Type Strains of BoHV-1 in Bovine Abortion Using Single Nucleotide Polymorphisms: 10 Herd Episodes

ABSTRACT BODY:
Narrative: Three vaccine manufacturers in the United States currently sell multivalent vaccines containing modified live *bovine herpesvirus 1* (BoHV-1) for use in pregnant cattle. Their use has become popular since they can be used year-round. One disadvantage is that they can be abortifacient unless vaccination is done within the previous 12 months using specific vaccine products and in accordance with label directions. Diagnostically it is impossible to distinguish iatrogenic from natural abortion on the basis of herpetic-type lesions and virus isolation alone. Use of single nucleotide polymorphisms (SNPs) in BoHV-1 was proposed as a method to resolve whether outbreaks were likely to be iatrogenic (1). We

selected 10 abortion episodes (2010 – 2014) where an apparent association existed between use of modified live BoHV-1 and abortion in the subsequent 1 – 3 months. In individual episodes the products were either used on or off label, according to the producer. All 10 episodes had SNP patterns consistent with those of commonly used modified live BoHV-1 strains. Use of SNP patterns is helpful in resolving whether abortion was likely due to vaccinal virus, particularly when disagreement existed between a producer and representatives of the vaccine manufacturer.

1: Fulton et al.: 2013. Vaccine 31(11):1471-1479.

CURRENT CATEGORY/DISCIPLINE: Pathology

AUTHORS/INSTITUTIONS: D. O'Toole, M.M. Miller, Department of Veterinary Sciences, University of Wyoming, Laramie, Wyoming, UNITED STATES;
C.C. Chase, Department of Veterinary and Biomedical Sciences, South Dakota State University, Brookings, South Dakota, UNITED STATES;

AWARDS:

Trainee Letter:

CONTROL ID: 2021241

TITLE: The Effect of Zinc Oxide Nanoparticles (Zno-NPs) and Diet Form (Dry and Moisture) on the Indices of Immune System, Blood Parameters and Gut Morphological of Broilers During Starter Period

ABSTRACT BODY:

Narrative: This research was conducted to investigate the effect of different levels of zinc oxide nanoparticles (100 or 200 mg/kg diet) and diet form (dry or wet diet with 1:3 water to diet ratio) on the indices of immune system, blood parameters and gut morphological of broilers during starter period (from hatch to 21 days). A total of 240 one-day old male broiler chickens (Ross-308) were randomly allocated into 2×2 factorial experiment consisted of four groups with four replicates (15 birds / pen) for a 21-day trial. Experimental diet was: T1) dry diet+100 mg of Zno-NPs/kg diet; T2) dry diet+200 mg of Zno-NPs/kg diet; T3) wet diet+100 mg of Zno-NPs/kg diet and T4) wet diet+200 mg of Zno-NPs/kg diet. The results of the research indicated that there were no significant ($P>0.05$) differences in heamatological parameters such as Hb, Hct and RBC although, the highest titer of mention parameters were observed in T3 (wet diet plus 100 mg of Zno-NPs/kg) and T4 (wet diet plus 200 mg of Zno-NPs/kg). Furthermore, the addition of Zno-NPs in wet diet significantly increased ($P<0.05$) the number of WBC, lymphocytes, and decreased ($P<0.05$) heterophil to lymphocyte ratio compared to the birds fed dry diet plus Zno-NPs. The total immunoglobulin and IgG concentration in the birds fed wet diet inclusion of 200 mg Zno-NPs was higher than other groups ($P<0.05$). As well, relative weight of bursa Fabricius and thymus in birds fed wet diet inclusion Zno-NPs was higher ($P<0.05$) than other group during the 21-day period. Duodenum and jejunum traits (villi height, depth of crypt and ratio those) was not affected by diet ($P> 0.05$). In conclusion, the present findings suggest that supplementation wet diet with Zno-NPs improved indices of immune response and the best response observed in the birds that fed with wet diet plus 200 mg of Zno-NPs per kg diet in comparison with other experimental diet during starter stage.

CURRENT CATEGORY/DISCIPLINE: Pathology

AUTHORS/INSTITUTIONS: F. Ahmadi, F. Mohammadi, M. Esfahani, V. Pahlavan, S. Pazhavand, Department of Animal Science, Azad University of Kurdistan, Sanandaj, Kurdistan, IRAN, ISLAMIC REPUBLIC OF;

AWARDS: Trainee Travel Award|Graduate Student Poster Presentation|Graduate Student Oral Presentation

Trainee Letter: My reasons.pdf

CONTROL ID: 2021191

TITLE: Pathology and Diagnosis of Necrotic Enteritis of Chickens

ABSTRACT BODY:
Narrative: Diagnosis of necrotic enteritis produced by *Clostridium perfringens* (NE) in poultry can be challenging, mostly because this organism is usually found as a normal inhabitant of the gut, making it difficult to determine its role in pathogenesis. We reviewed the diagnostic features of 65 cases of necrotic enteritis in chickens, that were submitted to the Turlock, Tulare and San Bernardino branches of the California Animal Health and Food Safety Laboratory, between 2004 and 2013. Of these, 70% of the cases had focal or diffuse gross lesions in at least one portion of the intestine. Microscopic lesions consisted of mucosal intestinal necrosis, and in some cases necrotic changes reached the submucosa, with a few cases in which the necrosis extended into the muscularis. Heterophils were the dominant inflammatory cells in the initial stages of the disease, but mononuclear cells are also present in more chronic lesions. Large numbers of Gram positive rods, usually grouped in clusters, were seen associated with the necrotic lesions. Immunohistochemistry for *C. perfringens* performed in small intestine of 10 of the birds with NE revealed the presence of strongly positive intralesional rods in all the birds tested by this technique. Microscopic intestinal lesions were observed most frequently in the jejunum-ileum (61%), duodenum (43%) and the ceca (17%). *C. perfringens* type A was isolated from the 24 (100%) cases in which anaerobic culture of the intestine was attempted. Seven (29%) of these 24 isolates carried the gene encoding for beta 2 toxin, while 2 (8%) each of those isolates were positive for the genes encoding enterotoxin and Net B toxin, respectively. Coccidiosis was diagnosed by fecal floatation and/or histopathology in 50% of the cases and it was the most frequent predisposing factor, but it was not always present. The number of cases NE received in these three laboratories increased ~ 100% in 2009 and ~ 200% in 2013 when compared with the average annual submission over the previous 9 years. Diagnosis of NE cannot be based on gross examination alone and an acceptable level of certainty should be achieved by combining several diagnostic tests. Although NetB has been recently been associated with many cases of NE around the world, our results suggest that this toxin is not necessary for NE to occur. The dramatic increase in the number of cases of NE to our lab over the past few years can be related to the significant reduction in the use of antimicrobials.

CURRENT CATEGORY/DISCIPLINE: Pathology

AUTHORS/INSTITUTIONS: F. Uzal, California Animal Health and Food Safety (CAHFS), UC Davis, San Bernardino, California, UNITED STATES;
C. Gornatti Churria, Faculty of Veterinary Sciences, National University of La Plata, La Plata, Buenos Aires, ARGENTINA;
G. Senties Cue, CAHFS, UC Davis, Turlock, California, UNITED STATES;
H. Shivaprasad, CAHFS, UC Davis, Tulare, California, UNITED STATES;

AWARDS:

Trainee Letter: