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VIRGINIA ANIMAL DIAGNOSTIC NEWSLETTER

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EDITORIAL

Avian Influenza Outbreak 2022

Avian influenza (AI) (also known as “bird flu”) is caused by the H5 and H7 subtypes of influenza type A virus, and it affects both domesticated and wild birds. Outbreaks of Avian Influenza happen periodically around the world, and the virus has been isolated from over 100 different species. Waterfowl that are carriers of the disease include ducks, geese, swans, etc. They carry the virus within their respiratory and intestinal tracts, even though some waterfowl species are never clinically sick. Waterfowl, specifically, are the primary concern of disease spread between our private and commercial flocks due to fomites and fecal material. Influenza type A is extremely contagious, especially within domesticated birds such as chickens and turkeys. The virus is spread by respiratory secretion, in feces, and on the surfaces that these bodily secretions land on. The current HPAI outbreak has spread across 32 different states, within 265 confirmed flocks after first being detected in February of 2022 and as of this moment has affected 36.66 million birds across the United States. Migratory fowl are monitored via surveillance testing and serve as a virus reservoir. A huge risk to poultry is the intermingling of domestic and wild fowl that can spread virus and exchange genes to create a new mutation of HPAI.

Avian influenza has two broad categories: low pathogenic and highly pathogenic, with H5 or H7 subtypes.

Low pathogenic Avian influenza (LPAI): Most avian influenza type A are low pathogenic and show no disease to mild disease. This can present with lethargy and decreased egg production. The concern with LPAI is that it can mutate into the more concerning highly pathogenic AI.

Highly Pathogenic Avian Influenza (HPAI): HPAI is associated with very severe clinical disease and a high mortality rate. Viral infections cause mortality in 90-100% of all birds infected due to multiple organ shutdown and failure within 48 hours after being exposed to the virus. The exception to this rule is waterfowl. They can carry HPAI without being clinically ill.

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An outbreak of this disease is concerning for a multitude of reasons:

- The virus spreads very easily in domesticated birds and wild waterfowl and results in significant mortality rates
- There is an economic concern due to the loss of birds within the poultry industry, export and import markets, and supply chains.
- Low pathogenic strains of avian influenza can mutate to highly pathogenic AI strains
- The virus can be transmitted to humans when exposed to infected birds and thus creates public health concern.

Are there treatment options?

Unfortunately, no. Due to the severity of the disease and how quickly it spreads, the only control measure is depopulation of infected flocks. In Virginia, as of February 12th, 2022 the state has 0 affected commercial flocks, 1 affected backyard flocks and a total of 90 birds affected within this outbreak.

Jamie Horstmann DVM and Jessica Walters DVM, PhD, DACPV
Harrisonburg RAHL

Equine and Camelids



NSAIDs chronic colitis in a horse

A seventeen-year-old Morgan gelding was submitted for necropsy after acute respiratory distress and fever. This animal underwent surgery two weeks prior to death to remove a squamous cell carcinoma of the penis, and recovered uneventfully. Large amounts of intestinal contents were collected from the abdominal cavity. The colon had two significant findings: a focal perforation of the right ventral colon and a well-demarcated, segmental stricture of approximately 1 meter of the right ventral/right dorsal colon, which was compatible with a vascular event. Histologically, abundant granulation tissue replaced the mucosa of the portion with the stricture, which indicated a chronic process (more than a week). Segmental colonic stricture with granulation tissue is a well-known sequel of non-steroidal anti-inflammatory induced colitis, which pathogenesis includes vascular constriction and ischemia/hypoxia of the large intestine,

particularly of the right dorsal colon. It was speculated that the perforation of the right ventral colon had similar pathogenesis.

Francisco R. Carvalho DVM, DSc, DACVP, Virginia Tech

Megaesophagus in a llama

A 12-year-old, male llama was submitted for dysphagia. At necropsy, the esophagus was diffusely dilated and there was prominent variation in myocyte size and numerous atrophied myocytes microscopically. There are no characteristic histologic features of megaesophagus, but the gross and microscopic findings, in this case, were consistent with megaesophagus. Megaesophagus is a relatively common occurrence in camelids that can be seen secondary to various processes (e.g. esophagitis, neoplasia, obstruction) or idiopathic. Megaesophagus is more commonly seen in adult to geriatric llamas but crias are more often affected in alpacas. In alpacas, megaesophagus also often occurs secondary to large vessel anomalies where feed can become trapped near the base of the heart. In this case, there was no evidence of an underlying cause for the megaesophagus and it was considered idiopathic.

Jaime Weisman DVM, MS, Warrenton RAHL

Septic jugular thrombosis in a horse

A sixteen-year-old mare was euthanized due to the development of pulmonary hypertension and elevated fibrinogenemia. This animal was treated for bronchopneumonia for a few weeks before the euthanasia.

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The cranial vena cava, approximately 30 cm cranial to the right auricle, was partially occluded by a focal transmural septic thrombus, with an abscess located at the entrance of the thorax (*E. coli* isolated). Numerous pulmonary vessels were obstructed with massive emboli, likely generated from the previously mentioned abscess. Jugular vein thrombosis in horses often follows catheterization or an injection and will cause swelling, heat, and pain in the affected area, with thickening of the jugular vein. In this case, the thrombus in the vena cava perforated the vein and extended into the adjacent connective tissue and muscle, with a focal abscess. Then, from the abscess or from the thrombus, multiple bacterial emboli were released, which triggered embolic pneumonia and the presence of large fibrin masses occluding numerous large and small-sized arteries. This finding could have been associated with pulmonary hypertension described clinically. In addition, evidence of embolic showering of bacteria into other organs was present in the kidneys, with numerous bacterial colonies in blood vessels.

Francisco R. Carvalho DVM, DSc, DACVP, Virginia Tech

RUMINANTS



Sudden Death in a Cow

A late-gestation, 5-year-old, Holstein cow was noted to be off feed in the morning, became recumbent by 10:30 A.M., and was dead within 45 minutes. The cow had been previously healthy. Gross examination revealed severe distention of the rumen and reticulum by feed material and watery green-brown fluid. Arising from the mucosa of the rumen were 10, firm, white to gray masses. The largest of these masses was 5 cm in diameter and was occluding the junction between the rumen and omasum. Additionally, the lungs were overinflated, with areas of emphysema and bullae formation, and the airways contained aggregates of green plant material. The uterus contained a 101 cm female fetus.

Histologic examination confirmed that the ruminal masses were fibropapillomas and that there were aggregates of feed material, protozoa, and bacteria in the bronchi and bronchioles of the lungs, consistent with aspiration of ruminal contents. Alimentary fibropapillomas in cattle are proliferative masses in the upper gastrointestinal tract associated with bovine papillomavirus-1, -2, or -5 infection. Fibropapillomas are often incidental findings but have been, as in this case, associated with ruminal tympany (bloat). The aspiration of ruminal content was likely secondary to ruminal outflow obstruction, and a combination of aspiration and venous compromise due to ruminal distention and recumbency, would account for the rapid clinical decline in this cow.

Teresa Southard DVM, PhD, DACVP, Virginia Tech

Caseous lymphadenitis and secondary amyloidosis

A six-month-old Suffolk ram lamb was submitted for necropsy with a history of renal disease, multiple intermittent episodes of abscess formation associated with caseous lymphadenitis, and progressive weight loss. On postmortem examination, multiple pulmonary abscesses were identified with *Corynebacterium pseudotuberculosis* isolated on microbial culture, and there were lesions of renal amyloidosis. This was a case of reactive (or secondary) amyloidosis due to chronic inflammatory disease (caseous lymphadenitis in this case) that resulted in increased production of serum amyloid A and ultimately insoluble deposition of AA protein.

Thomas Cecere DVM, PhD, DACVP, Virginia Tech

Sheep Whodunnit

An adult Marino ewe was found dead in the pasture early in the morning. Recently, a stray dog had been seen in the area, and the owner wanted to find out if the dog had killed this sheep. Gross examination revealed red staining of the fleece on the right side of the neck. At the level of the angle of the mandible there were 4 round defects in the skin, each 4-5 mm wide, with extensive hemorrhage in the underlying subcutaneous tissue, muscle and fascia. The cutaneous defects were arranged in two pairs, and in each pair, the defects were separated by a distance of 3.75 cm. The trachea was severed just caudal to the larynx and the lumen

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contained foamy red fluid. The lungs were diffusely atelectatic. The vocal folds were thickened and dark red. The cause of death was determined to be asphyxia secondary to tracheal laceration.

The necropsy findings were consistent with an attack by a carnivore. The puncture wounds were likely made by the canine teeth, and the inter-canine distance (3.75 cm) could be consistent with either a dog or a coyote, but not a fox or bobcat. (Verzuh et al. *Journal of Mammology*. 2018. 99(6): 1405-1410.) With bites to the neck and no other injuries on the body, the pattern of injury is more consistent with a coyote attack than with a dog attack. Dog attacks typically involve wounds on various body parts, and the wounds are more likely to be lacerations, caused by superficial wounds and tearing of the skin, than puncture wounds.

(<http://www.omafra.gov.on.ca/english/livestock/sheep/facts/coydog2.htm#4>)

Teresa Southard DVM, PhD, DACVP, Virginia Tech

COMPANION ANIMALS



Nocardiosis in a dog

A 12-year-old female spayed mixed breed dog presented for a swollen, edematous forelimb with skin ulcerations over the second digit. Imaging of the limb revealed significant bony lysis of the third phalanx of the second digit. A skin biopsy revealed pyogranulomatous inflammation and *Nocardia arthritidis* was isolated. The isolate was sent to a reference laboratory that could provide susceptibility testing of fastidious organisms. The patient was treated with antimicrobials and the second

digit was surgically removed; she responded well to therapy and had no clinical evidence of infection six months after her diagnosis. Nocardiosis in dogs typically manifests as opportunistic thoracic, skin, or lymphocutaneous infections and is most common in immunosuppressed or otherwise debilitated animals. Treatment is challenging and often requires surgical debridement and long-term antimicrobial therapy, although the prognosis for skin infections is generally good.

Tessa LeCuyer DVM, PhD, DACVM, Virginia Tech

Anticoagulant rodenticide toxicosis in a dog

An eight-year-old castrated male mixed breed dog was presented to a veterinarian for acute onset of limping, and following initial workup was referred to the VMCVM Veterinary Teaching Hospital. Edema of the limb was identified on CT scan, as well as suspected hematogenous pneumonia and DIC. The dog declined after multiple blood transfusions and was euthanized. Postmortem examination revealed widespread and severe subcutaneous hemorrhage and edema, serosanguineous peritoneal and pericardial effusion, and multifocal pulmonary hemorrhage. Liver samples were submitted to the Texas A&M Veterinary Diagnostic Laboratory and Bromadiolone was detected at a concentration consistent with anticoagulant rodenticide toxicosis. Bromadiolone is a second-generation coumarin derivative vitamin-K antagonist rodenticide.

Thomas Cecere DVM, PhD, DACVP, Virginia Tech

Rhodococcus equi abscess in a cat

We isolated *Rhodococcus equi* from a cutaneous abscess in a 14-year-old domestic cat living in southwestern Virginia. *R. equi* is an environmental bacterium distributed worldwide that has zoonotic potential. It has recently undergone some taxonomic reclassification and you may see the organism named *Rhodococcus hoagii* in some sources now; we continue to use *R. equi* because the pathogen is so recognizable to most veterinarians with that name. While rhodococcosis is typically seen in foals in the form of pyogranulomatous pneumonia, *R. equi* can also rarely infect dogs and cats. In cats, *R. equi* infections tend to occur in animals less than one year of age with access to the outdoors. Pneumonia is the most common form of feline rhodococcosis and affected cats often have

LABORATORY NEWS

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pulmonary abscesses and pyothorax. However, cats may also have a cutaneous form of the disease, as was observed in this case. In contrast to foals, no single antibiotic treatment protocol has been shown to be consistently effective in cats and *R. equi* infections are often refractory to conventional antimicrobial therapy.

Tessa LeCuyer DVM, PhD, DACVM, Virginia Tech

Thymoma associated exfoliative dermatitis in a cat

A 5-year-old, male neutered cat was received for necropsy. On gross examination, more than 80% of the skin had multifocal to coalescing areas of alopecia, erosions and ulcers, and frequent areas with grey scales covering the eroded skin. The cranial mediastinum had a multilobulated, white to tan, firm mass, that was fatty on cross-section. On histology, in sections of skin and ear canal there was diffuse hyperkeratosis overlying the epidermis, with segmental areas of orthokeratosis or parakeratosis. The epidermis was mildly acanthotic with numerous lymphocytes and histiocytes infiltrating between the epidermal and dermal junction (interface dermatitis). The infiltrate also extended into the follicular epithelium with frequent perifollicular fibrosis. In addition, scattered necrotic keratinocytes were seen at all levels of the epidermis. The mediastinal mass was densely cellular, well-demarcated, multinodular, expansile and encapsulated. The neoplasm was loosely arranged in cords of polygonal cells with abundant eosinophilic cytoplasm, consistent with a thymoma. The gross and histological findings in the skin and the mediastinal mass, are consistent with thymoma-associated exfoliative dermatitis, which is a paraneoplastic syndrome that results in autoreactive T cells that target keratinocytes.

Valentina Stevenson DVM, Virginia Tech



ViTALS

Congratulations to pathology residents Anna Hassebroek (anatomic) and Christina Pacholec (clinical) for passing phase I of the ACVP certifying exam! Our former resident and current clinical instructor, Vanessa Oakes, will be defending her PhD by the end of the semester, and will be joining IDEXX as an anatomic pathologist in June. We're sorry to see her go but excited to see where the next stage of her career leads her!

Tanya LeRoith DVM, PhD, DACVP, ViTALS Director.

VDACS

The VDACS Laboratory System has been undergoing a complete evaluation by an external body of experts in laboratory diagnostics to determine ways to improve our system! We are excited to have had the opportunity to work with Drs. David Zeman and Bruce Akey and look forward to their final report.

We are excited to have two new veterinarians starting in June at the Harrisonburg Laboratory. Dr. Hailey Quercia will be our Poultry Diagnostician and Laboratory Director, and Dr. Jamie Horstmann will join us as our Mammalian Diagnostician for the Harrisonburg Laboratory and Outreach Veterinarian for the Office of Laboratory Services.

Jessica Walters DVM, PhD, DACPV, Program Manager,
Office of Laboratory Services

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RAHLS: Regional Animal Health Laboratory System

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