Animal Health Monitor

OCTOBER, 2019
Volume 11, Issue 3

BRITISH COLUMBIA | Ministry of Agriculture

Articles of Interest:

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Diagnostic Challenges by Stephen Raverty

A 1.5 month old German Shepherd dog presented with acute hind-end paralysis in June 2019 to a local clinic, was admitted overnight, provided supportive care including fluids, then discharged the following morning still paralyzed. The owners homecared for the dog for the following two months and in August, she returned to the clinic with profound loss of muscle in the hind limb, ongoing paralysis, decubital ulcers, and, due to a poor prognosis, was humanely euthanized.

At necropsy, the dog was emaciated with cutaneous ulcers along the hip and thigh and numerous insect larvae in the perineum. Fleas were evident throughout the torso. There was bilateral hind limb loss of muscle. Little feed was in the stomach and a small amount of melena was evident in the duodenum and cranial jejunum. The liver with contracted and gall bladder markedly distended with bile. Based on the clinical history and gross findings, neurologic and/or musculoskeletal disorders were prime considerations. The entire length of the vertebral column was incised and the spinal cord and brain evaluated in situ, then removed. There were no gross lesions in the vertebral column, pelvis or skull.

Histologically, the most profound lesions were identified in the spinal cord at levels C7, T1 and to a much lesser extent, T13 and L1. The lesions were bilateral, but asymmetric and featured prominent axonal vacuolation of the dorsolateral and ventromedial funiculi with cellular debris (ellipsoids) and gitter cells consistent with axonal degeneration (Figure 1).

The microscopic findings were consistent with German Shepherd myelopathy, a hereditary degenerative myelopathy; however, trauma, lumbosacral disorders, fibrocartilaginous emboli, giant axonal neuropathy and other conditions were also considerations. Molecular studies for *Neospora caninum* and canine distemper virus were negative and aerobic culture of the brain cultured light mixed growth of *Streptococcus dysgalactiae* and *Escherichia coli*. Based on the degree of post mortem change, these isolates were considered contaminants. There was no microscopic indication of fibrocartilaginous emboli, *Sarcocystis caninum*, or neurofilament accumulations typical of giant axon neuropathy of German Shepherd dogs.

Small animal neurologic cases can not only pose a clinical challenge, but also a pathologic conundrum. The gross findings and spectrum of neurologic lesions in this case were suggestive of degenerative myelopathy; however, the signalment and clinical history for German Shepherd myelopathy is typically 5 to 8 years of age at onset and is slowly progressive in contrast to this animal. In this case, the acute onset and progression of the disease was more consistent with Afghan hound necrotizing myelopathy. In domestic species, degenerative myelopathy is recognized in horses, brown Swiss cows, cats, senescent rats, and humans. Ultimately, the pathogenesis of these conditions has yet to be fully resolved and neurologic disease continues to be a diagnostic challenge.

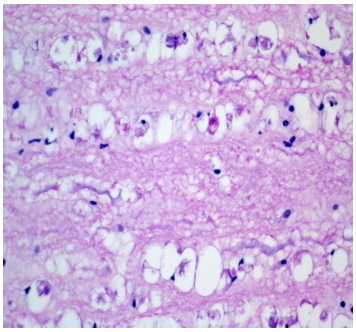

Figure 1. Spinal cord. Longitudinal section, dorsal funiculi, T1 with linearly aligned dilated axonal sheaths with cellular debris (digestion chambers) and gitter cells.

Reportable Disease Mock Exercise at the Animal Health Centre

by Ann Britton

The mission of the Animal Health Centre is to diagnose, monitor, and assist in the prevention, control and management of animal pests and diseases in British Columbia. As part of that undertaking, it is our duty to monitor for reportable diseases. A reportable disease is defined by the Animal Health Act as an environmental toxin, infestation, syndrome or transmissible disease that is prescribed as a reportable disease for the purpose of implementing preventive, control or eradication measures to safeguard animal health, to safeguard public health in relation to diseases that are, or may be, transmissible from animals to humans, to avoid barriers to trade or for other reasons in the public interest. The Animal Health Centre diagnosed and was a critical partner with CFIA in controlling and eradicating the Fraser Valley avian influenza outbreaks in 2004, 2005, 2009 and 2014.

Response to suspicion of a reportable disease consists of internal actions taken in the lab to quickly make a diagnosis as well as cleaning and disinfecting to prevent spread of disease within the lab or from the lab. Once a diagnosis is made, external actions are taken in partnership with CFIA to control and eradicate the disease in the affected geographic area. In June of 2019, the Animal Health Centre initiated a mock reportable disease exercise to test our internal action plan. This exercise was secretly planned by a committee comprised of 3 pathologists in consultation with Dr. Pritchard and consisted of a pre-arranged submission of animals with a history designed to raise suspicion of a reportable disease. The exercise was monitored as it evolved by the planning committee and a debrief meeting was held following the exercise to discuss any needed updates to our internal action plan.

The exercise was deemed a success as post mortem staff immediately recognized from the history that the mock case was unusual and needed immediate attention from the duty pathologist. The duty pathologist reviewed the case, determined it was suspect for a reportable disease and enacted the action plan. Once the action plan was completed, staff were informed of the mock nature of the submission and asked to formulate suggestions for enhancement of the plan at our debrief meeting. As a result, we have updated our plan and will be testing it again in the future.

Rapid detection of a reportable disease is essential to enact control and eradication procedures which will minimize adverse health and economic effects for producers and the public alike. The most important piece of information we use at the Animal Health Centre to determine if we may be dealing with a potentially reportable disease is the history requested on the submission form. An accurate history including progression and duration of clinical signs, number of animals dead and/or sick out of total herd number and the time frame from first signs to time of submission can save hours and even days of workup time for diagnosis of a reportable disease.

Rapid detection of a reportable disease is to everyone's advantage. Animal Health Centre would like to remind submitters how much we appreciate and need a complete and accurate history for every submission to efficiently enact our mission.

Suspect Blue-Green Algae Toxicity in Dogs in BC

by Glenna McGregor

Over the Labour Day weekend the Animal Health Centre received a report of 5 dogs that developed sudden-onset hypersalivation and, in most of the dogs, cluster seizures shortly after swimming or wading in HiHium lake, a lake northwest of Kamloops that is primarily used for fishing. The lake had a foul odour and an algal bloom, described as spotty bright blue/green discoloration with a milky shine that was moving around the lake and rising/falling. One of the dogs died and the others recovered with supportive care and treatment with Cholestyramine (binds bile in the gastrointestinal tract and prevents enterohepatic recirculation of bile acids and associated bound substances). Bloodwork performed on some of the dogs was largely unremarkable.

The sudden onset, history and clinical signs were considered suggestive of blue-green algae toxicity. Unfortunately, samples from the affected animals could not be feasibly obtained to confirm this diagnosis. Also, as discussed below, confirmation of blue-green algae toxicity is often quite challenging. Microcystin testing of water samples from the lake, performed by the Interior Health Authority, found approximately 5 ug/L of microcystins, which is higher than recommended 1.5ug/L for drinking water but lower than the recommended limit of 20 ug/L for recreational water. This does not rule out blue-green algae toxicity in these dogs as the water samples were collected a couple days after the dogs fell ill and there is often marked spatial and temporal variation in microcystin concentrations in a body of water. Also, the clinical signs in this case were much more suggestive of an algal neurotoxin, such as anatoxin, than microcystin (a hepatotoxin) and the water was not analyzed for algal neurotoxins.

Blue-green algae toxicity occurs throughout North America and is caused by ingestion of high concentrations of toxin-producing blue-green algae, more commonly known as cyanobacteria. It can affect pets, livestock, wildlife, humans and some aquatic organisms including fish and shrimp.

Warm water favours algal blooms, so it is most commonly seen in the late summer and fall when water temperatures are at their warmest. Nutrient rich eutrophic and hypereutrophic water bodies are most commonly affected. Fertilizer and animal waste run-off increase algal growth. Low winds or winds that concentrate algae into small pockets near the shore where animals may drink also increase the likelihood of blue-green algae toxicity. Broadly speaking, the toxins produced by blue-green algae (collectively referred to as cyanotoxins) are divided into hepatotoxins (most commonly mycrocystin), which result in massive hepatic necrosis, and neurotoxins (including anatoxins and saxitoxins), which result in sudden onset of neurological clinical signs including hypersalivation and seizures. With both the hepatotoxins and the neurotoxins the mortality rate is high, and death generally occurs within hours.

Definitive diagnosis of blue-green algae toxicity can be challenging. There are more than 30 species of cyanobacteria associated with toxic algal blooms and they can produce toxins of six distinct chemical classes. There are a variety of chemical assays that have been described for detection of the various toxins; however, other than the assays for microcystins, these are not widely available, often quite complex and often very costly. Mouse bioassays and morphological identification of algae in water samples are also sometimes used. Stomach contents/vomit from affected animals or people and water samples from the suspected source are the best samples for detection of toxins. Microcystins have also been detected in feces several days after suspected intoxication.

Suspect cases of blue-green algae toxicity should be reported to the local health authority. For more information on blue-green algae toxicity please see https://www.healthlinkbc.ca/healthlinkbc-files/blue-green-algae.

An Unusual Case of Enteric Coccidiosis in a Farmed Duck

by Stephen Raverty

Duck farming in British Columbia ranges from hobbyists, small backyard flocks to large commercial enterprises, which primarily produce meat for niche culinary and Asian-Canadian markets. Value added products include drumettes, sausages, stock, strips, ground meat, burgers, pot pies, smoked meat, spring rolls, cubed meat, eggs and others. For meat, Pekin ducks are the most commonly farmed, although Aylesbury and Muscovy are also produced; whereas, for egg production, the primary breeds are the Indian Runner and Khaki-Compbell. Increased market demand and expanding international trade has resulted in a significant boost in duck production over the last 20 years. Although many of the recognized diseases of ducks are comparable to other poultry and waterfowl, increased farming of ducks has also resulted in the emergence of novel management and infectious disease related concerns.

In late summer, 2019, a 3.5 month old female Indian runner duck cross from a flock of less than 100 birds was presented for necropsy. This specimen and a second bird had been purchased from a local producer, were transported to the farm, and died within 6 days. Clinical signs included loose stool, wheezing, lethargy, weakness and inappetence. The second bird started to eat within a day of arrival and has since appeared normal. Neither bird had a history of vaccination.

Post mortem examination of the bird revealed mild bilateral reduction in the breast musculature, generalized dehydration and the crop was empty with only a small amount of grit within the gizzard. The gall bladder was distended and bile could be expressed into the duodenum and the liver was slightly reduced in size with sharp peripheral margins. The most significant finding was in the cranial half of the small intestine. Extending from the gizzard to midlevel of the jejunum, the bowel was rigid, tubular, and on cut surface, the walls were thickened by slightly tan yellow gelatinous material (edema) and contained a small amount of yellow mucus. Differentials included bacterial, fungal, viral and parasitic infections with possible dysbiosis, toxic or some other systemic disorder. Representative portions of bowel were harvested for diagnostic studies. The intestinal lesions would have been sufficiently severe to have contributed to the loss of condition, generalized dehydration and loss of this duck.

Microscopic examination of the affected segments of small intestine was hampered due to post mortem change and artifactual sloughing of the enterocytes; however, massive accumulations of protozoal parasites (schizonts, merozoites and oocysts) morphologically consistent with of *Eimeria* spp were noted throughout all levels of villi, interspersed within the lining epithelia of the intestine, glandular crypt lumens and within the lamina propria (Figure 1). There was mild multifocal congestion of intestinal villi with scattered acute hemorrhage. Fecal floatation did not detect any parasites and aerobic culture of the bowel yielded moderate growth of Escherichia coli. No *Salmonella* spp were recovered and PCR of pooled tissue swabs was negative for Influenza virus-Consensus. A diagnosis of enteric coccidiosis was rendered.

Intestinal coccidiosis has been sporadically reported in domestic ducks and currently comprises two reported species, *Eimeria danailovi* and *E mulardi*. Based on extrapoltion from other poultry, transmission is most likely direct by consumption of infectious stages with local invasion and destruction of intestinal cells. Clinical coccidiosis tends to occur more commonly in younger birds and it is likely that the parasite is host specific. In this case, follow up segregation of the second bird, fecal parasitology, and possible application of an appropriate anticoccidial drug were recommended. There have been no subsequent mortalities reported within the flock. A source of parasite exposure and potential implications of this infection to overall farm health could not be determined in this case, but efforts to monitor for this pathogen are ongoing.

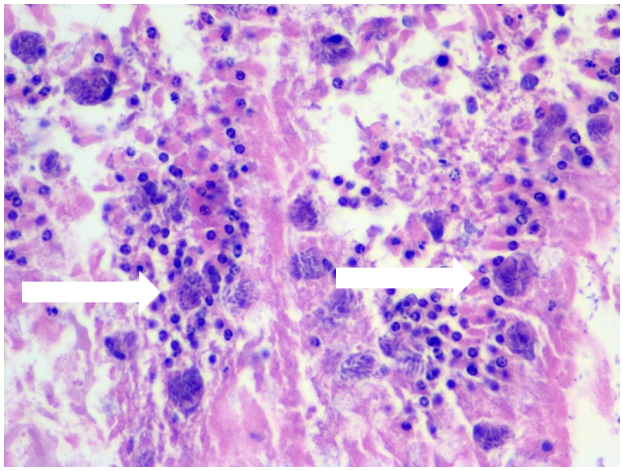

Figure 1. Section of duodenum with large numbers of protozoa between intestinal epithelia and within the lamina propria. (arrows: schizonts with merozoites). There is widespread sloughing and dissolution of enterocytes.

Employees of the Post-Mortem Team at the AHC

Kristen Moffitt is a Registered Veterinary Technologist. She started as an auxiliary employee with the BC Animal Health Centre in the post mortem room in November 2011, becoming full time in 2016. Kristen loves her job because every day is different and the post-mortem team gets to work on so many different cool species. Kristen can't imagine doing anything else, or going back to regular clinic work!
Outside of work, Kristen is passionate about riding horses and dance. She lives in Chilliwack with her wonderful husband Jeremy and their1.5 year old son Kip. They are expecting their second child in early January 2020 and cannot wait for that next adventure.

Chelsey Wood graduated from the Animal Health Program at TRU in June,2010 then worked full time in a small animal private practice for two years before attending UBC to obtain her BSc in Applied Animal Biology. Post graduation, Chelsey worked for the CFIA as a meat hygiene inspector in the poultry division until starting with the AHC as an auxiliary employee in January, 2017. Chelsey became a full-time permanent employee in necropsy in the spring of 2018.

Chelsey has always been fascinated with animal necropsies and loves the work done here. Outside of work she can typically be found at the barn spending time with her horses, or at home hanging out with her cats and dogs. In the summer months she enjoys getting out on the lake to fish, or spending time with friends camping.

Jennifer von Hardenberg is a Necropsy technician at the Animal Health Center who helps keep all areas of the Post Mortem room running smoothly so the Pathologists and other Lab Sections can deliver results of their samples swiftly to clients. Before starting at the Animal Health Center six years ago, Jennifer completed schooling at Douglas College and Kwantlen College and worked as a Registered Animal Health Technician and a farrier in the lower mainland. She also currently works part time for Racing Forensics at Hastings Racetrack and enjoys the contact with "live" animals!

Jennifer is a devoted mum to two busy, happy toddlers and an aptly named aussie "Rowdy". She enjoys riding her horse when she can and truly appreciates the work/life balance that her current job share position is affording her to spend the maximum time with her kiddos in their early years.

AHC Sample Submission Guidelines

Sample Submissions—a completed submission form must be received with every submission. Minimum information required for completing the form is:

- Complete contact information for the client and veterinarian (if applicable)
- The species and / or breed, sex and age of the animal
- A complete history of the affected animal (s) indicating suspected disease (s) if possible. Writing out a thorough yet concise history will assist in selecting the appropriate tests and in making the final diagnosis and recommendations.

Proper sample packaging is also important to having your sample properly analyzed. Before collecting specimen (s), check the sample requirements for the particular test you require at https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/animal-and-crops/animal-health/animalhealthcentrefeeguide.pdf.

To access current submission forms, go to https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/animal-health/animal-health-centre

Calendar of Events

AG-DAY 2019
October 28—29, 2019
Victoria, BC

Organized by the British Columbia Agriculture Council, Ag Day is a series of scheduled meetings between BC farmers, ranchers, Cabinet Ministers, MLAs, senior government officials and other key stakeholders. In addition to connecting with government, Ag Day helps to increase awareness around the positive impact agriculture has on the local economy, and the challenges the sector faces.

THE PACIFIC AGRICULTURE SHOW
January 30—February 1, 2020
9:00 a.m.—4:30 p.m.
At the Tradex Exhibition Centre in Abbotsford
1190 Cornell Street, Abbotsford BC

The Pacific Agriculture Show is the largest and most important agriculture exhibition in the Province. Bringing together thousands of farmers and agri-food producers, the 2020 event will be the 22nd annual show. The show attracts attendance from all the livestock and horticulture sectors and hosts a variety of industry conventions and meetings, such as the BC Dairy Expo, The Horticultural Grower's Short Course, Cannatech, and the Ag Innovation Day.

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Past editions of the Animal Health Monitor can be found on our website:

http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/animal-health/animal-health-centre/newsletter

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