Presenting Complaint:
The dog has been lethargic and vomiting off and on for the past week after consuming a stuffed animal toy.

Physical Examination:
The dog is mildly dehydrated and exhibits mild abdominal discomfort on palpation. Temp = 103.1 F, Pulse = 114 bpm, Resp = panting. Lab work pending. Barium suspension was administered orally 48 hours prior to presentation.

Clinical Findings: Metallic positive contrast material is evident within bowel loops consistent with previously administered liquid barium. A heterogenous, foamy mix of weak positive contrast, gas and soft tissue opacities.

FEATURE CASE:
Imaging in Practice
BY Kristina Miles, DVM, MS, DACVR
Assistant Professor & Section Head, Radiology

Patient: 9-year-old, spayed female Golden Retriever

Presenting Complaint:
The dog has been lethargic and vomiting off and on for the past week after consuming a stuffed animal toy.

Physical Examination:
The dog is mildly dehydrated and exhibits mild abdominal discomfort on palpation. Temp = 103.1 F, Pulse = 114 bpm, Resp = panting. Lab work pending. Barium suspension was administered orally 48 hours prior to presentation.

Clinical Findings: Metallic positive contrast material is evident within bowel loops consistent with previously administered liquid barium. A heterogenous, foamy mix of weak positive contrast, gas and soft tissue opacities.

Feature Case continued inside on page 3 >

From the Editor
As the season changes from summer to fall, it’s also a season of change at the Lloyd Veterinary Medical Center. Our new interns and residents arrived in July and are a month into their specialty training programs.

We also welcomed the following to our veterinary hospital team: Dr. Bryce Kibbel, community practice; Dr. Louisa Ho Eckert, veterinary soft-tissue surgeon, Dr. Kate Hepworth, equine field services, and Dr. Conrad Wilgenbusch, equine emergency surgeon.

You might find an article or two written by some of these veterinarians in future issues of Iowa State University Vet Pulse. As always, please feel to email us with topics you’d like covered in future issues.

We’ll have an exhibit booth at the IVMA annual meeting. Please stop by!

Rodney S. Bagley, DVM, DACVIM
Managing Editor, Professor & Interim Associate Dean of Clinical Operations

Web-Exclusive Content
In addition to the print publication our website features: expanded content, archives of previous issues, the option to subscribe to an electronic version of Iowa State University Vet Pulse and web-exclusive articles.

> Visit vetmed.iastate.edu/VetPulse to read the full online articles:
• A Sweet Disaster – Xylitol in Dogs
• Faculty Spotlight on Dr. James Noxon

INTERESTED IN EARNING IOWA CE CREDIT ONLINE?
Visit vetmed.iastate.edu/VetPulse to answer questions on this case.
CLINICAL TRIAL:
Patients Wanted for Clinical Studies in Immune-Mediated Hemolytic Anemia and Thrombocytopenia

By Dana N LeVine, DVM, DACVIM, PhD
Assistant Professor, Small Animal Internal Medicine

Dr. LeVine, board-certified small animal internist, is passionate about all things hematologic. She has two ongoing research studies that focus on immune-mediated blood disorders. Both studies are soliciting canine subjects.

The first study investigates reasons for thrombosis in immune-mediated hemolytic anemia (IMHA). Most dogs that die of IMHA die due to fatal thrombi. Although clinicians do their best to anticoagulate these patients, the ideal protocol remains unknown, and thrombi still occur. Recently, neutrophils have been shown to release their DNA when activated, forming webs of DNA called neutrophil extracellular traps (NETs) that capture bacteria. However, these NETs are also very procoagulant. Dr. LeVine is studying the role of NETs in IMHA in order to find a novel therapeutic target to prevent IMHA-associated thrombosis. To enroll in this study, owners must sign an informed consent agreeing to allow a 10 ml (2 teaspoon) blood sample and a voided urine sample to be collected. Dogs receive a Coomb’s test, paid for by the study, if the diagnosis of IMHA is uncertain.

The second study, funded by the American Kennel Club Canine Health Foundation, focuses on immune thrombocytopenia (ITP). ITP is the most common acquired bleeding disorder in dogs, causing frank and sometimes fatal hemorrhage. The underlying cause of ITP is unknown, and there are no predictors of disease severity, response, or relapse. Despite a general association between thrombocytopenia and bleeding, not all ITP patients bleed. Consequently, veterinarians treat all ITP patients aggressively, non-specific immunosuppression. High morbidity and mortality result not only from uncontrolled bleeding, but from treatment side-effects, such as fatal opportunistic infections. Veterinarians need more specific and more individualized ITP treatment suited to disease severity and bleeding risk. Dr. LeVine’s ITP study aims to develop a diagnostic ITP “profile” of immune markers that illuminates disease pathogenesis. Additionally, since a genetic component is indicated by a breed predilection in Old English sheepdogs and cocker spaniels, the profile will include genetic loci associated with ITP. This disease characterization will allow for novel treatments specifically targeting the underlying immune defect. The study hopes to identify predictors of disease severity, enabling clinicians to identify and treat those patients with significant bleeding risk.

Dr. LeVine is seeking dogs that are thrombocytopenic due to ITP and dogs that are thrombocytopenic for other reasons (DIC, neoplasia, tick-borne disease, etc.) to serve as thrombocytopenic controls. Any dog with a platelet count less than 50,000/μl may qualify.

To enroll in this study, owners must sign an informed consent agreeing to allow a 15 ml (1 tablespoon) blood sample and voided urine and fecal samples to be collected. Dogs receive a Coomb’s test, paid for by the study, if the diagnosis of IMHA is uncertain.

Go to vetmed.iastate.edu/VetPulse to view full list of free tests for dogs enrolled in the ITP study.

For more information, or to refer a patient, please contact Dr. LeVine at 515-294-4900 or dnellevine@iastate.edu.

FEATURE TOPIC:
Anticholinergic Drugs in Dogs

By Bonnie L. Hay Kraus, DVM, DACVS, DACVAA
Assistant Professor, Anesthesia

Q Can I use anticholinergic drugs with dexmedetomidine in dogs?

A The use of anticholinergic drugs with α2-agonists has been an area of controversy. Some practitioners prefer to administer an anticholinergic to reduce the incidence or magnitude of bradycardia when administering the less α2-specific drug xylazine. However, the newer drug, dexmedetomidine, is a more specific α2-agonist. The primary mechanism for the bradycardia seen in dogs appears to be a baroreceptor reflex due to stimulation of peripheral α2b-receptors, rather than a central decrease in sympathetic outflow as seen with xylazine. Dexmedetomidine causes vasoconstriction, a reflex bradycardia and a decrease in cardiac output presumably due to the increase in systemic vascular resistance. Dogs typically have high normal mean arterial blood pressure (MAP) and a significant bradycardia which are dose dependent. It is tempting to treat this bradycardia with an anticholinergic drug such as atropine or glycopyrrolate.

A recent study evaluated the cardiovascular effects of dogs administered dexmedetomidine with and without atropine in dogs. Dogs received dexmedetomidine 10μg/kg IM alone or with atropine (0.02mg/kg). Heart rate, cardiac output and blood pressure were measured. Dogs receiving dexmedetomidine alone had heart rates significantly lower than baseline and exhibited sinus arrhythmia and second degree atrioventricular block. Atropine-treated dogs had heart rates that returned to baseline; however, MAPs were very high (> 170mmHg) and cardiac output was not improved. These dogs also developed ventricular premature contractions, a sign of decreased myocardial oxygen delivery.

Recommendation: Do not use an anticholinergic to prevent or treat bradycardia associated with dexmedetomidine in dogs if MAP is normal to high normal. Anticholinergic use may be considered in individual patients if it is associated with hypotension. Consider reversing with the α2-antagonist atipamezole if bradycardia becomes severe (<30-35 bpm). Sudden arousal may occur in anesthetized patients.

>> Submit a question at: VetPulse@iastate.edu

Systemic hypertension can cause damage to multiple organs including the target organs: kidneys, eyes, brain, and heart.

Indirect blood pressure should be monitored in patients that have clinical abnormalities that are consistent with hypertensive target organ damage, or if there is diagnosis of a disease that causes secondary hypertension (ie. renal failure and Cushing’s disease).

**Indirect Blood Pressure Measurement Basics**

- A skilled veterinary technician is the preferred person for obtaining the readings due to their experience operating the equipment.
- Blood pressure is elevated by stress and anxiety associated with obtaining the reading. It is important to measure it in a quiet room where the patient is acclimated.
- To improve accuracy, readings are occasionally performed upon arrival in the exam room with the owner present.
- Place the animal in either a lateral or ventral recumbent position with the measuring cuff close to the horizontal level of the right atrium.
- The selected cuff size should be 40% of the circumference of the cuff site. Measure using a centimeter marked tape or estimate by using the cuff itself. A cuff that is too small or tight can result in falsely elevated results. A cuff that is too big or loose may result in falsely low readings.
- Medical tape can be used to secure the cuff and prevent it from loosening during inflation. Do not tighten the cuff when placing the tape.
- Location for cuff placement is proximal to the hock or carpus, or at the base of the tail.
- Shave area distal to the cuff. Depending on location selected, the dorsal or plantar surface of the metatarsals, palmer aspect of metacarpals, or ventral surface of the tail is clipped.

Since patients may require the care of multiple services and blood pressure readings, following a standard procedure will ensure accuracy.

**Standard Procedure**

- Place the patients into lateral recumbent position with the appropriate sized cuff proximal to the hock. Clip the area dorsal to the metatarsals to use the dorsal pedal artery. If the patient reacts strongly to being placed in lateral recumbent position, use the tail.
- Apply ultrasound gel to the Doppler probe.
- To help maintain a stress-free environment, place the Doppler near the tail of the animal. To reduce Doppler noise, do not turn on the Doppler until solid contact has been made between the animal and the Doppler probe.
- Place the probe over the clipped area of the selected artery using tape or direct pressure to hold the probe in place.
- An average of three to seven readings is recommended. Complete cuff deflation should be performed in between readings to allow for re-perfusion of the artery.
- For consistency, record the cuff size, location and results into the patient’s medical record for future reference.

A normal systolic blood pressure reading for small animal patients is 140-160 mmHg. Elevations in blood pressure should be repeatable in multiple sessions to ensure the need for anti-hypertensive treatment.


---

Imaging in Practice

is present within a focally enlarged (2 X central height of L5) small intestinal loop in the left mid-ventral abdomen immediately caudal to the splenic tail. Normal diameter (normal = 1.6 X L5 central height) small intestinal loops that exhibit peristalsis are evident immediately cranial to the urinary bladder silhouette. The gastric fundus contains a foamy heterogenous mix of small gas and soft tissue opacities, while the pylorus is moderately distended with soft tissue/fluid, which border effaces with the ventral hepatic silhouette. However, the pylorus is not caudally displaced. A thin linear collection of positive contrast at the level of intercostal spaces 9-10 is noted within the pylorus on the lateral projection as well. A normally located duodenum is not identified on the VD projection. Wispy soft tissue/fluid opacities are noted in the fat immediately caudal and lateral to the dorsal extremity of the spleen on the VD view, and caudolateral to the abnormally distended left ventral small intestinal loop.

EXPANDED CONTENT ONLINE

> Visit vetmed.iastate.edu/VetPulse to read case conclusions and outcomes, view additional photos and earn Iowa CE credit by answering case-related questions.
Compounding for food animal species should be done on a VERY LIMITED basis and many medications should NOT be compounded at all for food animals. For the limited number of medications that can be used, be sure to include the residual withdrawal period for the medication on the compounded product label.

Famotidine injectable is currently on low availability. Zantac® 25mg/ml injectable is still available as well as Protonix® 40mg vial injectable as alternatives. Remember, once Protonix® 40mg vial injectable is reconstituted, it can only be used for up to 24 hours at room temperature.

The Iowa State University Lloyd Veterinary Medical Center pharmacy does compound sterile and non-sterile preparations with client-specific prescriptions for outside hospital veterinarians. Call the pharmacy at 515 294-2427 for available preparations.

For additional information please contact the pharmacy at 515 294-2427.