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rDVM QUARTERLY

VETERINARY COMMUNITY NEWS FROM AMC FALL 2018

Dear Colleagues,

I am pleased to announce that our newly remodeled second-floor clinic is now open! This redesigned area will help us provide even better service for the clients you send to us. Our new, state-of-the-art facility includes a fully renovated patient waiting area with a dedicated feline section; a streamlined, central area for client check-in and check-out to optimize efficiency; and 5 new exam rooms, bringing the total to 19. Clients can enjoy new, more comfortable furniture, renovated restrooms, access to WiFi, and cell phone charging stations. If you're ever at AMC, please stop in for a visit or contact me if you would like a guided tour.

We recently welcomed two new staff doctors to our team: Dr. Melissa Smith and Dr. Nahvid Etedali. Melissa Smith, DVM, PhD, DACVAA, is our new head of Anesthesia & Pain Management. Dr. Smith is board certified in veterinary anesthesia and analgesia with advanced training in pain management. This position is critical to AMC's Level 1 status as an approved Veterinary Trauma Center, verified by the American College of Veterinary Emergency and Critical Care and the Veterinary Committee on Trauma. Dr. Smith completed her residency in veterinary anesthesia and analgesia at the University of Georgia College of Veterinary Medicine in Athens and completed a rotating internship in veterinary medicine and surgery at Angell Animal Medical Center in Boston. She received her PhD in biomolecular pharmacology at Boston University's Whitaker Cardiovascular Institute.

Nahvid Etedali, DVM, DACVIM (SAIM), joins AMC with strong clinical experience and a specific focus on hemodialysis, hemoperfusion, and therapeutic plasma exchange. He will launch an acute dialysis program at AMC in 2019. Previously, Dr. Etedali completed his residency in internal medicine at the University of Pennsylvania Matthew J. Ryan Veterinary Hospital, where he received extensive training in hemodialysis, hemoperfusion, and therapeutic plasma exchange, including 250 extracorporeal treatments. Dr. Etedali completed a small animal rotating internship at the Cummings School of Veterinary Medicine at Tufts University, where he earned his Doctor of Veterinary Medicine degree.

As always, we are grateful for your continued support and trust in AMC. We value your partnership. Should you have questions or concerns, please feel free to contact me.

Sincerely,

Kate W. Coyne

Kate

Kathryn Coyne
CEO
kathryn.coyne@amcny.org
212-329-8601

The Animal Medical Center's Referral Coordinator Program

The Animal Medical is pleased to announce the launch of a dedicated Referral Coordinator Program for Internal Medicine and for all Surgery Services. The Referral Coordinator (RC) works directly with each service and each rDVM office to ensure a coordinated patient care and communication experience before, during, and after all consultation appointments and procedures. The RC acts as a point of contact for the rDVM community, helping them and their clients seamlessly access AMC services. The RC is an integral part of each service's team, trained to follow their specific workflow and procedures while also acting as a practice liaison for the referring community.

The RC communicates urgent medical information between doctors who may not be immediately available by phone and sends all patient visit reports and results to rDVMs while facilitating communication between clients and AMC staff doctors. The RC also schedules appointments, collects medical records, presents estimates, calls in prescriptions, arranges discharges, and answers client and rDVM questions.

Not only does the Referral Coordinator Program provide customer service excellence to our valued referring veterinarians and their clients, it also helps AMC address the national veterinary technician shortage by taking some of the administrative burdens off of our LVTs, allowing them to truly focus on providing outstanding medical care to our patients.

Please find the contact information for our two dedicated Referral Coordinators under the service contacts at the back of this issue. We are in the process of adding three more Referral Coordinators to the program and look forward to assisting you and your clients.

Neurology Spotlight: Q&A with Dr. John McCue

This issue kicks-off a multi-part series highlighting the expertise of the Animal Medical Center's Neurology Service. AMC's neurology team is led by three board certified neurologists with a combined 30 years of clinical experience. Our neurologists are available for appointments seven days a week and have access to all 17 specialties within the hospital, ensuring comprehensive, collaborative care. AMC's emergency room is open 24 hours a day, seven days a week to triage and stabilize acute neurologic conditions and contact the neurologist on call when indicated.

Below are excerpts from a recent conversation with Dr. John McCue, staff neurologist.

Q: *Who are the members of AMC's neurology team and can you elaborate on how the team works with other specialists at AMC?*

A: The neurology team is comprised of three board certified neurologists, three neurology residents, and four licensed vet techs. The collegial environment of AMC facilitates collaboration amongst specialty services to achieve the best care we can offer our patients. We could not do what we do without the support and availability of all the specialists in the hospital. Most cases require close monitoring and care around the clock, so we work in tandem with our Critical Care Service for all hospitalized pets. Years of experience working closely with our ER veterinarians and staff has provided for the rapid assessment and stabilization of patients presented on an emergent basis after the neurology team has left for the day. Radiation Oncology and our expert diagnostic imaging specialists complement our team, as well as the other allied specialists in the hospital. The Integrative & Rehabilitative Medicine Service is another resource for our neurosurgical and mobility-impaired patients.

Q: *What training is required to become a board certified veterinary neurologist?*

A: All members of the specialty complete 4-5 years of additional training beyond graduation from veterinary school. After graduation, veterinarians seeking specialization as a veterinary neurologist complete a one-year rotating internship prior to applying for residency. Because of the small number of training programs and degree of competition, many applicants will complete an additional year of focused training in a specialty internship in neurology before qualifying for a residency position. The neurology residency comprises three years of practicing neurology and neurosurgery prior to sitting for a certification exam at the end of the program. Clinical research with the intent of publication is conducted during the three-year residency program.

Q: *What makes the Neurology Service at AMC unique?*

A: There are many things that make the service unique. Among these elements are teamwork and availability. Teamwork starts with the members of the neurology team. The neurologists, residents, and nurses work together to

John McCue
DVM, DACVIM
(SAIM, Neurology)
john.mccue@amcny.org
212-329-8770

provide the best care to our patients. We approach all cases as a unit, which allows for continuity of care and sharing of opinions and experience. This model expands to the entire hospital where multiple services easily work together in the management of cases from the simple to the complex. It's a group effort. Above all, we strive to be available to our colleagues, clients, and patients. Also available is state-of-the-art equipment and facilities for managing the most complex cases and accessing the best diagnostics. For example, we maintain 24-hour access to MRI for those emergent patients requiring immediate imaging and surgery. We couldn't do this without the cooperation of our critical care, anesthesia and diagnostic imaging teams. Our state-of-the-art MRI and CT complimented by skilled ultrasonography and electrodiagnostic equipment allow us to diagnose all manner of neurologic disease.

Q: *In what clinical situations is referral of a canine or feline patient with a suspected neurologic condition imperative?*

A: Unfortunately, many neurologic conditions in our pets arise suddenly, so many of these patients present as emergencies. Traumatic injury to the nervous system can result in serious complications and permanent dysfunction or death if not properly addressed. Trauma can come in the form of external trauma such as blunt head injury or can be internal as from intervertebral disc herniation. When this trauma results in significant clinical signs, it is imperative to seek emergent neurologic consultation and intervention to avoid permanent damage. In the case of nonambulatory pets suffering from disc herniation, emergent surgery is necessary to maintain the ability to walk. Seizures are another reason for emergent presentation, especially cluster seizures and prolonged seizures. It is imperative that those patients with complicated seizures receive immediate care and monitoring followed by efforts to identify the cause of seizures. In essence, any acute neurological deterioration in a pet is a reason for referral to a veterinary neurologist.

Q: *AMC has a lot of technologically advanced medical equipment. What are the most important tools used by the Neurology Service?*

A: The most important tool we have as neurologists is the neurological examination. This involves a careful examination, coupled with detailed information provided by owners and basic information about the pet. Our examination tells us from where in the nervous system clinical symptoms originate. Details about the pet, such as age and breed, and detailed historical information about the onset and evolution of clinical signs allow a veterinary neurologist to localize the problem and prioritize possible causes. It is only then that we employ our diagnostic equipment to help confirm the diagnosis and direct therapy. Quality magnetic resonance imaging is indispensable to this task. Much of what we deal with is structural disease of the nervous system. It takes a high-field MRI to properly view the anatomy of the nervous system. High quality MRI allows for special imaging techniques that can highlight anatomy such as functional studies of blood flow in the brain. It all starts with the neurological evaluation which tells us where to look and what to look for. It is amazing how much a simple exam and a conversation about the clinical signs can tells us before even considering specialized testing.

Q: *You're pioneering minimally invasive neurosurgery in dogs and cats; can you tell us about your latest advancements?*

A: Recent technological improvements in video-based endoscopic systems has allowed for high-definition imaging of anatomical structures. Because of the small size of these cameras, they can be maneuvered through small openings while providing enhanced visualization and illumination. We can therefore replace "open" surgeries with small surgical corridors while improving patient comfort and surgical outcome. An exciting application of this technology has been the use of endoscopes with working channels to cannulate and view the interior of the brain's ventricular system and surgically correct obstruction to normal cerebrospinal fluid circulation. We have used these techniques to fenestrate intracranial cystic malformations causing obstructive hydrocephalus. This can all be accomplished through a hole only 6mm in diameter. Prior to this type of procedure, the brain would have been incised through a large opening to gain access. Now we can restore physiologic CSF flow through intraventricular methods. We use a frameless neuronavigation system to guide our trajectory and cannula placement which is essential in navigating this complex anatomy through a small opening. These techniques may revolutionize how we manage obstructive hydrocephalus in dogs and cats.

Q: *What is on the horizon for veterinary neurology at AMC over the next five years?*

A: Besides integrating high-definition video camera systems and neuronagivation techniques, we are seeking to expand the use of 3D printing technology. The applications are constantly growing. Using high quality imaging, we can design surgical guides for complex tumor removal, custom designed guides and braces for spinal stabilization, and models for surgical planning. The development of cost effective and biocompatible resins also allows for custom printing of implants to replace craniofacial and spinal bones allowing us to reconstruct diseased tissue. Better and safer methods of accessing the brain will also allow us greater access to brain tumors that have few treatment options currently. The greater understanding of tumor biology and advances in personalized anti-tumor medications and vaccines will improve our ability to treat brain tumors in the near future.

John McCue
DVM, DACVIM
(SAIM, Neurology)
john.mccue@amcny.org
212-329-8770

Endocrine Update: Your Patient May Have a Brain Tumor

Endocrine disorders are quite common among our companion animals. Many of these involve loss of counter regulatory systems at the level of the pituitary gland. Despite common knowledge of these disorders originating with the pituitary gland, we rarely think to perform imaging of the brain when we diagnose these syndromes. The normal pituitary gland sits in a fossa located immediately ventral to the hypothalamus. This fossa is termed *sella turcica* after its appearance to a Turkish saddle. The pituitary gland is separated from the brain by a thin diaphragm of meninges through which pass the pituitary stalk and blood supply to the anterior portion of the pituitary gland. The pituitary gland is the source of many vital secretory factors that secondarily control the secretion of hormone by the adrenal, thyroid and gonadal tissues among others. Control of these secretory factors is via negative feedback inhibition of the target gland hormones on the pituitary and hypothalamus. Considering functional pituitary disorders in dogs and cats hyperadrenocorticism and hypersomatotropism (the cause of acromegaly) are most prevalent.

Hyperadrenocorticism is one of the most common endocrine disorders of dogs. There is an estimated prevalence of 1-2 cases/1,000 dogs/year in the United States. While adrenal dependent forms do occur, pituitary dependent hyperadrenocorticism (PDH) is most common, affecting 85-90% of dogs.[1] The pathogenesis involves hyperplasia of corticotroph cells of the anterior pituitary and the autonomous secretion of ACTH. In some dogs with functional pituitary adenomas, these masses can grow beyond the confines of the pituitary fossa (or sella turcica) producing what are commonly referred to as macrotumors. Currently, it is not known how many dogs have an enlarged pituitary adenoma at the time of diagnosis, however, the incidence may be as high as 75% in some references.[2,3] In most dogs, signs of hypercorticolism precede any clinical signs related to a space-occupying mass in the brain, therefore, advanced imaging of the brain is not commonly pursued at the time of diagnosis.[4,5]

Not only is PDH common in our canine population, there is a high probability that when we diagnose PDH, that patient has an enlarged mass associated with the base of the brain. What about those dogs without an enlarged pituitary gland at the time of diagnosis? Considering the loss of feedback inhibition intrinsic to the disease, it stands to reason these adenomas will enlarge during the course of the disease. We utilize this lack of response to negative feedback mechanisms in the diagnosis of PDH every time we perform dexamethasone suppression testing for screening and localization purposes. Current medical therapies focus on limiting cortisol production at the level of the adrenal glands without affecting production of ACTH. It is not clear what effect medical control of hypercortisolism may have on negative feedback mechanisms and tumor growth.[7] A phenomenon of rapid ACTH-producing tumor growth following bilateral adrenalectomy is recognized and known as Nelson syndrome in people. Nelson syndrome refers to rapid enlargement of a pituitary mass that occurs after loss of negative feedback from adrenal cortisol production, which has an inhibitory effect on ACTH release. By treating the endpoint of excess cortisol

FIGURE 1. Post-contrast T1-weighted MRI of cat with acromegaly. Note the modestly enlarged pituitary gland (arrow).

FIG. 1

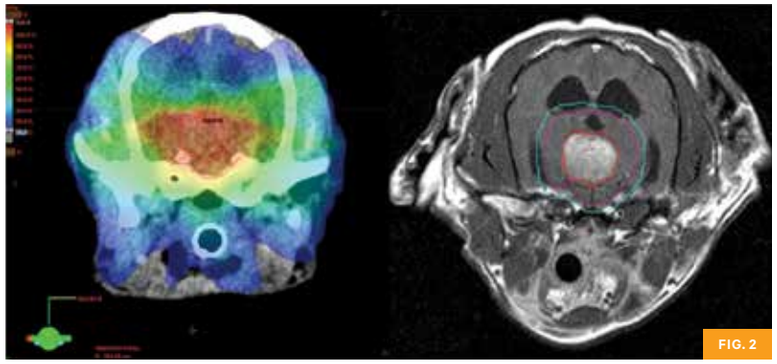

FIG. 2

FIGURE 2. Dose color wash radiation plan of a dog with a pituitary tumor indicating the central orange/red portion receiving the highest proportion of radiation dose. The MRI with tumor volume overlay is included in the right panel.

Red = Gross Tumor Volume (GTV – "The Tumor")

Pink/Magenta = Clinical Target Volume (CTV – equivalent to goal of surgical margins)

Blue/Cyan = Planning Target Volume (PTV – accounts for daily variation in positioning set up, treatment table or gantry sag, patient motion (breathing), etc.)

production, we may in fact be promoting pituitary adenomatous growth.[6] The prevalence of enlarged pituitary masses may be under-recognized as clinical signs of a mass lesion in the area of the pituitary (i.e. suprasellar mass) mimic those observed in some dogs receiving Trilostane and Mitotane (lethargy, anorexia, disorientation). These may be interpreted as signs of hypocortisolism or drug effect obfuscating the investigation of brain pathology.

What about cats? By comparison hyperadrenocorticism is rare in cats. However, another functional disorder of the pituitary gland, hypersomatotropism, is becoming more recognized.[8] The clinical manifestation of overproduction of growth hormone is acromegaly. Excess production of growth hormone results in characteristic osteogenesis and muscular hypertrophy particularly prominent around the face and paws. In cats, diabetes mellitus (DM) appears to be a prominent feature of the disease. Cardiomegaly is another feature of the disorder. Growth hormone influences production of insulin-like growth factor 1 (IGF-1) by the liver. Both growth hormone and IGF-1 contribute to insulin resistance in peripheral tissues causing a type of secondary diabetes mellitus. This type of diabetes mellitus can be quite difficult to control with some cats requiring 2 to 20 times the amount of insulin usually prescribed for cats. Such poorly regulated diabetes mellitus makes diabetic control quite challenging and can contribute the overall morbidity. IGF-1 has become a very useful marker of GH secretion. IGF-1 has a longer serum half-life, and production is not sporadic as in GH, making it a better marker of GH levels over time.[9] Measuring IGF-1 has become more common as a screening test and shown that acromegaly may occur with a greater prevalence than previously realized.

A recent large study from the United Kingdom examined a cohort of 1,221 cats with DM.[10] They detected a 24.8% prevalence of acromegaly amongst cats with DM. Besides the large case numbers, an important aspect is how cases were identified. These cats were not initially screened because of suspicion of acromegaly. Investigators blindly performed IGF-1 testing on all samples submitted to a regional diagnostic laboratory for fructosamine testing. Diabetic regulation was not a determining factor. Both clients and the attending veterinarians were subsequently queried as to diabetic regulation and clinical signs of acromegaly. Among all these cats, 26.1% were noted to have serum IGF-1 levels exceeding a cut-off value indicating hypersomatropism. Worth noting is that only 24% of attending veterinarians suspected acromegaly in these cases. Each of the cats in the elevated IGF-1 group was offered advanced imaging of the pituitary gland. Although only 20% were subsequently imaged, a pituitary mass was found in 93% of cases (58 out of 63). Two additional cats were later confirmed at necropsy. Diabetes mellitus is not the only relevant marker of acromegaly in cats. There are multiple recent case reports of cats with acromegaly without diabetes mellitus. Taken together, these results raise some interesting points. Our current reference ranges for IGF-1 may be excessively

broad with high cut-off values used to distinguish acromegaly. There may be cases of cats with regulated DM that have hypersomatotropism, leaving them better characterized as secondary, endocrine-related diabetes mellitus and not the classical noted Type-2 DM.[12] Theses cats could then benefit from other treatment modalities such as radiation or hypophysectomy. We may in fact be missing the "tip of the iceberg" in terms of the prevalence of acromegaly, not only in the diabetic cat population but in general.[12]

Currently imaging of the pituitary is not considered part of the diagnostic work up in cases of hyperadrenocorticism or hypersomatotropism. It is time for a paradigm shift. This paradigm shift is also supported by availability of other treatment modalities-[15] Until recently, treatment options for functional diseases of the pituitary gland were limited to nonexistent. Medical therapies fail to address the root of the problem, namely the hyperplastic functional cells at the level of the pituitary. Instead, therapies focus on the symptoms of blood sugar regulation and decreasing cortisol production at the level of the adrenal glands while the inciting issue is left unaddressed. The pituitary sits at the base of the brain in a complex area bounded by key arterial input to the brain, bundles of cranial nerves, and a major venous outflow system. Such complex anatomy has caused us to shy away from surgery in that area. Despite surgical approaches and case management described almost 100 years ago, surgery of the pituitary gland is very uncommon in veterinary medicine.[15] Considering the complex anatomy and location, radiation therapy has been sought as a less invasive treatment option. Radiation been shown to be effective in addressing the mass effect associated with tumors of the pituitary gland. Endocrine control is more inconsistent, but can result in improved control or even remission in some cases.[16] Such advanced treatment modalities need to be tailored to the individual patient. With the advent of stereotactic radiotherapy and the evolution of minimally invasive and novel neurosurgical techniques, these modalities have become more effective with reduced morbidity and mortality. Not only can we identify the iceberg, but we can do something about it.

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Cataracts and Cataract Surgery in Dogs

Alexandra van der Woerdt
DVM, MS, DACVO, DECVO
Head of Ophthalmology
alexandra.vanderwoerdt@amcny.org
212-329-8729

Cataracts are a common cause for decreased vision in dogs. The most common reason for cataracts in dogs is a genetic predisposition for cataract formation. This is most commonly seen in purebred dogs, although mixed breed dogs can have a genetic predisposition as well. The age of onset is often specific to the breed and varies greatly. An American Cocker Spaniel can be blinded by cataracts before reaching one year of age. Bichon Frisé dogs usually develop cataracts between the ages of four and seven years. Miniature poodles often get cataracts well past ten years of age. The second most common cause for cataract formation in dogs is diabetes mellitus. Cataracts can occur in dogs in which the diabetes mellitus has been well regulated. However, it is more common in dogs in which the diabetes mellitus is difficult to regulate. Diabetic cataracts can develop very quickly. Dogs can go from normal vision to virtually no vision in a few days to weeks. Other causes for cataracts in dogs include retinal degeneration and chronic anterior uveitis.

Not all dogs presented for the evaluation of cataracts in your clinic will have cataracts. Nuclear sclerosis, the normal aging of the lens, is often mistaken by owners for a cataract. Iris atrophy is common in older dogs, increasing the pupil size and making the aging lens more visible, thereby adding to the "cloudy look." Nuclear sclerosis can become very dense in very old dogs, making the distinction between nuclear sclerosis and cataracts a challenge in some cases. In nuclear sclerosis, vision is maintained (although close-up vision can be affected) and the fundus reflex is visible on ophthalmic examination. In a complete (mature) cataract, vision is lost and the fundus reflex is not visible on ophthalmic examination.

The stages of a cataract are as follows. An incipient cataract is a small opacity in the lens which does not interfere with vision. A mature cataract is a complete, blinding, cataract in which the entire lens is involved. An immature cataract is any cataract of a size that falls between "incipient" (small dot) and "mature" (complete) and can range from not having any effect on vision if the cataract is relatively small, to significant impairment of vision if the cataract is almost complete. Over time, the lens proteins start to break up and leak out of the lens capsule. This is a hypermature cataract. Clinically, the lens starts to shrivel up and lens-induced uveitis may be present. An intumescent cataract is a cataract in which the lens size is larger than normal. This is common in diabetic cataracts. In a Morgagnian cataract, the lens cortex has resorbed and the lens nucleus, which is more resistant to degradation, has dropped to the bottom of the lens capsule.

Cataract surgery is routinely performed in dogs, but is much more involved in dogs than it is in humans. Both the owners and the dog have to be ready for surgery for it to be successful. The owners have to be dedicated to all the aftercare involved and the dog has to be tolerant of frequent applications of ophthalmic medications. Prior to cataract surgery, an electroretinogram is performed to test the function of the retina and an ocular ultrasound is performed to ensure that a retinal detachment is not present. Cataract surgery is performed under general anesthesia and I, therefore, usually recommend a

physical examination and routine bloodwork at the client's veterinarian prior to surgery. In diabetic dogs, a urinalysis and culture is also recommended. The cataracts are removed using phacofragmentation. A fine ultrasonic tip is used to break up the cataract and the fragments are removed through the same small incision. A foldable artificial intraocular lens, specifically designed for dogs, is introduced inside the empty lens capsule after the lens material has been removed. The cornea is closed with 8-0 or 9-0 vicryl. Post-operative ocular hypertension occurs in some eyes and is the reason that all cataract patients are admitted and spend at least one night in the hospital. The intraocular pressure is monitored for several hours after surgery and ocular hypertension is treated if it occurs. Most dogs go home the day after surgery with instructions to wear an E-collar for three weeks, apply multiple ophthalmic medications four times a day, and are prescribed a few oral medications as well. Routine recheck examinations are scheduled at approximately two weeks after surgery, one month after the first recheck examination, three months after the second recheck examination, and annual examinations after that. Ophthalmic medications are slowly tapered over a 4-6 month period.

The success rate of cataract surgery in dogs is approximately 90%. Unfortunately, 10% of eyes develop a blinding complication which can be within the first few weeks after surgery or many years after surgery. Complications may necessitate more frequent recheck examinations and prolonged use of medications. The most common complications include glaucoma, retinal detachment, and excessive intraocular scarring. If surgery is performed in both eyes, the chance of vision in at least one eye after surgery is very high.

As stated earlier, cataract surgery is routinely done in dogs. It is not the correct choice for all dogs with cataracts, but with dedicated owners and a cooperative dog, it can greatly improve the quality of life in dogs blinded by cataracts.

Gross Pathology: What's Your Morphologic Diagnosis?

Heather Daverio
DVM, DACVP
Anatomic Pathology
heather.daverio@amcny.org
212-329-8684

Signalment: 8-year-old, female spayed mixed breed dog.

History: An 8-year-old, female spayed mixed breed dog presented to the Emergency Service for recent history of regurgitating frank blood. The patient had a 3-year history of megaesophagus that was managed with Bailey Chair feeding. On her current regime, she regurgitated once every 5-7 days and was otherwise doing well. She had no prior history of aspiration pneumonia.

On presentation to AMC, the patient was in hypovolemic shock and had increased bronchovesicular lung sounds. She had bilateral epistaxis and spontaneously regurgitated blood. Point of care blood work revealed a moderate hyperlactatemia (8.76) and hemoconcentration (PCV/TS: 72/7). Chest radiographs showed a large, well-circumscribed, ovoid soft tissue mass in the mid-thoracic esophagus. Humane euthanasia was elected given uncertain prognosis.

Necropsy Findings: A post-mortem endoscopy is performed and reveals a large, well-encapsulated dark red to purple tubular structure arising from the esophagus. On gross postmortem examination, the thoracic esophagus is diffusely distended and at its widest is 6.2 cm. On palpation the cranial thoracic esophagus is gas filled and the caudal thoracic esophagus is doughy. At the level of the heart, the esophagus is transversed by a prominent (0.8 cm wide) azygos vein. [Figure 1]

Please formulate differential diagnoses based upon the history, clinical findings, and images before turning the page.

FIG. 1

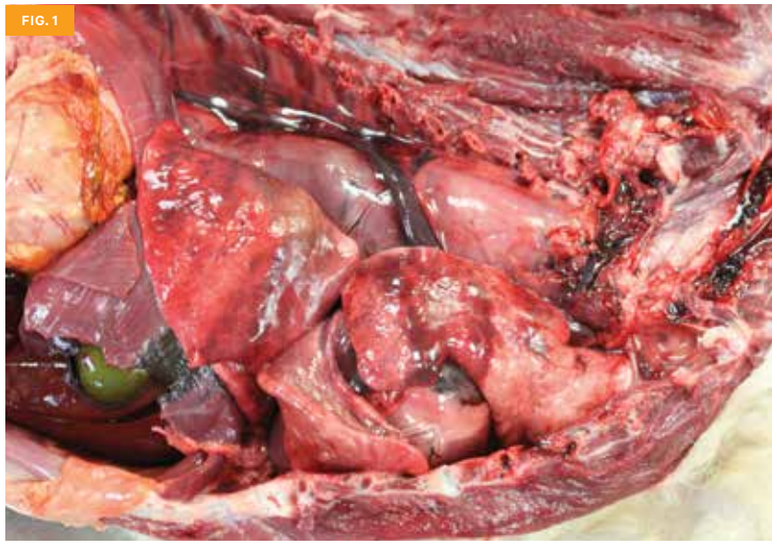
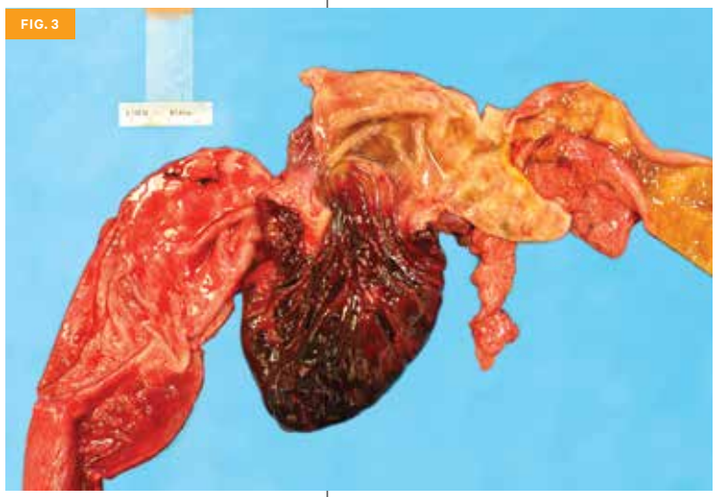


FIG. 2

FIG. 3



Additional Necropsy Findings: At the esophageal hiatus, approximately 75% of the orad stomach and associated omentum invaginates into the caudal esophageal lumen (intussusception). [Figure 2] The displaced stomach creates a 10 cm x 6 cm x 6 cm, ovoid, fleshy, dark red mass that fills and expands the esophageal lumen (intussusceptum). The exposed surface of the intussusceptum is derived from the gastric mucosa and is diffusely glistening, gelatinous, and dark red. Loosely adhered to the exposed surface is a blood clot. The cut surfaces of the affected gastric wall are expanded up to 0.7 cm thick by a gelatinous, opaque, dark red-black material (mural hemorrhage and edema). The delineation between the affected and non-affected gastric mucosa is abrupt. [Figure 3] The esophageal lumen orad to this mass contains a large amount of mucus mixed with blood. The intussusception is easily reduced. When the stomach is reduced the affected region's serosa has dozens of prominent, engorged blood vessels.

Histology:

Stomach: The normal gastric architecture is obscured by marked gastric gland loss and expansion of the interstitium by blood. Multifocally the surface epithelium is attenuated or eroded and occasionally covered by a necro-inflammatory coagulum. [Figure 4] There is common epithelial necrosis characterized by disassociation and pyknosis of chief and parietal cells, cellular and karyorrhectic debris, and infiltration by neutrophils and macrophages. [Figure 5] The retained chief and parietal cells are commonly degenerate. The mucosal and submucosal interstitia are severely expanded by hemorrhage admixed with fibrin, inflammatory cells, and karyorrhectic and cellular debris. Hemorrhage extends, to a varying degree, throughout the muscular tunics, serosa, and omentum. Occasionally, blood vessel walls are indistinct and replaced by fibrin and scant inflammatory cells. Intact blood vessels are severely congested.

Morphologic Diagnosis:

Esophagus and stomach: Gastroesophageal intussusception, acute, severe with severe regional mucosal necrosis and transmural hemorrhage and edema

Esophagus: Megaesophagus, severe with mild, chronic esophagitis

Comments: Postmortem examination confirmed the presence of a mass within the caudal esophagus with concurrent megaesophagus, as suspected on thoracic radiographs and confirmed on postmortem endoscopy. Differentials for megaesophagus are vast (including congenital, acquired, and iatrogenic forms). Causes of primary megaesophagus include congenital idiopathic megaesophagus and idiopathic megaesophagus of the mature dog.[4] Acquired megaesophagus is seen with neuromuscular disease (i.e. localized or system myasthenia gravis, immune-mediated polymyositis, polyradiculoneuritis, glycogen storage disease in Lapland dogs, canine giant axonal neuropathy, and neuromuscular junction disorders), esophagitis of any cause (i.e. parasitic, infectious, caustic, and traumatic), infectious etiologies (trypanosomiasis/Chagas disease and canine distemper virus), esophageal obstruction, neoplasia, hypoadrenocorticism, systemic lupus erythematous, lead poisoning, snake envenomation, persistent right aortic arch, and failure of the cardiac sphincter to open.[4] Also, iatrogenic megaesophagus can be seen with cholinesterase inhibitors.[4] Potential causes for the esophageal mass included neoplasia (i.e. papilloma, squamous cell carcinoma, and mesenchymal tumors), inflammatory nodules, and intussusception. In this case, the esophageal mass was created by invagination of a sizeable proportion of the stomach into the caudal esophageal lumen, consistent with a gastroesophageal intussusception. The affected gastric mucosa (intussusceptum) was severely expanded by mural hemorrhage and edema due to regional vascular compromise and subsequent tissue devitalization/necrosis.

Gastroesophageal intussusception (GEI) is caused by retrograde invagination of part of or all the stomach into the distal thoracic esophagus without displacement of the gastroesophageal junction. The duodenum, omentum, spleen, or pancreas can be involved as well.[1–8] GEI is a rare, life-threatening condition that should be considered a differential in cases of unresponsive vomiting or regurgitation, especially with concurrent respiratory distress.[1–8] Although uncommon GEI has been

FIG. 4

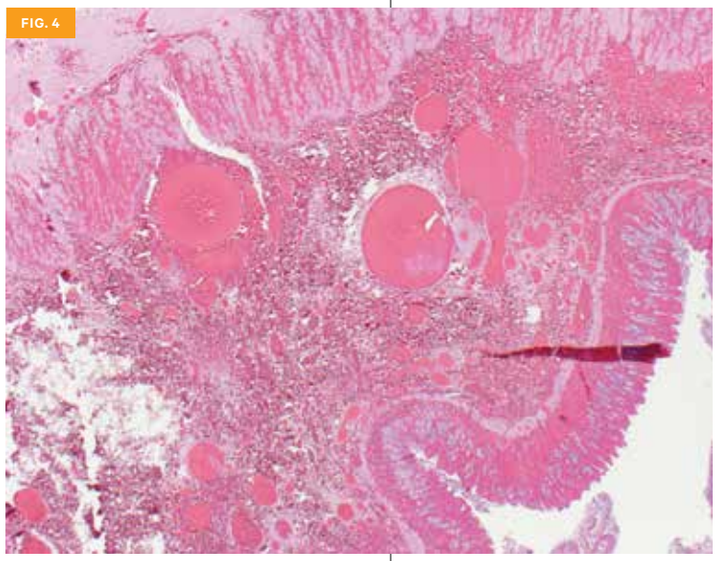
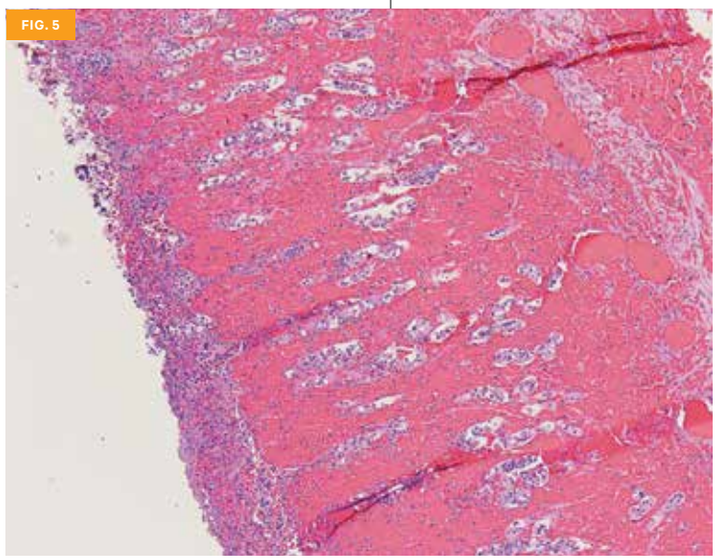


FIG. 5



reported in pediatric humans, canines, domestic felines, and a leopard.[7] In veterinary medicine, it is most commonly reported in young (less than 3 months old), large breed dogs. German shepherd dogs are overrepresented, which may be attributable to the increased incidence of congenital megaesophagus and other esophageal abnormalities in the breed.[1–8] The pathogenesis of GEI development is unknown and may be multifactorial. There is a strong association with pre-existing esophageal pathology (i.e. megaesophagus, enlarged hiatal hernia, lower esophageal sphincter incompetency, and esophageal motility disorders).[1–8] In humans, risk factors include conditions that increase abdominal pressure.[5] Similarly, in dogs predisposing factors may include increased intrabdominal pressure resulting from chronic vomiting or blunt trauma and negative thoracic pressure from inspiratory dyspnea.[5,7]

Two forms of gastroesophageal intussusception are reported: a chronic recurrent form that causes intermittent gastrointestinal signs and an acute, rapidly progressive form that results in signs of acute esophageal obstruction and respiratory distress.[5] In contrast to dogs, who more often experience an acute and fulminating form, the latter type is more common in the cat.[1,3,5,7] Signs are typically due to esophageal and gastric outflow obstruction and include dysphagia, ptyalism, vomiting, regurgitation, gastrointestinal discomfort, abdominal pain, and hematemesis. Dyspnea and respiratory distress result from the space-occupying lesion and/or aspiration pneumonia.[1–8] Diagnosis relies on identification of the invaginated stomach in the esophagus.[1–8] Radiographic findings include a soft tissue mass in the caudodorsal mediastinum, ventral deviation of the trachea and cardiac silhouette, cranial displacement of the hemidiaphragm (V/D view), and lack of the gastric silhouette in the cranial abdomen. Secondary aspiration pneumonia may be seen concurrently.[1–8] Contrast media may highlight a luminal filling defect and outline rugal folds.[1–8] As in this case, a fleshy, soft tissue mass including apparent rugal folds can be seen with esophagoscopy.[1–3,5,7] Differentiating GEI from a sliding hiatal hernia and periesophageal hernia is based on location of the gastroesophageal junction and stomach. Sliding hiatal hernias are characterized by cranial malpositioning of the gastroesophageal junction into the thoracic cavity, while periesophageal hernias are due to malpositioning of the stomach adjacent to the thoracic esophagus.[5,7]

Prognosis for GEI is guarded to poor and depends on early diagnosis, aggressive stabilization of the patient, accurate diagnosis of concurrent or underlying disease processes, and rapid reduction/correction.[1–8] Rapid patient decompensation results from reduced vascular return secondary to vessel compression, the obstructive nature of the intussusception, and endotoxic shock resulting from tissue ischemia and necrosis and inflammatory mediator release. The condition of the animal can deteriorate quickly and progress to hypovolemic shock and death.[1–8] Long-term survival depends on appropriate management of concomitant esophageal abnormalities and aspiration pneumonia.[1,3,5,7] The acute presentation of this animal in hypovolemic shock was consistent with the acute form typically seen in dogs.

References:

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Keyhole Thoracic Surgery: A window to the heart and more

Reprint courtesy of New York State Veterinary Medical Society's Connections Magazine

When a 10-year-old, male neutered, yellow Labrador Retriever began breathing heavily, many of the typical offenders were considered. An upper airway exam was performed to evaluate for laryngeal paralysis, and three view thoracic radiographs were obtained to evaluate the cardiac silhouette and pulmonary parenchyma. While paresis of the left arytenoid was noted, the cranial mediastinal mass was a much more concerning clinical finding, and the likely cause of the change in breathing pattern.

In a location whose entire design is a cage to protect vital structures and prevent traumas from the outside world, intra-thoracic masses can be a challenge, both diagnostically and therapeutically. Thankfully, the increasing availability of advanced imaging techniques, particularly computed tomography, has increased our ability to accurately diagnosis intra-thoracic disease. Surgical approaches are gradually catching up, with the latest advances coming with the increasing utilization of minimally invasive techniques, or video- assisted thoracic surgery (VATS).

Keyhole, or minimally invasive surgery has advanced rapidly in veterinary medicine in the last twenty years as technological advances and decreasing costs have made these procedures financially viable and clinically reasonable. By utilizing fiber optic light sources and HD video imaging systems, surgeons are able to see within a given cavity and manipulate structures using endoscopic surgical instruments. Clinical advantages are seen within these patients in decreased post-operative pain levels and fewer incisional complications. Additionally, the magnification provided by the imaging system and ability to advance into small spaces can sometimes provide superior visualization during procedures. In the thoracic cavity, endoscopic surgeries are both more advantageous as well as being more susceptible to limitations. The use of minimally invasive techniques allows the rib cage to remain largely unaltered while still performing the necessary procedure, decreasing patient morbidity and post-operative pain. Those same rigid bony structures can prevent free movement of instrumentation, which has to be placed through portals between or behind ribs.

The rib cage also provides the scaffold needed to create a working space once the thoracic cavity has been entered and the loss of negative pressure allows the lungs to relax away from the parietal surfaces. Thoracoscopic surgery therefore requires the use of positive pressure ventilation during the procedure and only minimal, if any, additional pressure within the pleural space can be used without compromise to ventilation. This can sometimes limit visibility and, particularly in procedures performed within a single hemithorax, require the use of one-lung ventilation to provide an adequate working space.

Given these challenges, appropriate case selection and communication of risks are essential. A complete and detailed view of the surgical plan is needed, ideally utilizing three-dimensional imaging techniques to gain a thorough evaluation of

Katie Kennedy
DVM, MS, DACVS-SA
Surgical Oncology
katie.kennedy@amcny.org
212-329-8723

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the location and extent of disease. The surgical approach, whether open lateral thoracotomy or median sternotomy, or thoracoscopic lateral or paraxyphoid techniques, is dependent upon being able to reach and assess the affected areas.

This is particularly true in assessing lymph nodes or contralateral structures. Once detailed, it must be determined if the surgical plan is feasible to be performed thoracoscopically. Frequently, this is limited by the size of the patient, allowing enough room for manipulation within the thoracic cavity, and the size of the area to be resected and its relation to vital structures.

All that being said, VATS has been successfully used for numerous procedures with a low rate of conversion to an open procedure and similar success rates as in open procedures. Lung and pleural biopsies are particularly amenable to the technique since minimal manipulation is generally required and small samples can be suficient for a diagnosis. More advanced procedures, such as complete lung lobectomies, mediastinal mass resections, thoracic duct ligations, and subtotal pericardiectomies, are more involved but, in the hands of experienced practitioners, have similar surgical times and complication rates. Resection of peripheral right auricular masses and the use of VATS for thoracic exploration of pyothorax cases remain more controversial, primarily due to questioning of their clinical utility rather than the technical feasibility.

For our yellow Labrador, a CT scan was performed to further delineate the size of the cranial mediastinal mass and its relation to the major vessels within the cranial thorax. The mass was found to be 6.6cm in its largest diameter and to be well marginated, although in contact with the cranial vena cava and aortic arch. No enlarged intra-thoracic lymph nodes or pulmonary parenchymal disease was noted.

Given current experience, a cut-off of up to 5cm for dogs weighing 15 to 30kgs and up to 8cm for dogs weighing over 30kgs is recommended when resecting cranial mediastinal masses thoracoscopically. This Labrador was a well-padded 43kgs, so would be approaching but still within the guidelines for resection. No invasion into the great vessels was evident on CT scan, but adherence could still possibly prevent resection of the mass.

While under general anesthesia for the CT scan, an ultrasound guided aspiration of the mass was performed in an effort to obtain a definitive diagnosis. Differentials for cranial mediastinal masses primarily include thymoma and lymphoma in dogs and cats; sarcomas, ectopic thyroid carcinomas, or branchial cysts have been reported but are rare. As with most lymphomas, the utility of surgery is highly dependent on the type and stage of lymphoma, with chemotherapy being a much more commonly used treatment modality. A pre-operative diagnosis of

FIGURE 1. VD (left) and right lateral (right) radiographs showing an oblong, lobulated soft-tissue mass in the cranial mediastinum, ventral to but not deviating the trachea. Cardiovascular and pulmonary structures are within normal limits. No lymphadenopathy or pleural space disease is detected. A metallic ID chip is in the dorsal soft tissues.

FIG. 1

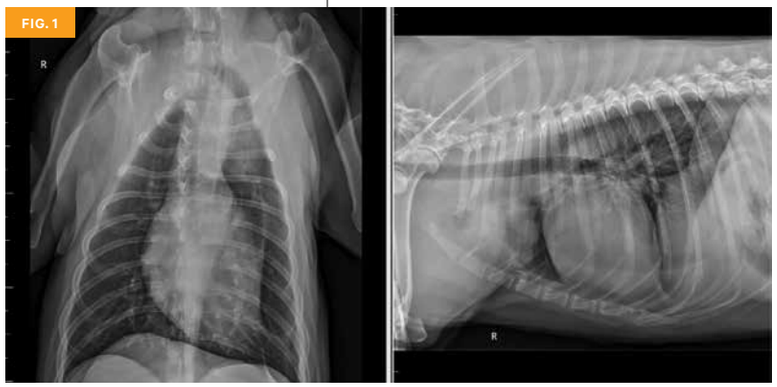
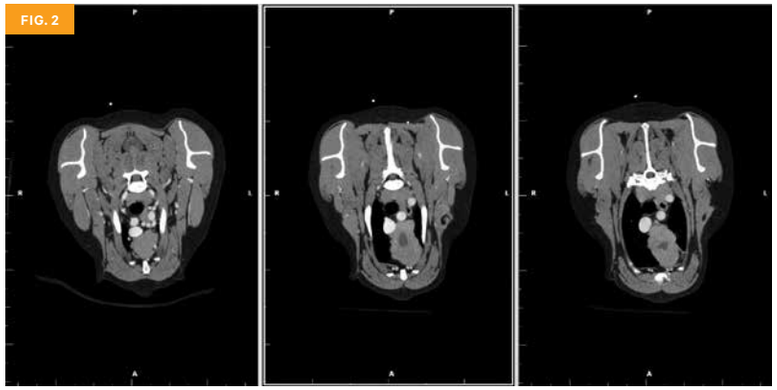


FIG. 1

FIG. 2



thymoma is also highly valuable given the incidence of paraneoplastic syndromes, particularly myasthenia gravis and its risk of megaesophagus and aspiration pneumonia. Our cytology confirmed this mass as a thymoma and serum acetylcholine receptor antibody titers were found to be normal.

Given these findings, thoracoscopic resection of the thymoma would be feasible through a paraxyphoid approach. In this configuration, the patient is in dorsal recumbency and the camera is placed immediately dorsal to the xyphoid, directed cranial to enter the thoracic cavity through the diaphragm. This allows visualization of the ventral internal aspect of the chest, and both hemithoraces once the mediastinum is dissected away from the sternum.

Instrument portals are placed on either side of the thorax, through the intercostal spaces, to allow manipulation of the tissues. Much of the dissection is performed using traction from one side and a vessel sealing device, such as a Ligasure, from the other. Once the thymoma is freed from the surrounding structures, it is placed into a specimen retrieval bag and one of the lateral portals enlarged to allow extraction of the mass but limit contact to the surrounding tissues and the potential for portal site metastasis.

With this positioning, conversion to an open median sternotomy would be planned for if needed due to lack of visibility, hemorrhage, or complications with dissection. A thoracostomy tube is placed intra-operative for use in the post-operative period; while no pulmonary parenchyma is directly handled during this procedure, the potential for iatrogenic damage and subsequent pneumothorax is still present.

Thoracostomy tube care and post-operative management are similar to other thoracic surgeries, with full mu opioids and multimodal pain management being essential for patient comfort. Short-term survival is primarily dependent upon the development of post-operative complications.

FIGURE 1. VD (left) and right lateral (right) radiographs showing an oblong, lobulated soft-tissue mass in the cranial mediastinum, ventral to but not deviating the trachea. Cardiovascular and pulmonary structures are within normal limits. No lymphadenopathy or pleural space disease is detected. A metallic ID chip is in the dorsal soft tissues.

FIGURE 2. A) Coronal (left) and sagittal (right) CT images with contrast in a soft tissue window. B) Serial axial CT images, moving caudally left to right, with contrast in a soft tissue window. A mostly homogenously contrastenhancing soft tissue mass, measuring 6.4cm by 4.2cm by 6.6cm, is present in the cranial mediastinum, with a noncontrast enhancing cyst or cavitation within the caudal aspect of the mass. The mass seems fairly well marginated. The dorsal aspect of the mass contacts the cranial vena cava but does not appear to invade or severely compress it. The caudal aspect of the mass is ventral and just cranial to the arch of the aorta. No pulmonary nodules or lymphadenopathy are identified.mass contacts the cranial vena cava but does not appear to invade or severely compress it. The caudal aspect of the mass is ventral and just cranial to the arch of the aorta. No pulmonary nodules or lymphadenopathy are identifed.

Thankfully our Labrador recovered successfully and fully from his surgery, which accomplished complete resection of his thymoma. At recheck three months post-operatively, he has no evidence of recurrent disease, a good long-term prognosis, and minimal surgical scarring that have left him ready to hit the beach this summer.

FIG. 3A

FIGURE 3. A) Thoracoscopic image obtained using a 30 degree 5mm scope through a paraxyphoid portal. The internal surface of the parasternal musculature and sternal median raphe is present at the top of the image. Mediastinal tissue is present to the right with the internal thoracic wall present to the left. Aerated lung is present at the bottom of the image.

FIG. 3B

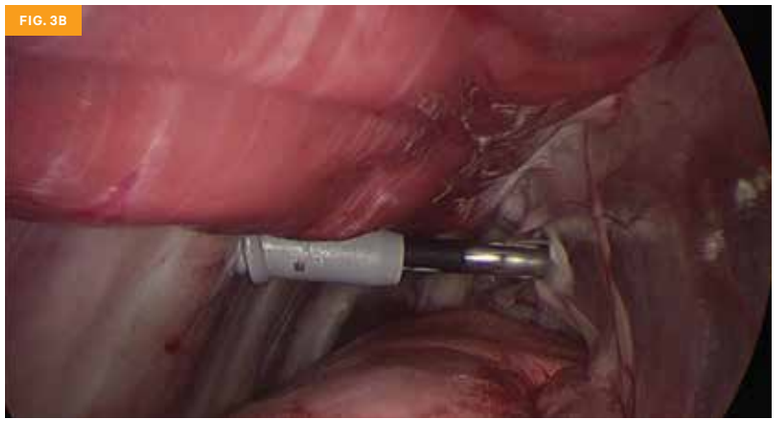


FIGURE 3. B) A 10mm portal has been created in the intercostal space with a threaded cannula. A vessel sealing device is being used to release the mediastinum from its ventral attachments.

FIG. 3C

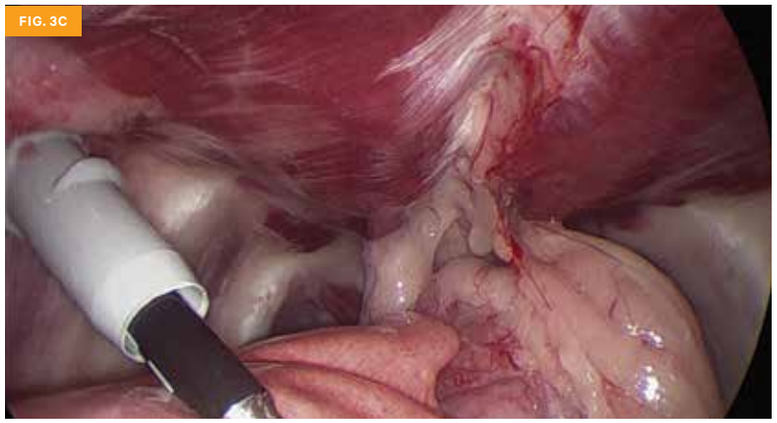


FIGURE 3. C) The mediastinum has been partially released allowing visualization of the thymoma, still being suspended within the cranial mediastinum.

What's your diagnosis?

Eunbee Kim, DVM and
Anthony Fischetti, DVM, MS, DACVR
Head of Diagnostic Imaging

History: An approximately 9-month-old male mixed breed dog was presented to the Animal Medical Center's Emergency Service for paraparesis. The owner reported putting the puppy on a high shelf in the bathroom for punishment after inappropriate urination. The dog was later found on the floor unable to ambulate.

Lateral and ventrodorsal radiographic projections of the thorax (Figure 1 and 2) and a ventrodorsal projection (Figure 3) of the abdomen were made. A complete study of the abdomen/pelvis could not be made at the time.

What's your radiographic diagnosis?

Turn to page 24 for the diagnosis and case discussion.

FIG. 1

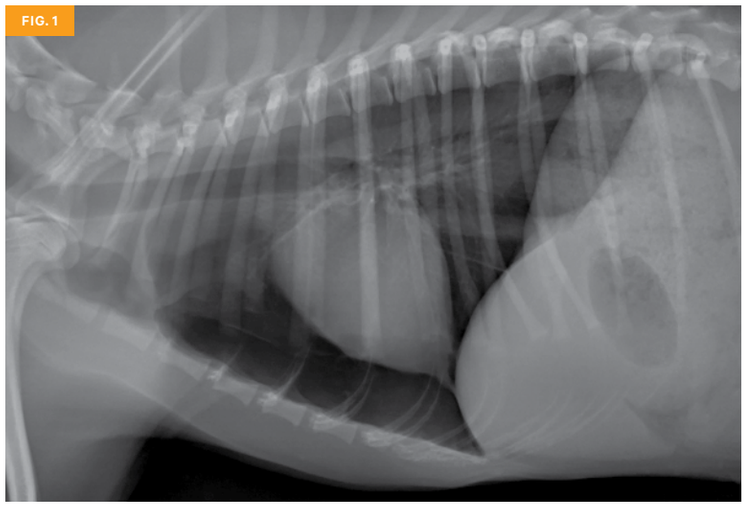


FIG. 2

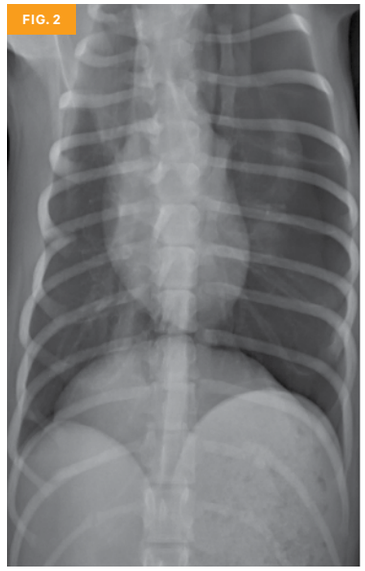


FIG. 3

To help stay abreast of and contribute to advances in medicine, AMC offers cutting-edge continuing education programs to the veterinary community. In addition, AMC's veterinarians are involved in numerous scientific research studies intended to improve quality of life and reduce illness. Indeed, clinical research contributes to new knowledge that improves our understanding of disease, expands and improves diagnostic testing, advances new therapies, and discovers better ways to diagnose illness. Much of this work is published in peer-reviewed scientific journals and/or presented at scientific meetings and conferences. *Edited by Philip Fox, DVM, DACVIM/DECVIM-CA, DACVECC, Head of Cardiology*

CONTINUING EDUCATION

CONTINUING EDUCATION LECTURES

Our continuing education lectures are open to all area veterinarians and technicians and are FREE of charge. All lectures are held at AMC from 8:00-9:00 am, unless otherwise noted. AMC lecture topics and dates are subject to change. *Please visit amcny.org/celectures or email education@amcny.org for up-to-date information. No registration is required.*

AMC's Partners In Practice (PIP) seminars are free and CE accredited, but require registration. Visit amcny.org/pipseminars for more information and to register.

PIP COMPREHENSIVE CLINICAL CONFERENCES

Partners In Practice Comprehensive Clinical Conferences are intended to provide several hours of comprehensive review and updates of important and contemporary topics in veterinary medicine. Upon completion, participants should gain enhanced knowledge of the selected topic. Conferences are held at AMC on Sundays from 9:00 am–3:00 pm and are both RACE and NYSED approved.

December 2
Cardiology – New Tips and Therapies

PIP PRACTICAL CLINICAL WORKSHOPS

Partners In Practice Practical Clinical Workshops are designed to promote sound diagnosis and effective therapies. Bring and share case materials if you wish! Participate in our time-honored teaching rounds and small group, interactive workshops. Space is limited to 15 participants, so register today! These PIP Workshops are held at AMC on Tuesday evenings from 7:00-8:30 pm and are NYSED approved.

2019 workshop dates will be available on our website soon.

RESEARCH HIGHLIGHTS

CURRENT CLINICAL TRIALS RECRUITING PATIENTS

(For more detailed information, visit amcny.org/clinicaltrials)

Cardiology

- Heart Failure: Evaluation of an oral nitrate medication added to conventional therapy to treat congestive heart failure in dogs

Integrative & Rehabilitative Medicine

- Feline Osteoarthritis: Field Safety and Efficacy of an Experimental Drug Compared to Placebo for the Treatment of Pain Associated with Osteoarthritis in Cats
- Hind Limb Strength: Pilot studies to evaluate thermographic imaging and manual muscle testing to assess hindlimb stress in dogs
- Canine Post-Surgical Lameness: Investigation of a device (Toe Grips®) applied to nails to reduce lameness in dogs recovering from knee surgery

Internal Medicine

- Kidney Disease: Comparison of a novel blood test (SDMA) to standard creatinine blood tests used to monitor cats treated for post-renal (kidney) obstruction
- Diabetes: Evaluation of regular insulin administered by constant rate infusion compared to intermittent intramuscular administration to treat cats with diabetes
- Anemia: Evaluation of the relationship between cobalamin and folate deficiencies and anemia in dogs

Interventional Radiology & Interventional Endoscopy

- Bladder Cancer: Artificial neobladder placement for dogs with resectable lower urinary tract tumors
- Bile Duct Obstruction: Treatment of Extrahepatic Biliary Duct Obstruction (EHBDO) in dogs and cats by Endoscopic Retrograde Cholangiopancreatography (ERCP) with biliary stent placement or the use of a rescue Subcutaneous Intestinal Biliary Bypass Device (SIBB)

Oncology

- Canine Lymphoma: Evaluation of 25-hydroxyvitamin D concentrations in canine multicentric lymphoma treated with a CHOP-based chemotherapy protocol
- Bone Cancer: Trial of Her2-expressing vaccine in dogs with appendicular osteosarcoma
- Vaccine-Induced Cancer: Evaluation of efficacy and safety of feline interleukin-2 immunomodulator following surgical excision of feline fibrosarcoma
- Carcinoma and Sarcoma: Leukocytes infiltrating canine solid tumors may harbor oncogenic mutations
- Spleen Cancer: Comparison of combination chemotherapy and immunotherapy for dogs with splenic hemangiosarcoma

RESEARCH STUDIES IN PRINT

AMC's clinicians contributed to a number of research studies that have been published during this recent quarter. Collaborative publications (AMC doctors are in bold) reported clinical findings in canine and feline patients. Topics included endoscopic laser ablation to treat congenital ureteral stenosis, surgery, cardiology, analysis of initial and postoperative bacterial lavage culture results in patients with septic peritonitis, effect of low-level laser therapy on bone healing and signs of pain in dogs following tibial plateau leveling osteotomy, and an oncologic report of metastatic thymoma in the liver.

Meler E, **Berent AC**, **Weisse C**, Dunn M. Treatment of congenital distal ureteral orifice stenosis by endoscopic laser ablation in dogs: 16 cases (2010-2014). *J Am Vet Med Assoc.* 2018 Aug 15;253(4):452-462.

Kalafut SR, **Schwartz P**, **Currao RL**, **Levien AS**, Moore GE. Comparison of Initial and post-lavage bacterial culture results of septic peritonitis in dogs and cats. *J Am Anim Hosp Assoc.* 2018 Sep/Oct;54(5): 257-266.

Kenedy KC, Martinez SA, Martinez SE, Tucker RL, Davies NM. Effects of low-level laser therapy on bone healing and signs of pain in dogs following tibial plateau leveling osteotomy. *Am J Vet Res.* 2018 Aug;79(8):893-904. doi: 10.2460/ajvr.79.8.893.

Wiles V, **Haddad J**, **Leibman N**, Avery AC, Hughes KL. Metastatic thymoma in the liver of a dog. *J Vet Diagn Invest.* 2018 Aug 17:1040638718791222.

AWARDS

Dr. Philip Fox was the recipient of a prestigious award presented to him by the AVMA Council on Research and WINN Feline Foundation. This presentation occurred at the National Veterinary Scholars Symposium held at Texas A&M University. The award, for Excellence in Feline Research, was in recognition for his many clinical and research contributions over many years. In addition, Dr. Fox presented a lecture to veterinary students at the Symposium who had been selected to attend based upon their career interest in clinical and basic research. Dr. Fox is a board certified cardiologist and clinician, Director of AMC's Caspary Research Institute, and Director of Education Outreach at AMC.

STAFF UPDATES

Please join us in welcoming two new staff veterinarians to AMC:

Melissa Smith, DVM, PhD, DACVAA will serve as our new head of Anesthesia & Pain Management. Dr. Smith recently completed a residency in veterinary anesthesia and analgesia at the University of Georgia. She became board certified by the American College of Veterinary Anesthesia and Analgesia in July 2018. Dr. Smith also earned her PhD in Biomolecular Pharmacology from Boston University.

Nahvid Etedali, DVM, DACVIM (SAIM) is joining AMC as a staff veterinarian in our Internal Medicine Service. Most recently, Dr. Etedali was a staff internist at Veterinary Emergency and Referral Group in New York

City. He completed his internal medicine residency at the University of Pennsylvania Matthew J. Ryan Veterinary Hospital and achieved Diplomate status from the American College of Veterinary Internal Medicine in 2017.

We would also like to congratulate **Bill Tavolacci, LVT** on receiving his Certified Canine Rehabilitation Practitioner (CCRP) certificate in August, and **Django Martel, DVM, DAVDC**, who recently obtained Diplomate status from the American Veterinary Dental College, becoming one of only two board certified dentists in the greater NYC area.

ALUMNI UPDATES

Congratulations to AMC alumna Birgit Puschner, DVM, PhD, who was recently appointed the new dean of the Michigan State University College of Veterinary Medicine.

ABOUT THIS NEWSLETTER

This newsletter is distributed quarterly to AMC's network of referring veterinarians, alumni and others who opt-in to receive this publication. To view past issues or to join our mailing list, please visit amcny.org/rdvm-quarterly. If you are an AMC alumnus who would like to sign up to receive periodic updates, please visit amcny.org/amc-alumni-registration.

To receive our current staff directory or if you have questions, email info@amcny.org.

For access to the AMC Patient Referral Form, visit amcny.org/referralform.

Front and back cover photos courtesy of Corey Towers.

AMC Specialty Services for Referring Veterinarians

For referring veterinarians please call 212-838-8100 and press 1 (between the hours of 8 am through 8 pm)

AVIAN & EXOTICS
Dr. Kathy Quesenberry
Dr. Cyndi Brown

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Dr. Philip Fox
Dr. Betsy Bond
Dr. Dennis Trafny

DENTISTRY
Dr. Dan Carmichael
Dr. Stephen Riback
Dr. Django Martel

DERMATOLOGY
Dr. Mark Macina

INTEGRATIVE & REHABILITATIVE MEDICINE
Dr. Leilani Alvarez
Dr. Barry Cherno

INTERNAL MEDICINE A
Dr. Beth Appleman
Dr. Nahvid Etedali

INTERNAL MEDICINE B
Dr. Douglas Palma
Dr. Dennis Slade

INTERVENTIONAL RADIOLOGY & INTERVENTIONAL ENDOSCOPY
Dr. Chick Weisse
Dr. Allyson Berent

NEUROLOGY
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Dr. Abbie Lebowitz

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Dr. Ann Hohenhaus
Dr. Maria Camps

OPHTHALMOLOGY
Dr. Alexandra van der Woerdt

RADIATION ONCOLOGY
Dr. Rachel St-Vincent

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Dr. Dan Spector

SURGERY SERVICE 3
Dr. Pamela Schwartz

SURGERY SERVICE 4
Dr. Rob Hart

SURGICAL ONCOLOGY
Dr. Katie Kennedy

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646-799-6028

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AAHA ACCREDITED — The Standard of Veterinary Excellence

FOR VETERINARY PROFESSIONALS

Partners In Practice Conference

Sunday, December 2, 9:00-3:00pm:
"Cardiology – New Tips and Therapies"
Presented by:

Philip R. Fox, DVM,
DACVIM/DECVIM (Cardiology), DACVECC
Animal Medical Center

and

Sydney Moise, DVM,
DACVIM (Cardiology, IM)
Cornell University College of Veterinary Medicine

RSVP: amcny.org/pipseminars

AMC Animal Medical Center SINCE 1910

NYSED Approved as a New York State sponsor of continuing education for veterinarians and veterinary technicians

RACE Registry of Approved Continuing Education — American Association of Veterinary State Boards

FOR PET OWNERS

Animal Neurology

Thursday, December 6, 6:00-7:00pm

Join Dr. Abbie Lebowitz, Staff Neurologist, as she discusses three of the most common neurological concerns: seizures, herniated discs and stroke. This event is geared toward the general public and is a great way for pet owners to learn more about neurological conditions and ask questions in a relaxed environment.

The event is FREE & pet-friendly!

RSVP: amcny.org/usdanevents

AMC SINCE 1910 | Animal Medical Center
Usdan Institute for Animal Health Education

What's your diagnosis?

Figures 1 and 2: There is an increased distance between the sternum and cardiac silhouette (*). This space is more radiolucent, lacking pulmonary blood vessels, consistent with pneumothorax. On the VD view, the retraction of the lung lobes away from the body wall is especially prominent in the left hemithorax (*). The black arrows indicate acute rib fractures of the right 7th and 12th ribs. The white arrows indicate chronic rib fractures of the right 13th and left 12th and 13th ribs. While the acute fractures have sharp edges, the chronic fractures can be differentiated due to the bony remodeling.

Figure 3: As in Figures 1 and 2, the pneumothorax (*), acute (black arrows) and chronic (white arrows) rib fractures can be seen in this view as well. Multiple, acute pelvic fractures (black arrowheads) include comminuted fractures of the articular portion of the right acetabulum and pubic bone with medial displacement of the right hip and attenuation of the pelvic inlet. An oblique fracture of the left ilial wing is medially displaced, also contributing to narrowing of the pelvic canal. There are normal physes of the bones that should not be mistaken for fractures.

Diagnosis:

1. Left-sided pneumothorax
2. Acute and chronic rib fractures, bilaterally
3. Multiple complex acute pelvic fractures

Discussion:

The combination of acute and chronic fractures coupled with fractures in different areas of the body is supportive of multiple-event trauma. Non-accidental injury should be the top differential in this case.

Non-accidental injury (NAI) is defined as willful injury to an animal that is not the result of an accident and should be suspected when the clinical history is incompatible with the radiographic findings. Characteristics that indicate NAI include "multiple fractures, fractures in more than one anatomical region, fractures in various stages of healing, delayed presentation of fractures and transverse fractures".[1] This study fulfills many of these criteria with the numerous acute and chronic rib fractures, multiple fractures in the thorax and pelvis, and incongruent clinical history.

To report a case with signs consistent with NAI in New York City, please call 311 (or 911 for a crime in progress). For further information on reporting suspected cruelty/abuse, please visit the ASPCA website: https://www.aspca.org/take-action/report-animal-cruelty.

1. Watson E, Heng HG. Forensic radiology and imaging for veterinary radiologists. *Veterinary Radiology and Ultrasound* 58:3, 2017. 245-58.

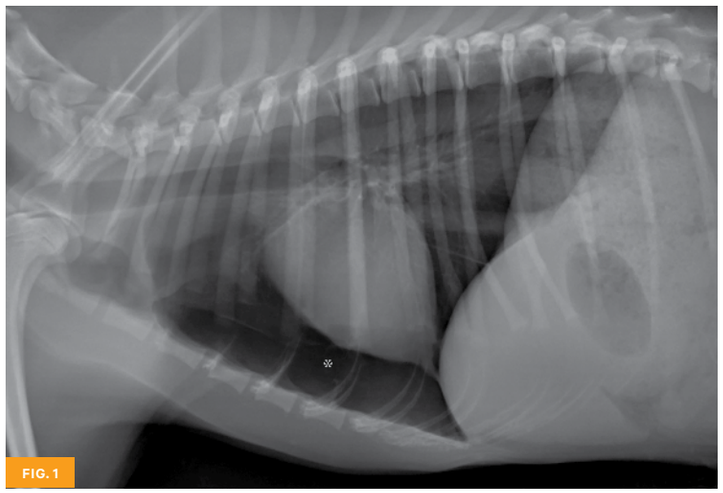

FIG. 1

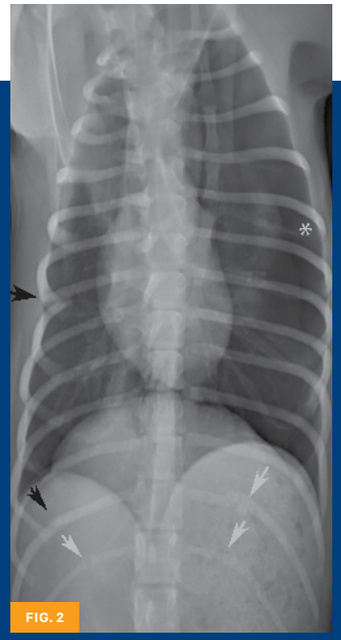

FIG. 2

FIG. 3

AMC
Animal Medical Center
SINCE 1910

510 East 62nd Street
New York, NY 10065