

# rDVM Quarterly

VETERINARY COMMUNITY NEWS FROM AMC | SUMMER 2019



## AMC

Animal Medical Center

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Caspary Research Institute | The Cancer Institute  
Emilia Saint-Amand Krimendahl Institute for Trauma Care | Usdan Institute for Animal Health Education

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# A Letter From Our CEO

SUMMER 2019

Dear Colleagues,

I'm pleased to announce that 2019 has been a positive and productive year!

In just a few months, the Animal Medical Center has seen some exciting changes that will enhance our patient, client, and rDVM experience. Most notably, I'm happy to announce that Dr. Katherine Quesenberry has been named our new Chief Medical Officer. She previously served as the Head of the Avian and Exotic Pet Services at AMC and brings more than three decades of experience in animal care, research, and veterinary leadership to the role. You'll hear from Dr. Quesenberry for the first time in her new role in this issue, and we're all looking forward to supporting her vision for the future of medical care at AMC.

We've also added a full-time licensed clinical social worker to our team, Judith Harbour. Ms. Harbour will work closely with veterinary staff to support their emotional well-being and provide counseling to clients. She will also facilitate our pet loss support group. Her deep understanding of the bond between humans and animals will play a vital role in assisting clients facing trauma, loss, or difficult decisions, and we're pleased to have this valued resource here at AMC. In addition, we also welcomed back former AMC intern Dr. Lauren Saunders to our ER service as Staff Doctor. Dr. Saunders was an outstanding intern, and she is already an invaluable addition to our emergency team.

The year is full of continuing education events and events for pet owners through our Usdan Institute for Animal Health Education, both of which you can learn more about on our website at [amcny.org](http://amcny.org). Thank you, as always, for your continued trust in AMC. We value our relationship with our referring veterinarians and appreciate your support.

Sincerely,



Kate



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# NYC's Animal Medical Center Strengthens Leadership Team with Appointment of New Chief Medical Officer

*Katherine Quesenberry, DVM, MPH, DABVP (Avian), Brings Over 35 Years of Experience to the Role*

On March 5, 2019, the Animal Medical Center, the world's largest non-profit animal hospital, announced the appointment of Katherine Quesenberry, DVM, MPH, DABVP (Avian), as Chief Medical Officer. Dr. Quesenberry, who most recently served as the Head of the Avian and Exotic Pet Services at AMC, brings more than three decades of experience in animal care, research, and veterinary leadership to the role.

In her new capacity, Dr. Quesenberry will be responsible for providing medical oversight and direction of all clinical activities to AMC's 100+ veterinarians. As AMC approaches its 110-year milestone and manages a record caseload of more than 54,000 patient visits each year, Dr. Quesenberry will ensure the institution's continued legacy as a leader in veterinary medicine. She is charged with maintaining the highest standards in patient care, research, and education.

Over the course of her tenure at AMC, Dr. Quesenberry led AMC's Avian and Exotic Pet Service, during which time she trained more than 20 residents and specialty interns in the veterinary care of exotic pets. She has authored numerous scientific articles and has lectured widely both nationally and internationally on topics in this veterinary specialty. Dr. Quesenberry is a member of the Editorial Board of the Merck Veterinary Manual and has served as the Scientific Editor of the Journal of Avian Medicine and Surgery for the Association of Avian Veterinarians since 1994. She is co-editor of *Ferrets, Rabbits and Rodents: Clinical Medicine and Surgery*, published by Elsevier, which is a best seller in veterinary medicine and is now going into its 4th edition. She was a co-editor of *Avian Medicine and Surgery*, also published by Elsevier. In 2017, Dr. Quesenberry was presented with the prestigious Oxbow Exotic Mammal Health Award in recognition of her contributions to the field of exotic mammal medicine and care.

"Katherine Quesenberry is a world-class veterinary professional with extraordinary leadership skills, clinical expertise, and strong research credentials, along with a true passion for veterinary medicine," said Kathryn Coyne, Chief Executive Officer at AMC. "Dr. Quesenberry's 35-plus-year legacy at AMC is marked by countless contributions to the advancement and evolution of veterinary medicine, and we are fortunate to have such a highly qualified individual to provide superior medical leadership."

"To me, AMC is unique in the field of veterinary medicine, symbolizing the best of what our profession can offer to both the veterinary community and to the public at large," said Dr. Quesenberry. "In my new role as Chief Medical Officer, I look forward to working with our extraordinary veterinary staff to ensure that AMC continues to be the premier provider of care, clinical research on naturally-occurring diseases, and education in the veterinary field."

# A Letter From Our CMO

Dear Colleagues,

It is with great pride and humility that I write to you as the new Chief Medical Officer of the Animal Medical Center. During my 35-plus years at AMC, I've seen time and time again just how important our relationships with our referring veterinarians are, and I look forward to deepening those relationships in my new capacity as CMO. It's my hope that you'll continue to think of AMC as a valued partner in caring for the pets we love and a resource on cases of all varieties, from emergencies and rehabilitation to cardiology and neurology. My goal is to serve the rDVM community to the best of my ability, propelling AMC forward into an even brighter future in fulfilling our mandates of compassionate care, education, and research.

If you have any questions or concerns, please don't hesitate to contact me. I look forward to working with you to ensure your referrals continue to receive the best care possible.

Sincerely,



Katherine Quesenberry  
Chief Medical Officer



Katherine Quesenberry  
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# Traumatic Caudal Mandibular Fracture in a Cat

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



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A castrated male domestic shorthair cat, 4.5 years of age, was presented to the Animal Medical Center's Emergency Service for evaluation of a traumatic left mandibular fracture after an altercation with a dog. Physical examination revealed multiple superficial excoriations to the face and body, and the mandible was deviated to the left with palpable crepitus in the caudal left mandible. Blood was drawn for a complete blood count and serum chemistry, both of which came back within normal limits. Hospitalization for supportive care in preparation for imaging and surgery two days later was offered but declined by the clients. They instead elected to take the patient home with oral buprenorphine and Clavamox after scheduling an appointment with the Dentistry Service two days later.

On the day of the procedure, the patient was again presented with no change in his left mandibular deviation. He had tolerated oral medication and was eating canned food with water added. The patient was placed under general anesthesia, and a cone beam CT scan of his head was performed, which revealed a caudal fracture of the left mandible. The body of the mandible had separated and shifted caudally from the vertical ramus and condyle, which was still in the temporomandibular fossa, and the angle of the mandible was fractured as a third, separate fragment, located rostromedial to its normal anatomic position. The mandibular symphysis was also partially separated.

Treatment options for caudal mandibular fractures in cats include intercanine bonding with esophagostomy feeding tube placement, a button suture muzzle, or tooth extensions. Feline caudal mandibles are so thin that using orthopedic miniplates and screws or similar rigid fixation is not feasible. Intercanine bonding involves fixing the mouth into a semiclosed position by adhering acrylic and wire to the maxillary and mandibular canines, allowing room for the tongue to be able to protrude and lap up gruel and water. This rigid fixation is maintained for a period of six to eight weeks. A feeding tube is generally required in the event that enteral nutritional supplementation is needed to maintain the patient. Intercanine bonding is especially good for cats with severely comminuted caudal mandibular fractures because it provides rigid fixation, but this technique often results in jaws that subsequently may not fully open or close. Additionally, intercanine bonding must be removed under general anesthesia, which contributes to client cost and, potentially, patient morbidity or mortality.



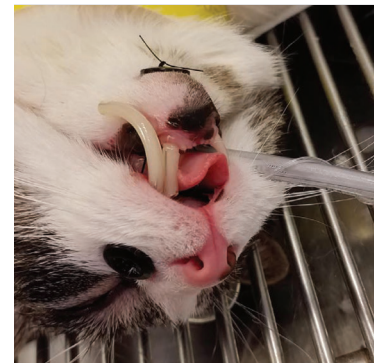
**ABOVE**  
2 views of patient with cone beam CT 3D reconstruction prior to repair.

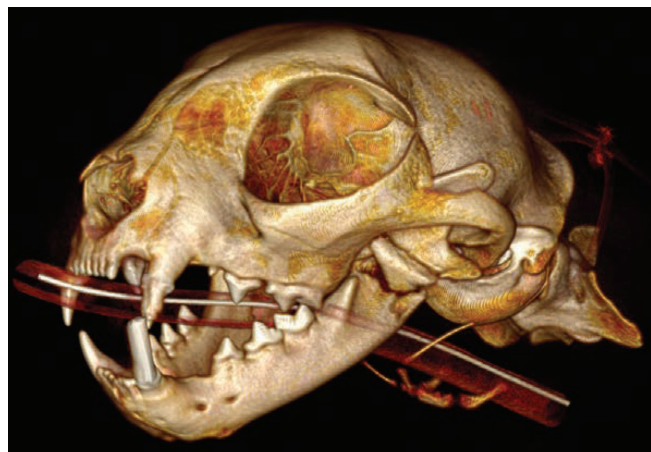
**BELOW**  
Patient with suture muzzle and tooth extensions in place.

Creating a button suture muzzle involves driving nylon suture through the skin of the ventral midline just caudal to the mandibular symphysis, up along the lingual aspect of one of the mandibles, into the oral cavity, then through the buccal mucosa of the cheek and out the skin just dorsal to the whiskers. The suture is then passed through a plastic button, back down the same path to the ventral mandible, through a second button and back up the contralateral side and through a third button on the other cheek, thus acting as a muzzle that limits the extent to which the patient can open his or her mouth. The buttons prevent pressure necrosis from the suture by increasing the surface area over which tension is distributed. The suture muzzle is a good intervention for cats with healthy canines, as the canines help keep the jaw in occlusion when the mouth is mostly closed; however, this technique will not work well for heavily comminuted fractures where the stability of the jaw is severely compromised. Removal of suture muzzles is easily performed by cutting the nylon suture and can usually be done without sedation if patient temperament allows.

Tooth extensions are segments of acrylic (with or without orthopedic wire reinforcement) inside rubber tubing that are bonded to the canines to lengthen them, which helps to capture the mandible from deviating out of occlusion. Tooth extensions are appropriate for simple fractures where there is not a great amount of distracting force, but they are relatively easily broken off, especially in fractious or strong cats. As with intercanine bonding, tooth extensions need to be removed under general anesthesia. One of the main benefits of the suture muzzle or tooth extension techniques is that some range of motion in the jaws is permitted during the healing process. This movement prevents restriction of mandibular range of motion that can ultimately result from rigid fixation techniques. After discussion with the owner, it was decided that a button suture muzzle with or without tooth extension was the best choice.

A circum-mandibular cerclage wire was placed around the patient's rostral mandibles to stabilize the partial symphyseal separation. A suture muzzle was placed using 2-0 nylon and four-holed plastic buttons. There still appeared to be too much instability in the jaw after application of the suture





**ABOVE**  
2 views of patient with cone beam CT 3D reconstruction 7 weeks after repair.

muzzle alone, so tooth extensions were placed on the left maxillary and mandibular canines. The patient recovered uneventfully from anesthesia and was discharged later that day with instructions to continue the buprenorphine and Clavamox as previously prescribed. The clients were instructed to return in six weeks for re-evaluation and to have the muzzle and extensions removed.

Four weeks later, the patient was presented because the maxillary tooth extension had broken off. On physical examination, the button suture muzzle and the mandibular canine extension were still in place, but the left maxillary canine extension was absent. The occlusion was in the correct alignment, and there was no palpable crepitus in the left caudal mandible. The patient was eating and drinking well, but had lost 0.8 kg of weight. Accordingly, the patient was sent home with instructions to try to feed approximately 25% more canned food and to return for recheck in two weeks.

Two weeks later, the patient returned to have the remaining appliances removed. The suture muzzle was still in place, but the nylon suture had been stretched out by approximately 5-10 mm. The occlusion was in alignment with slight deviation to the left but still in a non-traumatic fashion. The cat had lost 0.1 kg. He was admitted to the hospital and placed under general anesthesia immediately after the button suture muzzle was removed. A cone beam CT of the head was repeated and revealed that the three mandibular fragments had not formed a boney callus, but were in close approximation and were thought to be forming a fibrous union. Manipulation of his jaw under general anesthesia showed mild laxity to the left, but his occlusion returned to normal when his mouth was closed. The tooth extension on the left mandibular canine was removed, and any remaining acrylic on the left maxillary canine was similarly removed. The teeth were ultrasonically scaled and polished, and the patient recovered uneventfully from general anesthesia. The patient was discharged the same day without the need for medication.

Since the cat was discharged he has been eating and drinking very well. He is grooming himself and his occlusion remains in place. It is likely that 7 weeks is not enough to appreciate the true stability of the left caudal mandible with cone beam CT imaging, however the cat seems to be doing clinically quite well.

# High Flow Nasal Cannulation Now Available at AMC

**EMERGENCY AND  
CRITICAL CARE**

Small animals can experience breathing problems just like people. These issues arise from acute heart failure, pneumonia, or trauma or can be caused by chronic airway diseases such as asthma or bronchitis. High flow nasal cannulation (HFNC), a novel technology now available at AMC, seeks to relieve air hunger and respiratory distress associated with these issues when interventions such as oxygen, diuretics, and antibiotics are ineffective.

HFNC is well-tolerated by veterinary patients and is preferable to a mechanical ventilator for reasons of safety and cost. Therapy via mechanical ventilator is invasive and expensive, and in veterinary patients requires general anesthesia. Further, the high airway pressures required to improve delivery of oxygen via mechanical ventilator may contribute to lung damage.

For these reasons, we're pleased to introduce HFNC technology at AMC, as we continue to provide the best possible patient outcomes.





# Hypophysectomy at the Animal Medical Center

This issue continues a multi-part series highlighting the expertise of the Animal Medical Center's Neurology Service. 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.

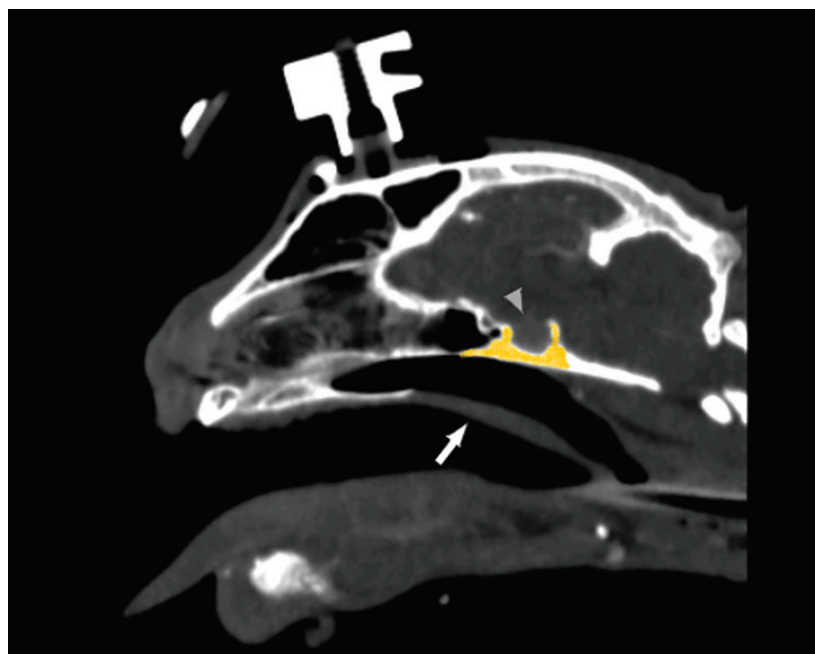


**John McCue**  
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*What is transsphenoidal hypophysectomy and why is it performed?*

The sphenoid bone comprises the middle part of the skull supporting the ventral aspect of the brain. Within the sphenoid bone is a depression that accommodates the pituitary gland, or hypophysis, as it sits beneath the brain attached by its stalk or infundibulum. In people, this area is accessed via a transnasal route. Differences in cranial anatomy make a transoral route preferable in dogs and cats. The procedure is considered minimally invasive; here, an existing orifice is used to access a difficult to reach area, thereby avoiding extensive tissue disruption and improving post-operative recovery. To reach the sphenoid bone, an incision is made in the soft palate and the mucoperiosteum of the nasopharynx. Thereafter, the ventral bone of the pituitary fossa is removed with a high-powered burr (Figure 1). This fossa is aptly named the sella turcica after its resemblance to a Turkish saddle.

Due to its location at the middle base of the skull, the area surrounding the pituitary gland has presented a challenge to neurosurgeons. Despite common knowledge of benign tumors of the pituitary causing various endocrinopathies, the potential for surgery to address these diseases has been elusive.

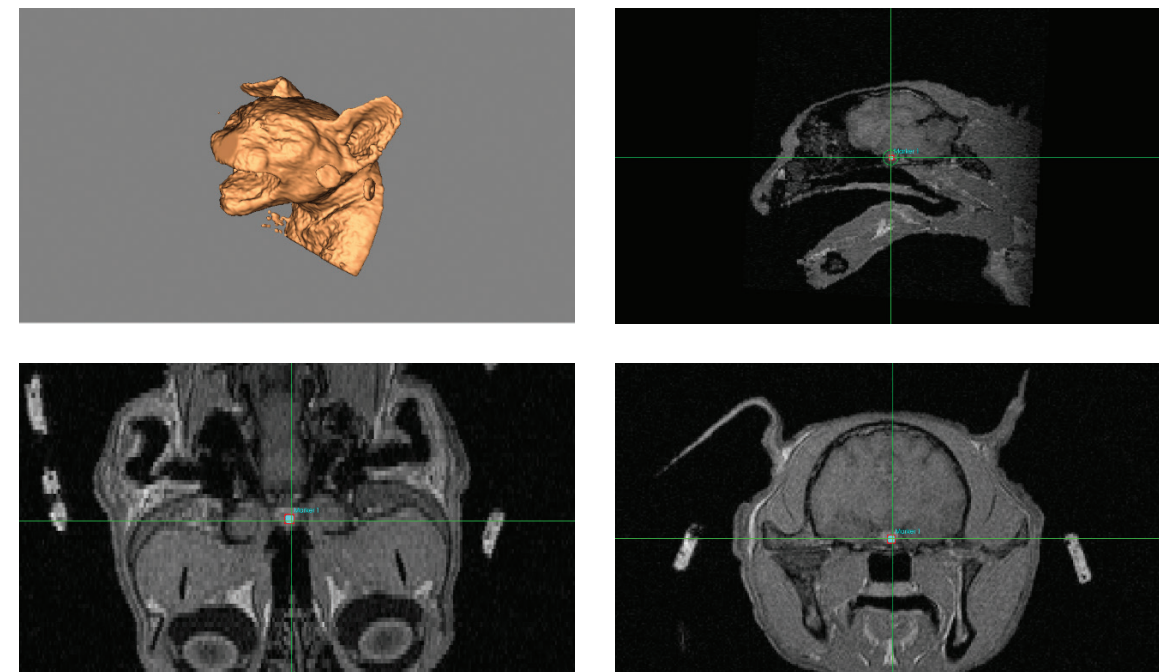


**FIGURE 1**  
Post-contrast sagittal CT image of a cat with acromegaly treated at AMC. The sphenoid bone is highlighted in yellow with a faintly contrast enhancing mass in the "sitting" in the fossa of the sella turcica (arrowhead). This bone is removed following an incision in the soft palate (arrow). A fiducial marker has been placed on the skull for navigation purposes.

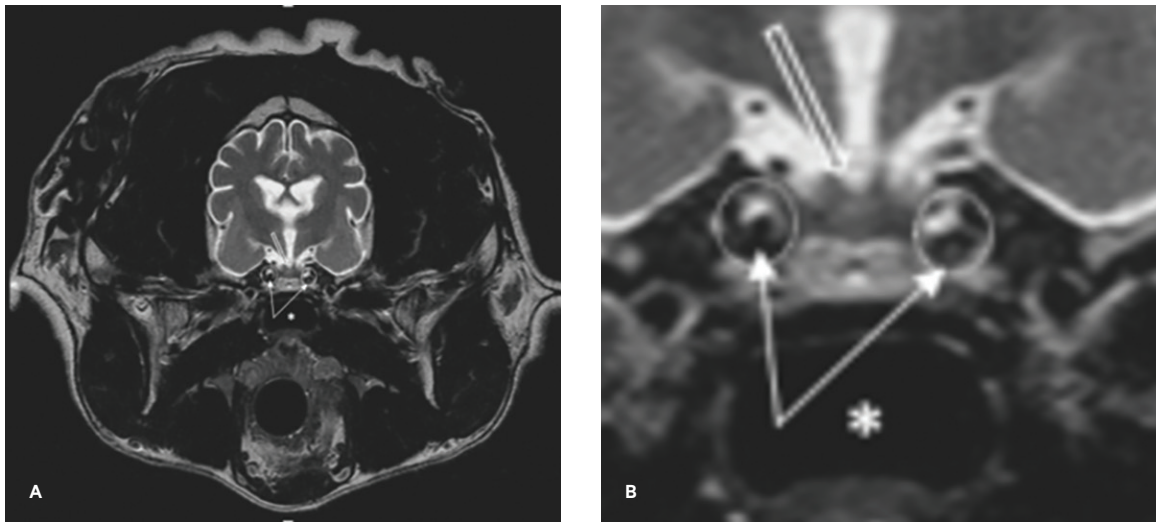
The primary limiting factors involve: (1) the complex anatomy and difficulty identifying the surgical landmarks; and (2) poor visualization of the surgery site due to lack of illumination and the small size of the surgical corridor.

These same factors have proved challenging to human neurosurgeons as well. Anatomical similarities between dogs, cats, and people have allowed for the direct translation of surgical skills and approaches between species. Recent technological developments have helped to address these factors in people and have been applied to dogs and cats. Improvements in the surgical localization of the pituitary fossa and better intra-operative visualization have led to the expansion of transsphenoidal surgery in people. Today, surgery is the mainstay of treatment of various functional disorders of the pituitary such as hyperadrenocorticism and acromegaly. Transsphenoidal hypophysectomy to remove functional pituitary tumors is the most successful long-term therapy in people. The same could be said for dogs and cats where there is access to these technologies. Thus far, access to facilities performing these types of surgeries in the United States has been limited. Worldwide, there are only a handful of centers offering these procedures in dogs and cats. In 2017, the Animal Medical Center joined this handful of institutions. Washington State University is the only other hospital performing these procedures commonly in the United States.

To better address the challenge of localizing the surgical site via the transoral route, a real-time neuronavigation system is employed. The system used at the Animal Medical Center is the Brainsight2 (Rogue Research, Montreal, Canada), which was developed exclusively for veterinary patients (Figure 2). Prior to surgery, detailed MRI studies are performed to highlight the tumor and relevant anatomy. Computed tomographic (CT) angiography is also



**FIGURE 2**  
Example of a neuronavigation plan using the Brainsight2 system. The site of the pituitary gland is center at the crosshairs and viewed in 3 planes. A 3D reconstruction of the patient with an open-mouthed surgical position is seen in the top panel for reference. Discoid fiducial markers are seen around the patient.

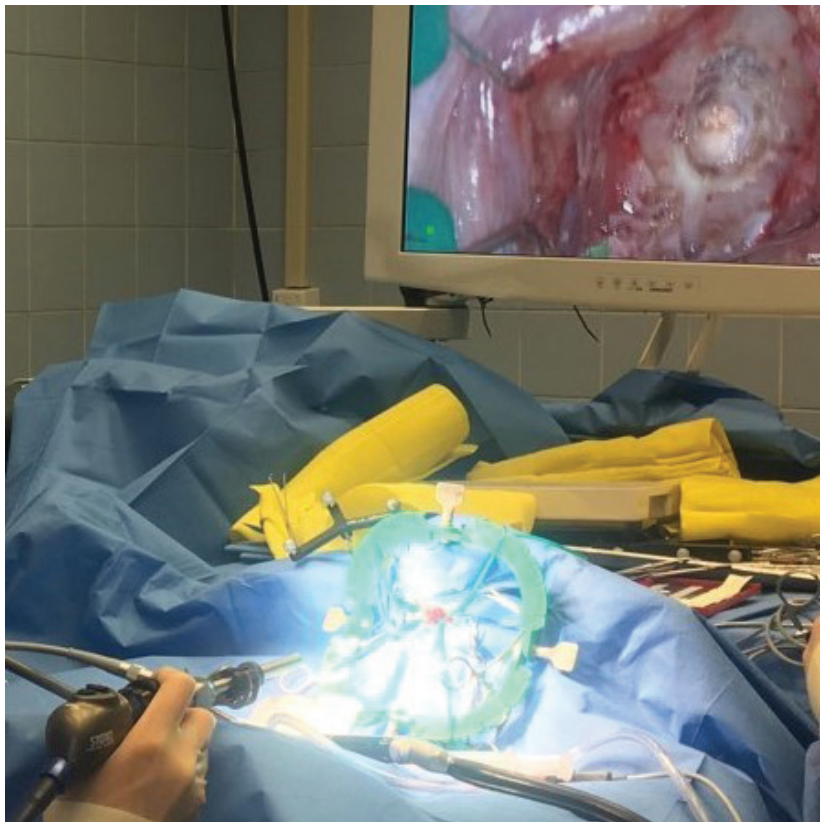


**FIGURE 3**  
Transverse T2w MRI at the level of the pituitary gland in a normal dog. The relevant anatomy is magnified in panel B. In A and B: the nasopharynx is highlighted with an (\*); the pituitary is shown with an open arrow. The dotted circles denote the paired cavernous venous sinus, a blood-filled structure which conveys the internal carotid (paired arrows) and cranial nerves III, IV, VI, and the ophthalmic and maxillary branches of CN V (these are contained as group within the circled area).

performed to visualize important blood vessels in the surgical field. These images are then used to generate a virtual 3D model of the surgical site. At the time of anesthesia, a temporary marker is placed on the patient, which will be used to navigate at surgery. In the operating room, the MRI/CT images are co-localized to the patient by the use of an infra-red camera system that allows real-time tracking of surgical instrumentation along the 3D images generated in the pre-op planning phase. In this way, the pituitary fossa can be accurately localized and major arteries, venous structures, and cranial nerves avoided when operating around this delicate anatomy (Figures 2 and 3).

The challenge of visualization and poor anatomy have been eliminated by the use of a high-definition video-based telescope system (VITOM, Karl Storz Endoscopy, Tuttlingen, Germany). This system has replaced the use of surgical microscopes and has improved surgical outcomes by increasing magnification and visualization (Figure 4). Improved efficacy and safety using the VITOM system was recently reported in dogs undergoing transsphenoidal hypophysectomy to remove functional pituitary adenomas causing hyperadrenocorticism.\* These dogs showed a sustained remission rate of 95% at one year. It should be noted that the median tumor volume of the pituitary masses removed by this method was nine times that reported in previous studies not employing new techniques of localization and visualization. Also, this remission rate exceeds that noted with medical therapy with mitotane or trilostane.

By utilizing advanced imaging techniques coupled with real-time neuronavigation and superior intra-operative visualization, surgery of the pituitary fossa is being expanded. Tumors in this area of the brain can be categorized as functional or nonfunctional. The most common functional masses are adenomatous hyperplasia/neoplasia causing hyperadrenocorticism and hypersomatotropism (e.g. acromegaly) in dogs and cats, respectively.\*\* The incidence of nonfunctional tumors of the pituitary fossa is not known. These types of cases represent approximately 50% of the cases referred to the Neurology Service at the Animal Medical Center with the chief complaint of a pituitary



**FIGURE 4.**  
Intra-operative picture showing the VITOM exoscope in the lower left corner being positioned for ideal viewing angle. The small surgical field is depicted on the screen in the upper right in high-definition offering unparalleled illumination and magnification.

mass. There are no published studies of removal of nonfunctional pituitary masses in cats. Until recently, radiation therapy was the only definitive option for these patients. An example of such a case accompanies this article (see “Case Study: Surgical treatment of a non-functional tumor of the pituitary fossa in a cat”).

A necessary consequence of pituitary gland removal is the need for post-operative hormone supplementation. Specifically, corticosteroid and thyroid hormone are supplemented; these are required for the life of the pet in most cases. In many cases, diabetes insipidus follows resection of the pituitary. However, the need for supplementation is transient in the majority of cases with normal water balance resuming at 4-8 weeks post-operatively.

Surgery via a transsphenoidal approach has advanced our ability to treat disease in this area of the brain. Outcomes are similar to tumor resection elsewhere in the brain. The development of a minimally invasive surgical corridor with improved exposure and visualization is a huge step in advancing neurosurgical therapy in dogs and cats. In time, this may be expanded to include the entire skull base, an area heretofore considered inaccessible.

\*Mamelak et al. Transsphenoidal surgery using a high definition video telescope for pituitary adenomas in dogs with pituitary dependent hypercortisolism: methods and results. *Vet Surg* 2014; 43:369-379

\*\*see article in *rDVM Quarterly*, Fall 2018, “Endocrine Update: Your Patient May Have a Brain Tumor”



# Case Study: Surgical Treatment of a Non-Functional Tumor of the Pituitary Fossa in a Cat

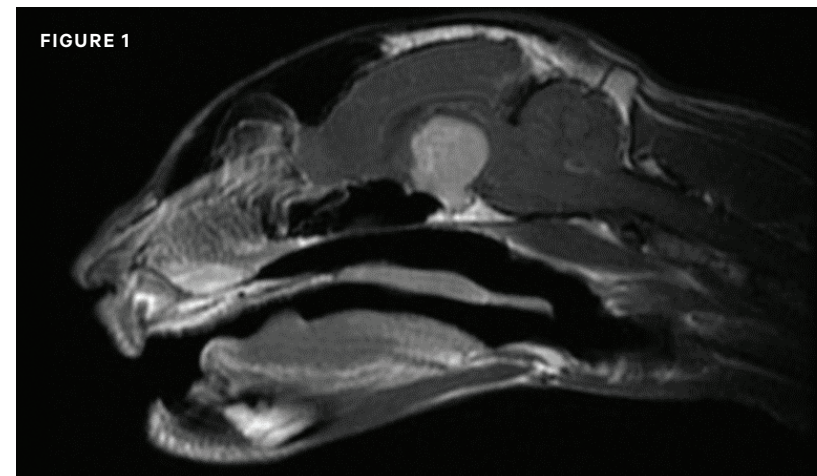


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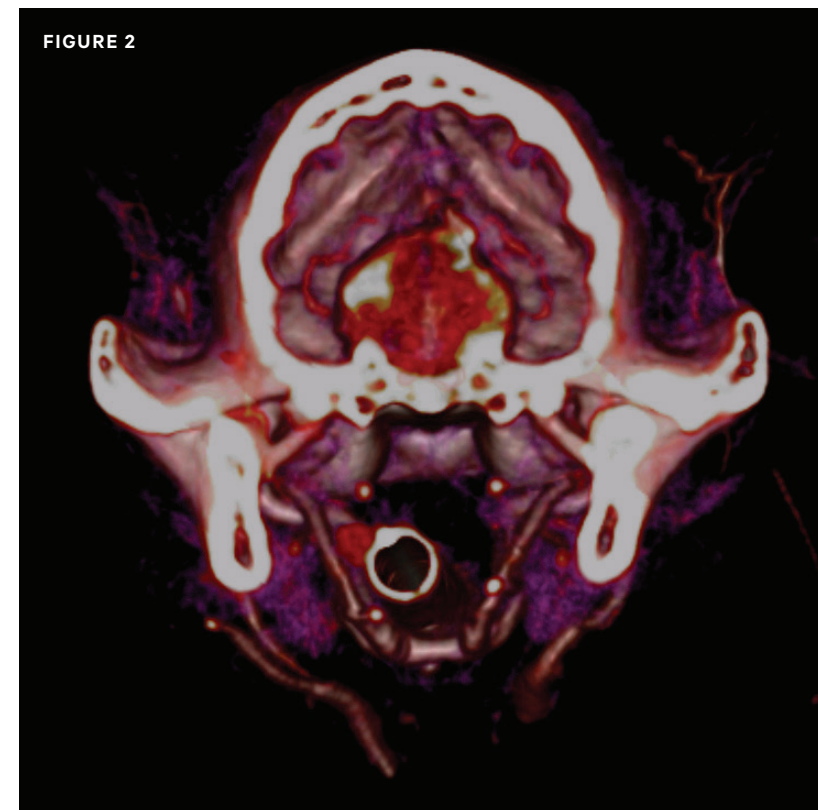
A 12-year-old, castrated male, domestic long hair cat was presented to his rDVM for a several month history of pacing and circling with loss of affect. Pre-anesthetic evaluation disclosed a heart murmur. Echocardiography identified cardiomyopathy with dilated morphology. No other abnormalities were noted. MRI was subsequently recommended. Imaging showed a large diffusely contrast enhancing mass arising from the base of the middle forebrain and causing significant compression and intracranial and foramen magnum herniation (Figure 1). Further endocrine testing showed no abnormalities and he was, therefore, diagnosed with a nonfunctional pituitary mass. His recovery from anesthesia was very prolonged, requiring overnight hospitalization. Treatment with corticosteroids failed to improve clinical signs. Radiation therapy was discussed. Given his poorly compensated intracranial hypertension and concurrent herniation, there was concern for his ability to handle multiple anesthetic events. He was subsequently referred to the Neurology Service at the Animal Medical Center for surgical consultation. Despite the large size of the mass and poor compensation, it was felt that surgery would provide the immediate result of reduction in tumor volume in addition to the benefit of a histologic diagnosis to guide therapy and prognostication.

At the time of referral, he maintained loss of affect and propulsive circling. MRI measurements showed a pituitary/brain area (P/B) ratio of 1.8 (reference range; P/B <0.31-0.40). This particular tumor was quite large with unusual blood vessels associated with base of the tumor at the planned surgery site (Figure 2). For his surgical planning, we utilized a noninvasive selective angiographic CT technique to highlight the arteries feeding the tumor. Intra-operatively, the Brainsight 2 system (Rogue Research, Montreal, Canada) was used to identify these vessels prior to encountering them buried in bone as we approached the tumor via a transoral transsphenoidal approach using the VITOM exoscope (VITOM, Karl Storz Endoscopy, Tuttlingen, Germany). Once the tumor was identified, surgical evacuation was assisted by use of a combination directional suction and ablative device (Myriad, NICO Corp. Indianapolis, IN, USA). After tumor removal, we used a separate endoscope with an angled viewing field to explore the surgical cavity and ensure complete tumor removal. The entire procedure was accomplished via an incision in the soft palate and a 4mm x 6mm window created in the bone at the level of the hamular processes. Biopsy confirmed a fibrous meningioma.

The pituitary gland was removed as part of the surgical procedure. Immediately after surgery, treatment with hydrocortisone was begun, with the

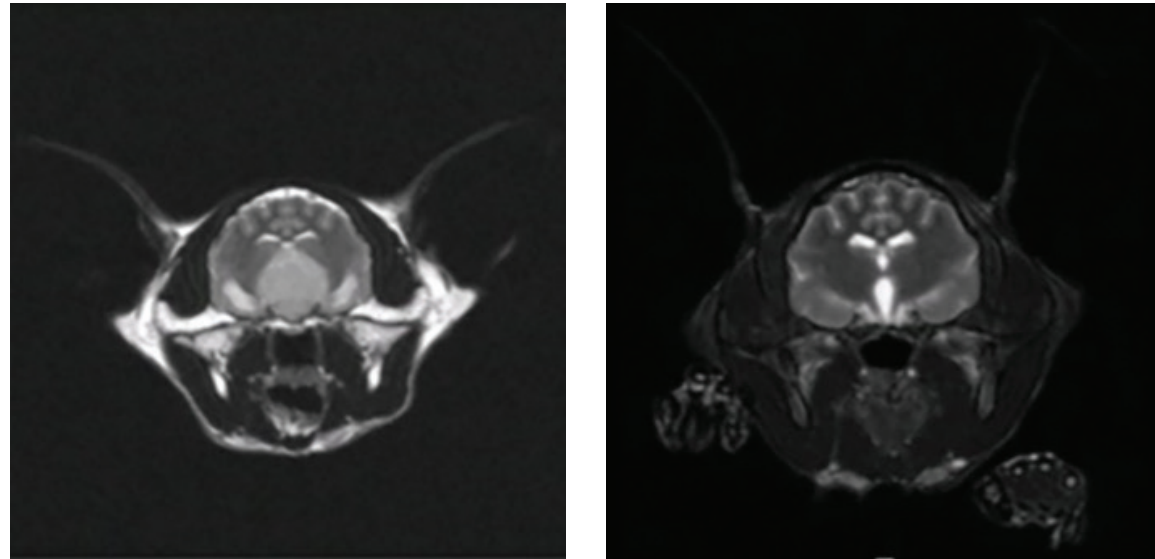


**FIGURE 1**  
Sagittal post-contrast T1W MRI, rostral is the left of the image. There is a large, contrast, enhancing mass arising from the pituitary fossa causing significant mass effect and herniation of brain.



**FIGURE 2**  
3D reconstruction of dual-phase contrast CT angiogram depicting the arterial vasculature within the sphenoid bone and associated with the tumor. Communicating arteries can be seen in the sphenoid bone ventral to the mass.





**FIGURE 3**  
T2W images at the widest cross-sectional area of the nonfunctional pituitary mass. The left panel shows the mass preoperatively at time of referral. The right panel was performed 6 months later. Note the absence of any visible tumor regrowth. The ventral part of the 3rd ventricle is still slightly expanded due to previous compression. Necropsy confirmed complete tumor resection at 6 months.

addition of levothyroxine once he was able to take oral medications. Removal of the posterior pituitary and disruption of connections to the hypothalamus required supplementation with desmopressin as a synthetic vasopressin analog to help water regulation. These therapies were continued after discharge. Immediate improvement in demeanor and behavior with resolved propulsive gait was noted. His personality was returned approximately 45 days post-operatively. Follow up MRI at 6 months showed complete tumor removal (Figure 3). Unfortunately, the patient suffered repeat episodes of heart failure and was euthanized shortly thereafter. Necropsy confirmed complete resection of the previous meningioma.

Meningioma is the most common primary brain tumor in cats. Surgery is considered the primary treatment option in those patients where the tumor is accessible. Gross tumor resection is often curative in the majority of cats with meningioma as demonstrated in this patient. Advanced imaging was used to assist surgical planning. Use of specialized endoscopic technology allowed appropriate visualization via a comparatively small surgical window. Tumor resection was facilitated by unique ablative tools that allowed for more complete and controlled tumor removal. These factors contributed to a successful and curative surgery for a tumor generally considered inoperable.

## Gross Pathology: What's Your Radiographic and Pathologic Diagnosis?

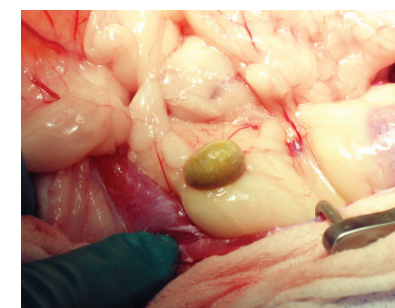
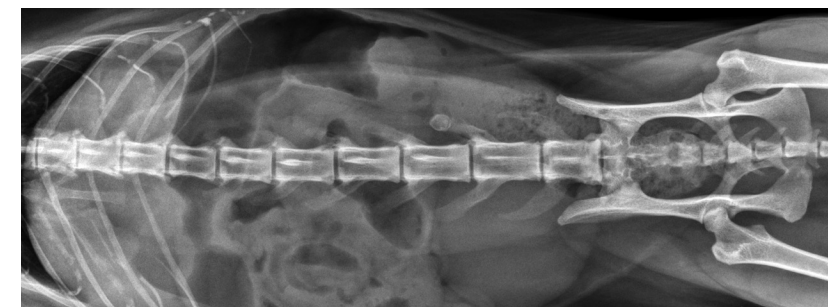
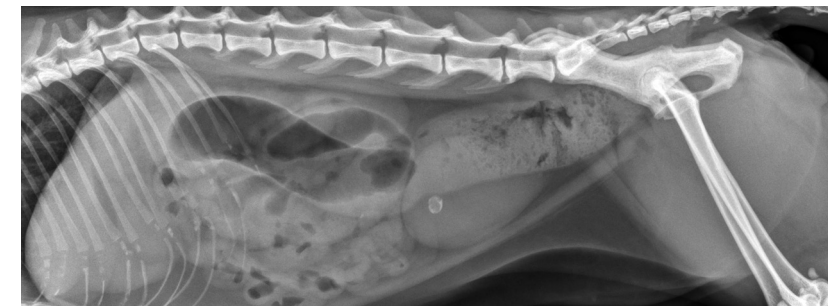
**Signalment:** 14 year old, female spayed, Tabby domestic shorthair cat.

**History:** Presented to the Animal Medical Center's Emergency and Critical Care Department with acute onset of vomiting and straining to defecate.

**Radiographs:** Right lateral and VD projections of the abdomen were made to further evaluate the clinical signs.

*What is your radiologic and pathologic diagnosis?*

Turn to the next page for diagnosis and case discussion.



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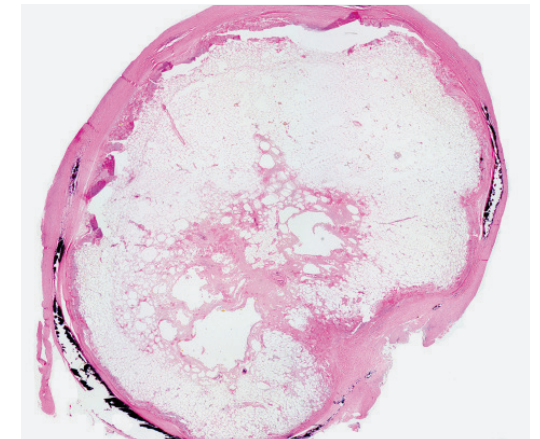
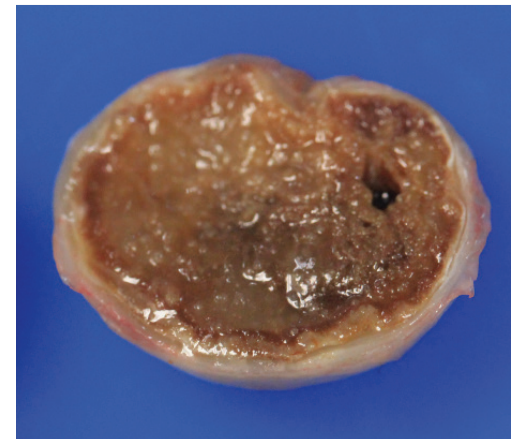
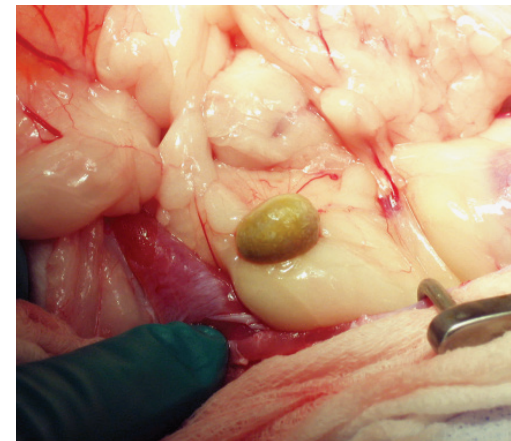
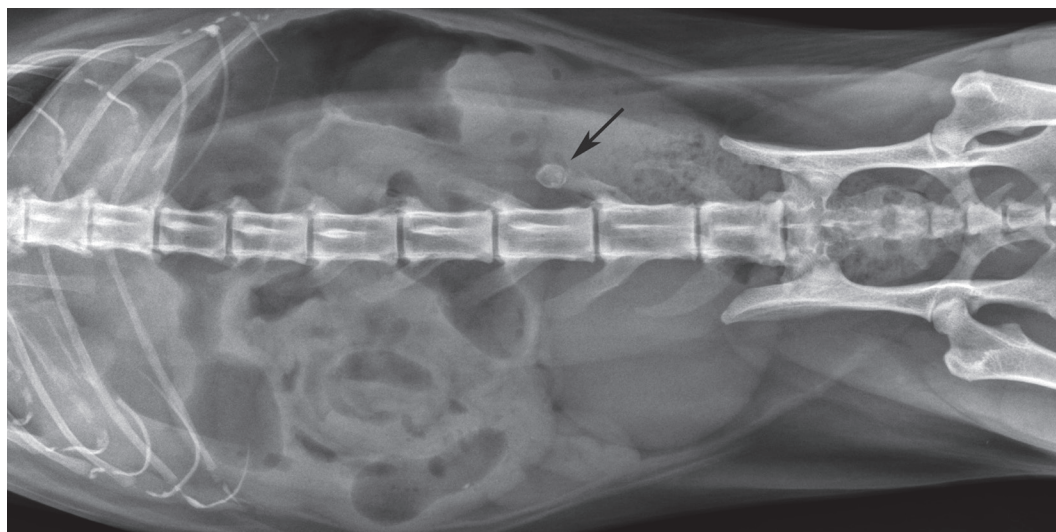
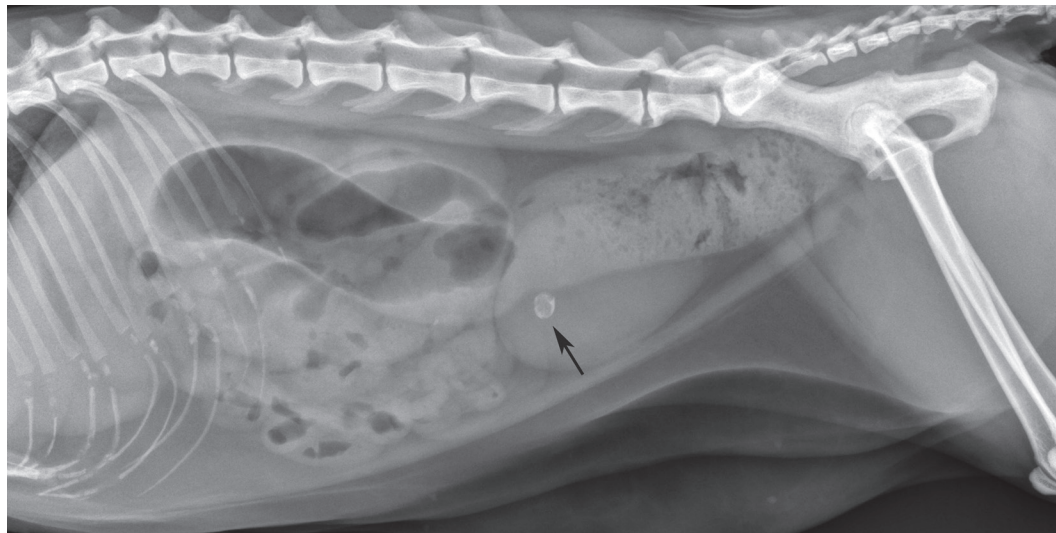
**Anthony Fischetti**  
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**Radiographic Findings:**

Orthogonal views of the abdomen are available for evaluation. Ventral to L2, there is a round, smoothly margined, mineral opacity with a distinctly radiopaque rim, measuring 1.6mm in diameter. The nodule is superimposed over the urinary bladder on the LAT but to the left of the urinary bladder on the VD projections. The nodule is not associated with any particular abdominal organ. This is most consistent with nodular fat necrosis (Bate's Body).

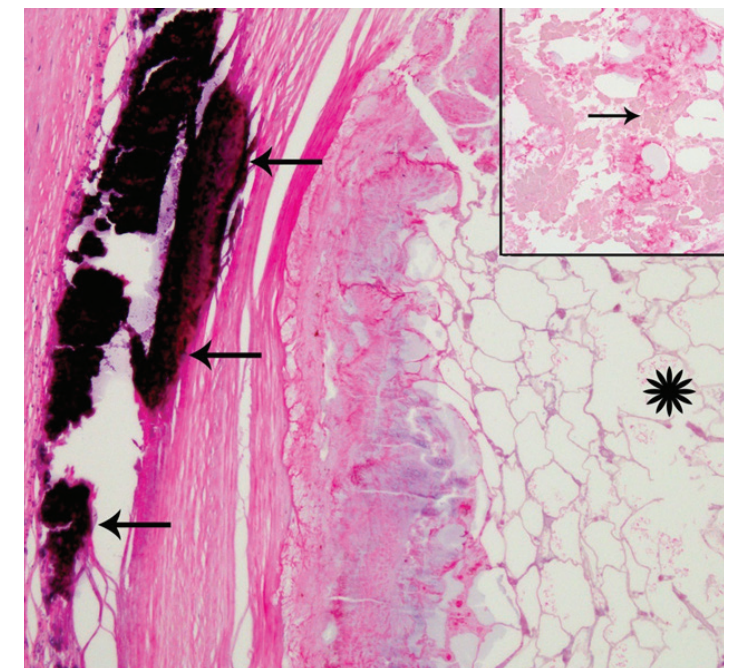
The stomach is empty. The small intestines are mildly fluid filled. Formed feces with pin point metal foci are present within the colon. The fecal material may be mildly desiccated to support constipation. The urinary bladder is moderately fluid filled. No other abnormalities noted.



**Gross and Microscopic Findings:**

Intraoperative view of nodular fat necrosis (upper left), gross images (upper right, sectioned; lower left, bar is 3mm), and subgross histologic view (lower right, H&E, bar is 2mm)

Histologic view of nodular fat necrosis (Bate's body), consisting of necrotic fat (center asterisk), a peripheral fibrous capsule, within which is mineral (arrows), H&E, bar is 100 um. Inset: closer view of fat necrosis, with loss of adipocyte cellular detail and presence of eosinophilic, crystalline material, H&E, bar is 50 um.





Radiographic Diagnosis:

- 1. Test negative for mechanical obstruction of the GI tract
- 2. Incidental nodular fat necrosis (Bate’s Body), left caudal abdomen
- 3. Possible fecal retention/constipation

Pathologic Diagnosis:

Abdomen: Steatonecrosis, focal with hemosiderosis, peripheral fibrosis and mineralization (consistent with nodular fat necrosis, Bate’s body)

Comments:

A definitive reason for the cat’s acute clinical signs is not determined from this exam. It is possible that the cat’s straining to defecate is related to constipation but the colon is not distended enough to support megacolon. The Bate’s Body is considered incidental and is NOT within the urinary bladder.

These images highlight the importance of making orthogonal views. What appears to be centrally located in the urinary bladder on one view is clearly not in the bladder on the other. Furthermore, the mineral rim and round shape of this Bate’s Body are not typical of cystic calculi.

Nodular fat necrosis (also called Bate’s body, Bate’s floater, and cholestroma) is a common radiographic and gross pathologic finding in cats and dogs. Alterations of fat, including inflammation, necrosis, and saponification can lead to changes in the radiographic and gross appearance. When calcium deposition occurs (typically calcium phosphates or carbonates at the periphery), these nodules can be readily identified radiographically. In one study, the diameter of nodular fat necrosis ranged from 0.5 to 4 cm, however, most were between 0.8 and 2 cm. Traumatized lipocytes can be hydrolyzed into glycerine and fatty acids, creating an acidic environment that can cause necrosis, augment inflammation, and result in saponification. Necrotic adipocytes may be replaced by fibrous connective tissue or undergo dystrophic mineralization. The etiology and pathogenesis of nodular fat necrosis is typically unknown. Hypotheses include pressure ischemia in obese animals or abnormalities in intracellular lipolysis during fat mobilization.

Outcome:

The cat’s clinical signs responded to supportive therapy. A follow-up abdominal ultrasound revealed altered intestinal wall layering, supportive of inflammatory bowel disease or other enteritis.

Reference:

Schwarz T, Morandi F, Gnudi G et al. Nodular fat necrosis in the feline and canine abdomen. *Vet Radiol Ultrasound* 2000 41(4):335-339.

NYC’s Animal Medical Center  
Appoints Judith Harbour, LCSW,  
as Staff Social Worker



*Leading the Veterinary Field  
with a More Collaborative,  
Compassionate, and Integrated  
Approach to Patient Care*

The Animal Medical Center is pleased to announce the appointment of Judith Harbour, LCSW, as Staff Social Worker. Ms. Harbour, a Licensed Clinical Social Worker, joins AMC with extensive experience in the veterinary field as a support professional and clinician.

As AMC’s full-time, on-site Licensed Clinical Social Worker, Ms. Harbour will work closely with veterinary staff and provide support and counseling to clients; facilitate AMC’s pet loss support group; assist with the AMC Community Funds, which provide subsidized veterinary care to people unable to afford care; and support all Usdan Institute

activities that focus on animal health education for clients and pet families. Ms. Harbour will also create and manage a compassion fatigue program for AMC’s veterinary staff by incorporating wellness programs and providing essential tools and coping strategies. This comprehensive, integrated, compassionate, and collaborative team approach is designed to enhance and elevate patient care and client services.

Previously, Ms. Harbour served as a Veterinary Social Worker both in private practice and at Riverside Animal Hospital in New York City, where she facilitated a monthly pet loss support group and provided pet loss counseling to individuals and families. She also provided client education around pet diagnoses, treatment, and wellness practices. Ms. Harbour also served as a Hospital Social Worker at Maimonides Medical Center in Brooklyn and as a Senior Mental Health Clinician at the Young Adult Institute in Queens, where she provided psychotherapy to individuals with developmental disabilities and their families in relation to issues of community safety and self-determination.

“I’m excited to join the Animal Medical Center and feel confident

that my clinical and advocacy skills, coupled with my passion for veterinary social work with a focus on the human-animal bond, can provide a strong support system to both medical staff and clients,” said Ms. Harbour.

Lauren Saunders, DVM, Joins  
AMC as Staff Doctor in the  
Emergency & Critical Care  
Department

Previously, Dr. Saunders served as an Emergency Veterinarian at the Friendship Hospital for Animals in Washington, DC where she maintained primary case responsibility for patients and mentored interns rotating in the service. Dr. Saunders completed a rotating internship in Small Animal Medicine and Surgery at AMC and received her Doctor of Veterinary Medicine from the Cummings School of Veterinary Medicine at Tufts University.

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, 8:00 am – 9:00 am, unless otherwise noted. *Please visit our website at [amcny.org](http://amcny.org) or email [education@amcny.org](mailto: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 our website at [amcny.org](http://amcny.org) for more information and to register.

**Partners In Practice (PIP) 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, 9:00 am – 3:00 pm, and are both RACE and NYSED approved. *Visit our website at [amcny.org](http://amcny.org) for more information and to register.*

**Presentations at International Veterinary Meetings**  
  
At this year's Veterinary Meeting & Expo (VMX) — formerly North American Veterinary Community

(NAVC) — in Orlando, **Dr. Leilani Alvarez** presented lectures on Integrative Medicine and Rehabilitation and **Dr. Philip Fox** directed a hands-on Echocardiography Laboratory for beginners.

**RESEARCH HIGHLIGHTS**

**Current Clinical Trials Recruiting Patients**  
(For more detailed information, visit [amcny.org](http://amcny.org))

- Cardiology**
- Evaluation of oral nitrate medication combined with conventional therapy to treat congestive heart failure in dogs
  - Assessment of new metrics to identify diuretic resistance in heart failure patients

- Emergency and Critical Care**
- Evaluation of the diagnostic accuracy of point of care analysis using urine and plasma in marijuana toxicosis

- Internal Medicine**
- Comparison of a novel blood test (SDMA) vs. standard creatinine concentrations to monitor cats treated for urethral obstruction
  - Evaluation of regular insulin administered by constant rate infusion compared to

intermittent intramuscular administration to treat cats with diabetes

- Interventional Radiology & Interventional Endoscopy**
- Evaluation of artificial neobladder placement for dogs with resectable lower urinary tract tumors
  - Comparison of extrahepatic biliary duct obstruction (EHBDO) management in dogs and cats using endoscopic retrograde cholangiopancreatography (ERCP) with biliary stent placement, or, using a rescue subcutaneous intestinal biliary bypass device (SIBB)
  - Comparison of serum carboplatin concentrations following intra-arterial versus intravenous administration in dogs with naturally occurring tumors

- Oncology**
- Evaluation of 25-hydroxyvitamin D concentrations in canine multicentric lymphoma treated with a CHOP-based chemotherapy protocol
  - Evaluation of efficacy and safety of feline interleukin-2 immunomodulator following surgical excision of feline fibrosarcoma
  - Comparison of combination chemotherapy and

immunotherapy to treat dogs with splenic hemangiosarcoma

- Rehabilitative Medicine**
- Field safety and efficacy of an experimental drug compared to placebo to manage pain associated with osteoarthritis in cats
  - Pilot studies to evaluate thermographic imaging and manual muscle testing to assess hindlimb stress in dogs
  - Investigation of a device (Toe Grips®) applied to nails to reduce lameness in dogs recovering from knee surgery

**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 new clinical findings in canine, feline, and exotic patients. Topics included epidemiology of dilated cardiomyopathy, new findings from a prospective randomized trial to treat canine periodontal disease, insights in the relationship between cobalamin and folate deficiencies in anemic dogs, interventional treatments for nasopharyngeal stenosis, stent

placement to treat tracheal collapse, epidemiologic insights in feline GI lymphoma, ureteral bypass to treat ureteral obstruction, pathologic findings, and clinical practice.

**Cardiology**  
  
Vollmar C, Vollmar A, Keene BW, **Fox PR**, Reese S, Kohn B. Dilated cardiomyopathy in 151 Irish Wolfhounds: Characteristic clinical findings, life expectancy and causes of death. *The Veterinary Journal* (2018) doi.org/10.1016/j.tvjl.2018.12.018.

**Dentistry**  
  
**Martel DP, Fox PR, Lamb KE, Carmichael DT.** Comparison of closed root planing with versus without concurrent doxycycline hyclate or clindamycin hydrochloride gel application for the treatment of periodontal disease in dogs. *J Am Vet Med Assoc.* 2019 Feb 1;254(3):373-379.

**Emergency and Critical Care**  
  
Kicenuik KS, Northrup NC, Clarke DM, **Bazzle LJ.** Successful management of oxorubicin overdose and extravasation in a dog with lymphoma. *Can Vet J.* 2018; Oct;59(10):1079-1084.

**Internal Medicine**  
  
**Stanley E, Appleman E, Schlag A, Siegel A.** Relationship between



cobalamin and folate deficiencies and anemia in dogs. *J Vet Intern Med.* 2019 Jan;33(1):106-113. doi: 10.1111/jvim.15348. Epub 2018 Nov 29.

Interventional Radiology

**Weisse C, Berent A,** Violette N, McDougall R, Lamb K. Short-, intermediate-, and long-term results for endoluminal stent placement in dogs with tracheal collapse. *J Am Vet Med Assoc.* 2019 Feb 1;254(3):380-392.

**Burdick S, Berent AC, Weisse C, Palma D, Asprea L,** Lamb K, Tozier E. Interventional treatment of benign nasopharyngeal stenosis and imperforate nasopharynx in dogs and cats: 46 cases (2005-2013). *J Am Vet Med Assoc.* 2018 Nov 15;253(10):1300-1308.

Goode K, **Weisse C, Berent A,** Lamb K. Evaluation of hepatic tumor portal perfusion using mesenteric angiography: A pilot study in 5 dogs. *J Vet Intern Med.* 2018 Dec 18. doi: 10.1111/jvim.15395.

Specchi S, Rossi F, **Weisse C,** Morabito S, Petrovitch NP, Drees R, Thierry F, Ricciardi M, Penchome R, Armenise A, Pey P, Paek M, Panopoulos I, Nicoli S, Schwarz T. Canine and feline abdominal arteriportal communications can be classified

based on branching patterns in computed tomographic angiography. *Vet Radiol Ultrasound.* 2018 Nov;59(6):687-696.

Borchert C, **Berent A, Weisse C.** Subcutaneous ureteral bypass for treatment of bilateral ureteral obstruction in a cat with retroperitoneal paraganglioma. *J Am Vet Med Assoc.* 2018 Nov 1;253(9):1169-1176.

Neurology

Cray MT, **Spector DI, West CL.** Acute masticatory muscle compartmental syndrome in a dog. *J Am Vet Med Assoc.* 2018 Sep 1;253(5):606-610.

Oncology

**Wright KZ, Hohenhaus AE, Verrilli AM,** Vaughan-Wasser S. Feline large-cell lymphoma following previous treatment for small-cell gastrointestinal lymphoma: incidence, clinical signs, clinicopathologic data, treatment of a secondary malignancy, response and survival. *J Feline Med Surg.* 2018 doi: 10.1177/1098612X18779870.

Pathology

**Enders AM, Donovan TA, van der Woerd A.** Pathology in Practice. *J Am Vet Med Assoc.* 2018 Oct 15;253(8):991-994. doi: 10.2460/javma.253.8.991. No abstract available.

**Donnelly KA, Le Roux A, Donovan TA,** Grodio J, **Quesenberry K.** Acute Necrotizing Pancreatitis in a Yellow-naped Amazon Parrot (*Amazona auropalliata*). *J Avian Med Surg.* 2018 Sep;32(3):232-239.

AWARDS

**Dr. Leilani Alvarez** received first place in the category of Canine Research Abstract from the American College of Veterinary Sports Medicine and Rehabilitation (ACVSMR) for her paper, *Effect of targeted pulsed electromagnetic field therapy on canine post-operative hemilaminectomy: a double-blind, randomized, placebo-controlled clinical trial.* Dr. Alvarez is the Director of AMC's Tina Santi Flaherty Rehabilitation & Fitness Service and head of AMC's Integrative and Rehabilitative Medicine Department.

ABOUT THIS NEWSLETTER

This newsletter is distributed 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 our website at amcnyc.org.

JOIN AMC AT THESE SUMMER EVENTS FOR PET OWNERS



BYOD  
(Bring Your Own Dog):  
CinemaLIC

Thursday, July 18th, Sunset

Hunters Point Park South,  
Long Island City, NY

Grab your dog and enjoy a free outdoor movie in Long Island City with the New York skyline as your backdrop! AMC's Usdan Institute for Animal Health Education will be on-site to provide pet health information and giveaways.

To learn more about the CinemaLIC movie series, visit [Cinemalicy.com](http://Cinemalicy.com).

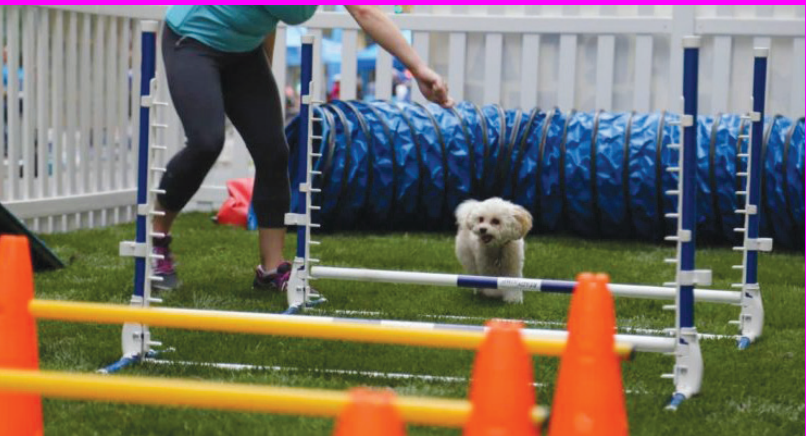
*Note: This event is dependent on the weather – please visit the CinemaLIC website for the most up-to-date news.*

Actual views of CinemaLIC from @ryandukephotography!

AMC's Usdan  
Institute  
at Summer  
Streets 2019

Saturday, August 3rd  
& Saturday, August 10th

Summer Streets Pet Zone



Join AMC at the Summer Streets Pet Zone. Members of the AMC Dentistry team will be on-site to provide dental health information and answer questions.

Free samples will be provided.

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Katherine Fugno  
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Kayla Jermansky  
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