



## Metropolitan Veterinary Referral Group

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## Lung Lobe Torsion in a Pug

by Amanda Conkling, Ohio Veterinary Surgery and Neurology Resident

Winnie is a 9-year-old, female spayed pug. She was evaluated by her referring veterinarian with the presenting complaint of lethargy and concern about orthopedic discomfort. Chest radiographs revealed a possible mass in the left cranial lung lobe and pleural effusion. She was referred to Dr. Patricia Thalhofer of Akron Veterinary Internal Medicine and Oncology Practice for further diagnostics.

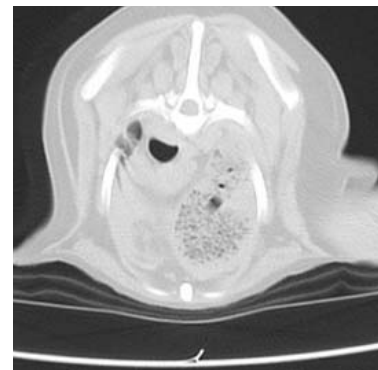
On presentation, Winnie had mildly increased respiratory effort. Auscultation revealed decreased lung sounds in the left cranial lung field with mildly increased bronchovesicular sounds in all other fields. No murmurs or arrhythmias were noted. Other than chronic, mild orthopedic disease, the remainder of her physical exam was unremarkable. Repeat



radiographs revealed a vesicular emphysematous pattern and air bronchograms in the left cranial lung lobe with a moderate amount of bilateral pleural effusion and atelectasis of the remaining lung lobes.

Abdominal films were unremarkable. Blood work revealed a mild elevation of her alkaline phosphatase as well as her corticosteroid-induced alkaline phosphatase. Based on this information, she was tentatively diagnosed with left cranial lung lobe torsion. She was placed in the intensive care unit for monitoring and scheduled for a CT scan and thoracotomy the next day with Dr. Sheldon Padgett of Ohio Veterinary Surgery and Neurology Services.

Winnie did well overnight and was placed under general anesthesia the following morning. A spiral CT of her thorax was performed with IV contrast given. CT revealed a vesicular gas pattern in the left cranial lung lobe with an air-filled bronchus that tapered in the direction of the mainstem bronchi (the reverse of normal). No contrast enhancement was noted nor was there significant blood flow in the affected lobe. There was a moderate amount of pleural effusion with atelectasis of the other lung lobes.



Based on this information, the diagnosis of left cranial lung lobe torsion was confirmed and Winnie was moved directly into the operating room and placed on a ventilator.

A routine left fourth intercostal thoracotomy was performed. Upon entering the chest cavity, there was free bloody pleural effusion present and the left cranial portion of the left cranial lung lobe was immediately noted to be deep red and severely congested. There was a sharply



demarcated twist at the hilus. There was a 2 cm portion of the caudal portion of the left cranial lobe that also was affected. The cranial portion, remaining in its twisted state, was removed with a thoracoabdominal 30 (TA30) stapler.

Because the caudal segment also was affected, that was removed with a TA30 as well. A thoracostomy tube was placed and the thorax closed.

During anesthetic recovery, Winnie had difficulty maintaining adequate oxygen saturation. Chest tube evacuation yielded mild amounts of serosanguinous fluid and air. Thoracic radiographs revealed mild pleural effusion, subcutaneous emphysema and surgical-related changes. No significant pathology of the remaining lungs was noted. Winnie was placed in the intensive care unit in an oxygen cage to recover for a few hours and did very well overnight. The following morning her thoracostomy tube was removed and she was discharged from the hospital two days postoperatively with a Duragesic patch in place and oral Tramadol.



At her two-week recheck, Winnie was doing extremely well with her owner reporting that she had "200 percent more energy."

Lung lobe torsion is a rare, but treatable, condition that can be reported in dogs, cats and humans. In the past, the right middle lung lobe has been most commonly reported with a predisposition in large, deep-chested dogs, particularly Afghan hounds. However, more recently, young male pugs have been determined to be at significantly higher risk for lung lobe torsion affecting the left cranial lung lobe.

Median age of affected pugs was 1.5 years (Evaluation of lung lobe torsion in pugs: seven cases JAVMA, 2006). The most common clinical signs included dyspnea, tachypnea, anorexia, lethargy, cough and pyrexia. Surgical removal is typically curative.



## Future Notes

### Hear Metropolitan Veterinary Referral Group Members Presenting at Conferences

May 29, 2008 – Western Pennsylvania VMA – Dr. Gamblin's topic, "Targeted Cancer Therapy in Veterinary Oncology"



## Contact Us

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**Specialist Spotlight**

# Feline Corneal Sequestra

By Ellen B. Belknap, DVM, MS, Diplomate ACVO

Corneal sequestration formation is a unique acquired disorder of the feline cornea characterized by chronic epithelial ulceration, necrosis of the corneal stroma, and accumulation of brown pigment within the stromal layer. Persian, Himalayan, Burmese and, to a lesser extent, Siamese cats are predisposed to the disease, although it may be identified in any breed. Infection with feline herpesvirus 1 (FHV-1) and coinciding chronic ulceration or keratitis may predispose to the sequestra. They also occur secondary to corneal irritation due to entropion, lagophthalmos or trichiasis.

In one study, the prevalence of FHV-1 DNA in corneal samples was significantly greater in cats with corneal sequestra than for clinically normal cats, but significantly lower in Persian and Himalayan, compared with domestic shorthair and longhair breeds. Treatment of superficial non-healing ulcers by debridement with a grid keratotomy has been reported to predispose to development of a sequestrum.

Initially, the disease may present as an area of faint brunescence (amber color) of the anterior stroma and epithelial layers of the cornea. Corneal sequestra may be located centrally or paracentrally, with the lesions varying in size from a few millimeters to occupying a majority of the cornea. Sequestra usually present as a unilateral problem, but have been observed in both corneas in predisposed breeds. As the disease progresses, the lesion becomes more distinct with well-demarcated edges and may appear as a raised brown-black plaque involving the epithelium and anterior stroma. Corneal vascularization may be observed extending from the limbus to the plaque. With chronic lesions, the plaque becomes more raised and there is frequently an ulcerated rim around the sequestrum. The cornea in chronic lesions is more inflamed, commonly with significant vascularization and edema. Despite the raised plaque-like appearance, the affected area may extend deep into the stromal layer of the cornea.

Clinically, the affected patient presents with significant blepharospasm, epiphora, hyperemia of the conjunctiva and pigmented ocular discharge. Black discharge may be observed at nonocular mucocutaneous sites. Most cats are between the ages of two and seven years, with no sex predisposition recognized. The sequestrum may remain static in the early stages for even years or may progress to later stages over weeks. Some lesions may slough naturally while others progress aggressively with extension to Descemet's membrane and lead to corneal perforation.

Depending on the amount of ocular discomfort and extent of the lesion, treatment for these sequestra may include conservative medical management or surgical intervention

with removal of the necrotic cornea. As mentioned, the sequestrum may occasionally be extruded over a period of months to years with a high rate of recurrence. Due to ocular discomfort, this is not usually possible and surgical resolution of these lesions is best achieved by performing a keratectomy followed by either a conjunctival pedicle graft or a corneconjunctival transposition (CCT). By performing a keratectomy early in the disease process, further progression of the sequestration to deeper stromal layers can be halted as well as minimizing further inflammatory changes of the cornea. A keratectomy is performed under general anesthesia and with the use of an operating microscope. The dissection of the sequestrum extends 1 mm beyond the sequestrum into normal corneal tissue with the depth determined by removal of all affected (pigmented) cornea. The use of a conjunctival graft following a deep keratectomy provides tectonic support, tissue to fill the ulcer, and facilitates healing by allowing direct blood supply. A major advantage of a CCT is to provide a clearer central cornea than the conjunctival graft.

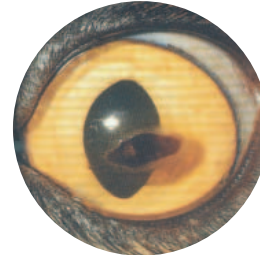
Restoration of an improved visual axis and lessening of pain are observed immediately following surgery. Recurrence is always possible in that eye, but the likelihood is reduced with appropriate surgical correction. A recent study of cases treated by a corneconjunctival transposition reported no recurrences in 17 eyes and excellent cosmesis. The use of porcine intestinal submucosa for correction of the corneal defect has also been reported to be effective. New lesions may occur in the other eye.

Treatment following surgical correction includes the application of a topical antibiotic four times daily, topical 1 percent atropine, and limited use of a topical non-steroidal anti-inflammatory agent. If the etiology of the sequestrum was thought to relate to infection with FHV-1, the patient is treated also with oral Lysine (500 mg) twice daily continually. The use of topical corticosteroids is not advised.

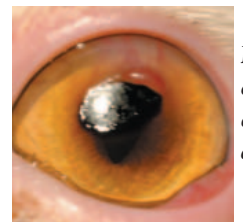
Histopathologic evaluation of the sequestrum demonstrates stromal degeneration, cell loss and desiccation; the lesion is often surrounded by a zone of mononuclear inflammatory cells (lymphocytes, plasma cells, macrophages and occasional giant cells). A recent study suggests melanin particles may be responsible for discoloration of the cornea.

In summary, feline corneal sequestrum is a problem most often affecting young purebred cats. While there are many proposed causes and predisposing factors, the etiology is often unknown. Medical management can be attempted, but is often unsuccessful and associated with a high rate of recurrence. Surgical intervention is therefore the preferred treatment, and results in the most rapid resolution in the case

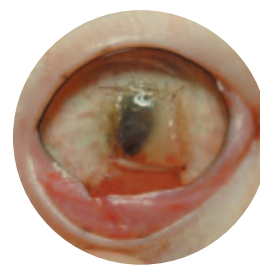
with pronounced ocular discomfort. Early recognition of this unique corneal disease is important for the best long-term results for vision and lack of recurrence of the lesion.



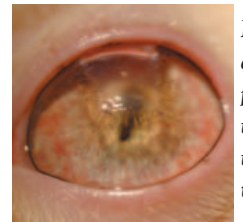
*Figure 1. Note the centrally located dark brown pigmented area of the feline cornea. Vascularization and inflammation of the cornea are not apparent.*



*Figure 2. A large sequestrum is present with corneal vascularization present dorsally, corneal edema, an adjacent granulation bed dorsally, and a rim of ulcerated epithelium.*



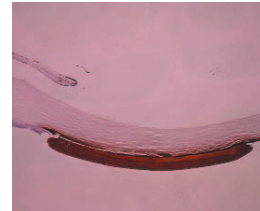
*Figure 3. This photograph is taken immediately after a corneconjunctival transposition has been performed. The presence of 9-0 Vicryl™ is observed with increased clarity of the central cornea.*



*Figure 4. This photograph is taken the day after a corneconjunctival transposition has been performed. One can appreciate the improvement in the axial cornea from Figure 3. Note the increase in vascularization of the iris due to inflammation.*



*Figure 5. This is the same feline patient approximately two months after a corneconjunctival transposition. Note the clear cornea, the transposed limbus, and the lack of inflammation of the iris.*



*Figure 6. This is a photomicrograph of a corneal section through a feline sequestrum. The dark elevated area adjacent and elevated above the corneal epithelium is the sequestrum.*

**Practice Points**

By the time of publication, **Ohio Veterinary Surgery and Neurology** should be performing in-house MRI with Metropolitan Veterinary Hospital's newly installed superconducting magnet. This addition will make Metropolitan Veterinary Hospital one of the few referral practices in the nation to feature on-site MRI and CT. We now offer two geometry-altering procedures (TTA and TPLO) for ACL tears in dogs. We're also performing a minimally invasive alternative for ACL reconstruction that uses arthroscopy and an additional 2 cm to 3 cm incision. For dogs with significant cartilage loss or osteoarthritis due to elbow dysplasia, we are performing sliding humeral osteotomies (SHO) to shift weight to the lateral condylar area of the humerus. Please call 330.670.2358 for more information.

**Veterinary Ophthalmology Service of Northeast Ohio** is pleased to be a part of the ACVO National Service Dog Eye Exam event the week of May 12. The American College of Veterinary Ophthalmologists, Pet Health Systems (PHS) and Merial are launching this unprecedented event, which will provide free eye exams and preventative health reports for 5,000 to 10,000 service dogs. More than 140 board-certified veterinary ophthalmologists, including Dr. Belknap, and 1,300 general veterinarians across the country will work together to provide these services at no cost to guide dogs, handicapped assistance dogs, detection dogs, and search and rescue dogs. ACVO and PHS hope to give back to these animals who selflessly serve the public by donating nearly \$1 million in services. We are proud to be participating in this event. Please contact Dr. Belknap with any further questions at 330.670.2360.

**Ohio Veterinary Cardiology** is expanding its catheterization procedures to include catheter-based occlusion of patent ductus arteriosus with the Amplatz® Canine Duct Occluder. This is a self-expanding device made from a nitinol wire mesh that can be placed into the ductus via a catheter advanced through the femoral artery. This device was designed specifically for the anatomy of patent ductus arteriosus in dogs and has significant advantages over embolization coils and ductal plugs, which were originally developed for use in humans. Dr. Hitchcock and Rachel Liguore, RVT, traveled to Purdue University in early April to gain experience with this new device. We are very excited to offer this promising, less-invasive new method. Please call 330.670.2376 for further information.

The **Akron Veterinary Internal Medicine/Oncology Practice** would like to thank all referring veterinarians for their support and dedication. Our goal is continual improvement of the team approach to veterinary care! Due to the increase in emergency medical cases, we now have a doctor assigned each day solely to support referral emergencies. We are available for phone consults as well. Please remember to call prior to sending an emergency case to improve our communication with the client. Also, we are pleased to announce that Michelle Fast is now the AVIMP administrative assistant. She has been our receptionist for eight years. For general practice questions or problems, please contact her directly at 330.664.6509 or you can e-mail her at m.fast@metropolitanvet.com. If you need more referral forms, maps and directions, she can send you a referral package.

Dr. Sivula of **Dancing Paws Animal Wellness Center** is pleased to announce that he is now performing adult stem cell therapy in conjunction with Vet-Stem®. Fat is harvested from the patient, processed to extract the adult stem cells and those cells are then injected into the patient. The current application in small animals is for osteoarthritis, but other internal medical applications are currently being investigated. Please call Dr. Sivula at 330.664.6504 or e-mail at dancingpaws@metropolitanvet.com to discuss the procedure.

**Vet-Rad** still accepts film! We welcome submission of X-ray films for second opinions. To make this process easier, we will supply you with free postage-paid mailing labels. To obtain them, or to ask a question about any topic related to diagnostic imaging, please call 1.888.4.VETRAD. If you've "gone digital," let us link you to our state-of-the-art teleradiology computer workstations. We'll receive your images seconds after they've been transmitted in DICOM format directly over the Internet – no need to burn CDs or e-mail inferior-quality jpeg images. Finally, we would like to welcome our newest partner, Dr. Pat Rose, Diplomate ACVS, ACVR. Pat is double-boarded in surgery and radiology, is an accomplished sonographer, and has a wealth of experience in diagnostic radiology, computed tomography and magnetic resonance imaging. We're fortunate to have her join our practice!