Collapsing Trachea and Stents

The trachea is meant to be a fairly rigid tube (Figure 1) consisting of a tracheal membrane connecting a group of C-shaped cartilage rings. In some dogs, the C-shaped cartilage becomes weak and begins to flatten out dorsoventrally (Figure 2). When the cartilage loses its curvature, the tracheal membrane becomes slack and instead of being a tight muscle canopy, the flimsy membrane moves as air passes through the trachea. The sensation of the membrane touching the tracheal lining generates coughing and if the membrane interrupts breathing, the dog may become distressed. Panting or rapid breathing for any reason makes the collapse and anxiety worse, which unfortunately tends to generate more rapid breathing and a vicious cycle of distress. The collapse creates increased respiratory secretions and inflammation, thus promoting more coughing which creates yet more inflammation. Most commonly the collapse is worst at the thoracic inlet. The condition almost always affects toy breed dogs (particularly poodles, Yorkshire terriers, Pomeranians, Chihuahuas) and the defect seems to be hereditary. The disease usually becomes problematic in middle age but can occur at any age. Dogs that are overweight or that live in households with smokers may be more at risk. Concurrent hepatomegaly and hepatopathy are also common in dogs with tracheal collapse.

Figure 1: Lateral thoracic radiograph showing a normal trachea (arrows).
Initially, dogs may present with a harsh dry cough that sounds like a goose honking. Coughing may occur when the dog is picked up or if tension is placed on its collar, since either may put pressure on the trachea. As the disease progresses, the dogs may develop exercise intolerance or even cyanosis with excitement. The strain of breathing may cause cor pulmonale and secondary left atrial enlargement. Concurrent lower airway disease may worsen clinical signs. The patient's distress can reach a level so severe that dyspnea and syncope can result. When this occurs, tranquilization may be indicated to relieve the anxiety that perpetuates the heavy breathing and coughing. Oxygen therapy and cough suppressants can also be helpful. If the dog reaches the point of extreme distress or collapse, the pet should receive immediate veterinary care as tracheal intubation may be indicated.

Techniques used to diagnose tracheal collapse include thoracic radiographs (Figure 3), fluoroscopy and endoscopy. In some cases, tracheal collapse can be managed with weight loss, environmental modifications and medications including cough suppressants and sedatives. If medical management does not produce satisfactory results, it is possible that surgical or interventional treatments may be of benefit. One surgical technique that is performed at The Animal Medical Center involves using a self-expanding stainless steel prosthesis or tracheal stent (Figures 4 and 5). During this quick and minimally invasive procedure, the spring-like device is placed within the trachea to hold it open using fluoroscopy. Results of the surgery are quite dramatic, with about 95% of dogs showing improvement after stent placement. The younger the patient, the more successful the surgery is likely to be, with success dropping off in patients over the age of 6 years. Complications following stent placement can include continued coughing, stent breakage, stent migration and development of granulation tissue. Owners should be aware that medications may still be indicated following surgery, but that the goal of the procedure is to prevent life threatening collapse.
Figure 4: Stents are available in different sizes and materials.

Figure 5: Lateral thoracic radiograph showing a stent placed in the trachea of a dog.

If you would like to refer a client or a case where an intratracheal stent may be appropriate, please call the appointment desk at The AMC at 212-838-7053 or contact a member of the surgery team directly.

The Surgery Team at The Animal Medical Center:

Janet Kovak-McClaran, DVM, DACVS
- Soft Tissue Surgery
- 646.643.5729 or janet.mcclaran@amcny.org

Pam Schwartz, DVM, DACVS, CCRP
- Orthopedic and Soft Tissue Surgery
- 646.591.7062 or pamela.schwartz@amcny.org

Chick Weisse, VMD, DACVS
- Director, Interventional Radiology Service
- Co-Director, Interventional Endoscopy Service
- 212.329.8816 or chick.weisse@amcny.org

Marc Havig, DVM, DACVS, CCRP
- Interim Chair, Department of Surgery
- Orthopedic Surgery
- 917.407.2804 or marc.havig@amcny.org