Fluoroscopy is the use of x-rays in a continuous fashion to observe radiographic anatomy at real-time speeds. Several indications exist for the use of fluoroscopy. These may include dynamic imaging of the trachea and GI tract, intra-operative orthopedic fracture repair, as well as vascular contrast studies and transjugular pacemaker placement.

Fluoroscopy is available in many forms including stationary and mobile units. At Upstate Veterinary Specialists, we use a mobile unit giving us the versatility to use fluoroscopy both in and out of the operating room. Fluoroscopy mobile units are called C-arms because the frame holding the imaging components is in the shape of a “C”. The X-rays are sent from the X-ray tube and captured by an image intensifier. Modern C-arms allow us to capture video loops at real-time speeds (15 frames per second) and play it back one frame at a time, providing accurate information down to a fraction of a second.

Real-time video also allows us to take advantage of another feature that our C-arm offers: digital subtraction angiography (DSA). DSA is a technology that subtracts or removes nearly all of the summating structures except for the vasculature in the region of interest. The capability to “look through” bones and soft tissue structures enhances our ability to focus entirely on the details of the vascular study.

The addition of fluoroscopy is now giving us an opportunity to offer less invasive procedures, resulting in decreased surgical time, morbidity, cost, and hospitalization. This tool is also improving our accuracy in the diagnosis and treatment of diseases that are dynamic in nature.

Two disease processes that demonstrate the value of fluoroscopy include tracheal collapse and esophageal hiatal hernia. With tracheal collapse, fluoroscopy can clearly identify the dynamic extent and severity of tracheal and mainstem bronchial collapse. Similarly, in patients with hiatal hernias, fluoroscopy can facilitate the diagnosis of an intermittent disease process that can be difficult to confirm purely on clinical signs and standard diagnostic tests.
Tracheal Collapse

Tracheal collapse is a disease resulting from chondromalacia of the tracheal rings. The dorsally directed “C” shaped cartilages of the trachea are connected by the trachealis muscle. When the cartilage softens, it allows the ring to flatten during times of increased negative pressure (coughing), stretching the trachealis muscle. This results in a “floppy” trachealis muscle, which hangs into the tracheal lumen. This additional tissue exacerbates coughing and results in progression of the tracheal collapse.

Patients with tracheal collapse usually have a distinct “goose honk” cough and often show signs of exercise intolerance, dyspnea, and collapse. Toy breed dogs are most commonly affected (Pomeranians, Yorkshire terriers, and Poodles). Most dogs initially respond to medical management. However, the disease usually progresses and pets that are losing the quality of life they once enjoyed should be evaluated for further treatment options.

Tracheal collapse is frequently diagnosed with survey radiographs; however, accurate diagnosis of the severity and location of the collapse can be extremely difficult without using fluoroscopy. It is critically important to determine the full extent of the affected trachea so that an appropriate treatment and prognosis can be discussed. Patients having moderate to severe tracheal collapse, minimal mainstem bronchial collapse, and unsatisfactory response to medical management are surgical candidates.

Surgical treatment of tracheal collapse consists of extraluminal placement of prosthetic tracheal rings or placement of an intraluminal self-expanding tracheal stent. Pets with purely extrathoracic/cervical tracheal collapse are candidates for extraluminal rings. The remaining patients with intrathoracic or a combination of intra/extrathoracic tracheal collapse are candidates for intraluminal stenting. (The fluoroscopic images of the trachea illustrate the dynamic nature of the collapse.)

Hiatal Hernia

Hiatal hernia is a condition in which the abdominal esophagus and/or a portion of the stomach intermittently herniates into the thoracic cavity through the esophageal hiatus. This disease typically results in regurgitation although patients can also present with vomiting, hypersalivation, anorexia, weight loss, hematormesis, and respiratory distress. English bulldogs and Shar-Peis are predisposed to this condition; however, development of this disease can occur at any age with any breed. In our experience, it also can be related to upper airway resistance, which can lead to increased negative pressure in the thoracic cavity. Fluoroscopy has been an invaluable tool in differentiating this disease from esophagitis and esophageal reflux.

Several types of hiatal hernias have been described (see below). Prior to surgical correction of the hiatal hernia, appropriate treatment of any upper airway disease should be performed along with a reasonable course of medical management. Medical management for hiatal hernias consists of elevated feeding, antacids, prokinetic agents, and coating agents. If clinical signs persist in the face of medical management, surgical correction should be recommended. The prognosis for surgical correction of hiatal hernias is good.

To view real-time fluoroscopy video images, visit our website: upstatevet.com/fluoroscopy_services.php
On April 14, 2009, Dr. Elizabeth Capitano, a Hill’s practice development veterinarian, presented an insightful overview to our doctors on new research developments from Hill’s Pet Nutrition in the study of nutrigenomics. She discussed the differences between nutrigenomics and nutrigenetics. Nutrigenetics is defined as how an individual processes nutrients based on his/her genetic profile, a profile that cannot be changed. Nutrigenomics is the utilization of targeted ingredients to normalize gene expression. Gene expression can change due to certain disease processes or due to changing life stages, such as aging. Nutrigenomic foods are functional foods, which include nutrients that target how genes are expressed. By changing gene expression, these foods can help either alleviate the clinical signs present in disease states, or they can alter some changes that have occurred due to life stage metabolism. Examples of Hill’s products utilizing nutrigenomics include Prescription Diet J/D® (with eicosapentanoic acid, EPA) and Prescription Diet R/D® (with lysine, carnitine, and increased soluble fiber).

So far we have used the SVAPs in 6 of our radiation patients, and they have worked very well. Our technicians have adjusted to using them and feel the SVAPs help us treat our patients more efficiently. Owners have been very pleased with the freedom it gives their pet during treatment, and they feel it improves their quality of life. Expect to see SVAPs on a regular basis in radiation therapy patients in the future.
Save the date!

Fall CE for Doctors

Featuring cardiologist Dr. Matthew Miller of Texas A&M College of Veterinary Medicine

Sunday, Sept. 13th at the Greenville Marriott

Register by Monday, Sept. 7th at upstatevet.com/ce

Paws for a Cause

When was the last time you and your dog saved a life?

Visit us online at www.upstatepawsforacause.org for more details!

Saturday, September 26th 2009
Registration: 8:00am Walk Starts: 9:00am