

Advanced IMAGING

AND THE VETERINARY PRACTICE: PART 2

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In part one of 'Advanced Imaging and the Veterinary Practice', printed in the March 2015 issue of PetTalk, we discussed how Computed Tomography, or CT, works and why it is an invaluable modality in the veterinary field. Today, our focus will shift to magnetic resonance imaging better known as MRI. MRI is another imaging modality that allows veterinarians to image the inside of your pet. While not as common as CT, there are a few specialty hospitals that are capable of performing this imaging procedure and they are improving the lives of many families and their four legged friends.

The physics of MRI are mind boggling and we must first understand that the body, whether it be human, dog, cat, or an exotic pet, is mostly made up of hydrogen and oxygen, which are the main components of water molecules. At the center of each hydrogen atom, there is an even smaller particle called a proton. Protons are like miniature magnets and are very sensitive to strong magnetic fields. All MRI machines are very powerful magnets and when you or your pet lies inside, the protons in the water of a patient's body line up in the same direction of the magnet. This is the same thing that happens

when a hand held magnet pulls the needle of a compass. While lying inside of the MRI, short bursts of radio waves (the same thing that comes out of your car speakers!) are directed at the body, which "knocks" the protons out of alignment with the magnet. As these radio waves are turned on and off,



a loud noise is produced. Ear plugs are often used for this reason during an MRI. When the radio waves are turned off, the protons in the patient's body realign with the magnet. As the protons realign, energy is released. This process of sending out radio waves and then turning them off is repeated over and over again in order to image a particular area of the body. The energy released as the protons return to their original alignment

is picked up by receivers. The different amounts of energy produced and the speed at which the proton realigns helps to distinguish between the various types of tissue. Protons in different types of tissue (i.e. fat, muscle, brain tissue) realign at different speeds and each produce distinct signals. In the same way that millions of pixels on a computer screen can create complex pictures, the signals from the millions of protons in the body are combined to create a detailed image of the inside of the body.

MRI is ideal for use in diagnosing neurologic diseases of the brain and spine. The nervous system plays a vital role in your pet's life and controls a dog's actions, from movement to play to eating to emotional behavior. There are many causes for neurologic disorders, some of which are injury, a reaction to medication, hereditary diseases, cancer, or general health problems. Two common neurologic disorders that an MRI is often needed are epilepsy and a herniated intervertebral disc. If your pet exhibits back pain, difficulty walking, seizures, or facial swelling don't hesitate to take your pet to your veterinarian. These symptoms may be an indication that your pet will need an MRI. Remember much like CT, only a veterinarian can determine if an MRI is needed.