

## **The Ultrasound Examination**

Ultrasound represents a technique for imaging internal organs without x-ray radiation. Instead, the ultrasound uses the reflection of high-frequency sound waves to evaluate the size, shape and position of soft tissues. These sound waves are out of the range of hearing. Neither people nor dogs can hear the sound waves.

Your veterinarian should contact the veterinarian who will be doing the ultrasound. The veterinarians will exchange information and discuss any other tests that should or may be done before or in addition to the ultrasound examination. A thorough medical history will be obtained both from your veterinarian and from you. Expect to leave your dog with us for several hours to have the ultrasound examination performed. We will call you and your veterinarian after we have reviewed the images.

Ultrasound does not replace traditional x-ray examination of the organs. Instead, it complements the x-ray and can provide information that the x-ray does not, and vice versa. It does offer several advantages over x-rays. It is safer for the operator than x-rays because sound waves do not represent a dangerous energy source. Also, organs that may not be visible at all on x-rays, such as lymph nodes and the pancreas, can be seen on ultrasound. Also, "real time" or moving images may be produced.

Air and bone are the enemies of ultrasound waves. Since the lungs are air-filled, they cannot be studied. The exception is a mass located within the lungs. Bones cannot be studied because they reflect the sound waves back to the ultrasound machine without producing an image. Because of the problems with imaging bone, the brain and spinal cord are not seen with an ultrasound study. However, if the dog has a soft spot in its head, ultrasound of the brain through this spot may reveal the presence of fluid or water on the brain (hydrocephalus).

Prior to the study, the hair must be clipped over the area of interest. Next, alcohol or a water-based gel is smoothed over the skin to improve the contact between the transducer and skin. The transducer is held in the operator's hand and moved over the skin. When sound waves are emitted from the transducer, they are reflected back to the ultrasound machine. The pattern of the reflected sound waves creates an image that is viewed on a screen.

In general, the ultrasound is used to examine the heart or to study organs within the abdomen, such as the liver, kidneys, spleen, or bladder. The cardiac ultrasound, also called an echocardiogram or an "echo," can measure the thickness of the heart wall and the size of the individual heart chambers. The heart valves can be examined for normal motion and any thickened areas. Motion can be detected so that an assessment can be made of the ability of the heart to move blood. Other measurements and determinations of heart function can also be made.

Some specific diseases can be diagnosed because they have a specific ultrasound appearance. However, other diseases cause ultrasound findings that are not unique.

Even when non-specific findings are detected, the ultrasound is still very helpful in detecting abnormal areas within a particular organ. It is a good screening tool but, in some cases, may not provide a diagnosis. In these situations, it may be necessary to obtain a surgical biopsy. A biopsy provides an actual piece of tissue for a pathologist to examine under the microscope for more information. In many cases, the pathologist makes the final diagnosis.

No special preparation is needed if the heart is to be studied. If organs in the abdomen are to be studied, your dog should be withheld from food for 12 hours. The urinary bladder is best visualized if it is full of urine. Therefore, do not let your dog urinate within 3-6 hours of the study, if possible.

If your dog is cooperative and not painful or nervous, no anesthesia or sedation is needed to ultrasound the heart or the abdomen. However, if its abdomen is tense due to pain or nervousness, or it is very wiggly, a light sedative may be needed.

Since an ultrasound study is performed in real time, the results of what is seen are known immediately. In some cases, the ultrasound images are sent to a veterinary radiologist for further consultation. If this happens, the final report may not be available for a few days.