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# MRI screening to characterize tumors in dogs

Masses in spleens or livers of dogs are relatively common findings for the veterinarian. They are often noted during the routine physical exam or during ultrasound imaging of the abdomen. These lesions may be a result of trauma, hyperplasia, and benign or malignant tumors. Benign lesions in the liver are more common than malignant ones, though clinicians cannot automatically assume that a mass is benign. To determine the character of a lesion, ultrasound and biopsies are used as diagnostic tools.

Ultrasound is an excellent modality for determining the presence of a mass but often the ultrasonographer cannot say whether it is truly benign or malignant. That is determined definitively only by biopsy. In human medicine, for a number of years, MRI imaging has been used to characterize lesions in the liver and spleen. MRI images have advantages over

ultrasound images in providing a much more defined, soft tissue imaging modality. MRI is considered the “Gold Standard” of imaging for the liver and spleen in people. MRI in people can not only determine whether a lesion is benign or malignant, but can further define whether it is a primary or metastatic (cancer spread) lesion. To determine whether canine benign and malignant tumors in the spleen and liver can be diagnosed through MRI, clinicians at VHUP and at HUP, (the hospital for humans a few blocks away), designed a study for MRI screening of dogs with focal splenic and liver lesions.

Dogs, unlike humans, have to be anesthetized for an MRI as they are required to be perfectly still. Cases were selected from patients presented at VHUP’s clinics. The study exam-

ined 20 dogs that had been scheduled for a splenectomy and/or liver biopsy.

The dogs were taken to a research MRI at HUP. Technicians and clinicians from VHUP accompanied the animals to handle anesthesia and contrast medium infusion. The MRI images were read by two radiologists (Drs. E.S. Pretorius and E. Siegelman) from HUP who used guidelines established for liver and splenic tumors in humans.

The animals then underwent a liver biopsy

between MRI and ultrasound were not possible.

In two cases the MRI found pulmonary metastasis not seen on radiographs. MRI also showed the exact location of the tumor, making it easier for surgeons if removal was required in several cases.

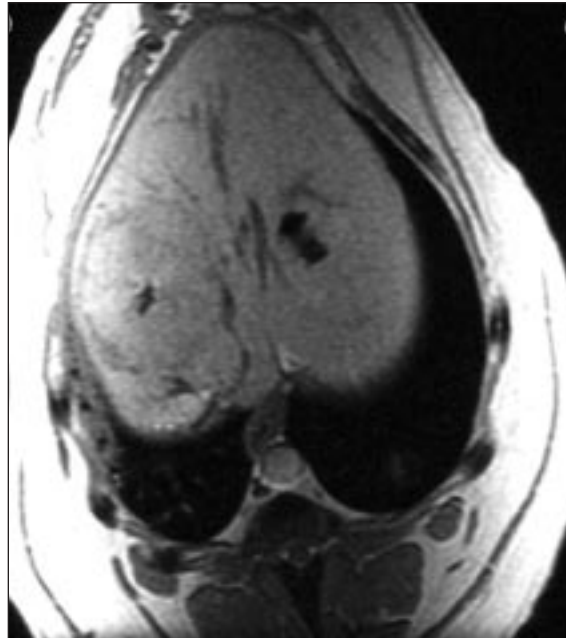
“It appears that MRI imaging maybe a useful screening method for canine patients with focal splenic or liver lesions,” says **Dr. Craig Clifford**, resident in oncology and primary investigator.

“We are enlarging the study to look at a bigger group. If the results hold true, then it is possible that some biopsies and surgeries of benign lesions can be prevented. The MRI modality also shows a more exact location of a mass, making it easier for the surgeon, in several cases, MRI provided the surgeon with valuable



T2 image

**A mass diagnosed as a cancer based upon abnormal appearance on the T2 image and called a hepatocellular carcinoma due to similarities to the rest of the liver on the T1 image. It was read as “low-grade” because it did not contrast enhance. This was proven after surgical resection of the tumor.**



T1 Late Post-Gad

or splenectomy and the removed tissues were then examined by the veterinary school’s pathologists. The MRI imaging characteristics were correlated with the pathologic findings to determine whether the expected MRI imaging characteristics of benign and malignant canine splenic and liver lesions were the same as such lesions in humans.

Using the MRI imaging characteristics for human benign and malignant liver and spleen lesions, radiologists at HUP identified 16 out of 17 benign lesions and 15 out of 15 malignant lesions. The overall accuracy was 31/32 lesions thus far. These findings were confirmed by the histopathology exam of biopsied or removed tissues. The animals were also examined by ultrasound, however, in the majority of cases, no specific diagnosis was given, so comparisons

information. One additional benefit of MRI and its superior soft tissue imaging is that we can use it to follow a tumor while it is treated with chemotherapy; the MRI allows us to see whether the tumor is shrinking. This is particularly important when new drug regimens which are designed to kill the blood vessels supplying the tumor are tried, for example, for hemangiosarcomas” (blood vessel tumor).

The clinicians participating in the initial pilot study are Drs. Clifford, **Chick Weisse, V’98**, and **Karin Sorenmo** of VHUP, and E.S. Pretorius, E. Siegelman and J.A. Solomon of HUP. This study was presented by Dr. Clifford at the 22nd Annual Veterinary Cancer Society Conference in New York this past September and received the Clinical Research Award.