

Ultrasound-guided histotripsy ablation of canine brain tumors through an acoustically transparent cranial window

Purpose

To investigate the safety and antitumor activities of a new ultrasonic technology, called histotripsy, that can noninvasively destroy (ablate) tumor tissue using acoustic energy, in dogs with brain tumors.

Background

Primary brain tumors (PBT) are a significant cause of illness and death in dogs. Surgery remains a common treatment for canine PBT, with the goal of removing as much of the tumor as possible. However, significant numbers of canine PBT are considered inoperable due to their location in the brain, and conventional, invasive surgical techniques can cause serious side effects. Even when surgery goes well, the tumor may regrow after surgery. New treatments, particularly for PBT that can't be removed by surgery or that have regrown after surgical removal, are needed to improve quality and quantity of life of affected dogs.

This proof-of-concept of study will provide data necessary to refine histotripsy technology and explore new, non-invasive techniques. This has the potential to allow precision image-guided, non-invasive treatment of PBT using ultrasonographic equipment and techniques that are currently in use in the majority of small animal veterinary practices.

This study is funded by the [Focused Ultrasound Foundation](#) and the **American Kennel Club**

Eligibility

- Dogs of any age, weight, sex, or breed who have a measurable (>10 mm in diameter), treatment-naive primary forebrain tumor documented with MRI that is able to be removed with surgery

Exclusion Criteria

- Dogs with other serious illnesses or cancers
- Dogs with cystic tumors (cystic component > 30% of tumor volume)
- Dogs requiring transfrontal surgical approach to access tumor
- Dogs who are not expected to survive for the duration of the study period (approximately 42 days)
- Dogs that have received prior treatment for their tumor, including surgery, radiotherapy, chemotherapy, or immunotherapy
- Dogs who have excessive neurological dysfunction or poorly controlled seizures

Study Design

The canine patient will undergo an initial brain surgery that will allow for tumor biopsy, placement of the acoustically transparent cranial window (ATW), and subsequent treatment of the brain tumor with histotripsy. The ATW is a small piece of a plastic-like polymer that has been approved for medical use. The ATW will be inserted on the surface of the patient's brain to allow sound waves to pass through. Immediately after the histotripsy treatment, an MRI will be performed and the dogs will be recovered from anesthesia. Two days after the histotripsy treatment, the dog will be anesthetized for brain ultrasound, MRI examinations, and surgical removal of the brain tumor. The dogs will be then evaluated on scheduled recheck visits with physical and neurologic examinations on day 14 and 42 post treatment, and brain ultrasound and MRI scans will be performed on days 14 and 42. We will analyze the safety and effectiveness of the therapy using brain images and tests performed on the tumor tissue we remove.

Compensation

Once the dog is deemed eligible, the study will cover costs associated with surgery to biopsy the tumor, implant the cranial window, and administer the histotripsy treatment, as well as the second surgery to remove the tumor, anesthesia for repeated MRI scans, and clinical visits during the study period. The cost of the initial MRI to confirm diagnosis is not covered by the study.

Contact

Dr. John Rossmeisl, Neurology
Office Phone: (540) 231-4621

Mindy Quigley, Clinical Trials Coordinator
Office Phone: (540) 231-1363 | Email: mindyq@vt.edu

If your query is urgent, please call the Small Animal Hospital on (540) 231-4621.