Irreversible electroporation for liver cancer immunotherapy: A pilot study

Purpose
To determine if treatment with High-Frequency Irreversible Electroporation (H-FIRE), which uses electrical pulses to destroy cancer cells, can cause an immune response in dogs with liver cancer.

Background
Canine liver cancer may carry an excellent prognosis when amenable to surgery, but unfortunately, there is no effective treatment for disseminated forms of the disease. The prognosis for dogs diagnosed with non-resectable (inoperable) liver cancer has remained dismal for the past decades, with survival measured in weeks to a few months, despite chemotherapy, targeted therapies, and radiation therapy attempts. We are opening a funded pilot study of High-Frequency Irreversible Electroporation (H-FIRE), a treatment modality that uses electrical pulses to destroy cancer cells, to determine if H-FIRE can provide a more effective treatment option for dogs with this type of cancer.

Eligibility
- Dogs of any age, weight, or breed diagnosed with primary liver cancer
- Tumor must be resectable
- Tumor confirmed by cytology or histopathology to be hepatic carcinoma (primary liver cancer); recurrent tumors are acceptable
- Expected survival > 4 weeks without treatment

Exclusion
- Other life-limiting disease
- Chemo/kinase/radiation therapy during the past 3 weeks

Study Design
Enrolled patients will receive a complete physical exam and lab work. Cancer will be staged using chest x-rays, abdominal ultrasound, and fine needle biopsy sampling. About one week later, your dog will return for a CT scan to plan treatment. Subsequently, your dog will be scheduled for the H-FIRE treatment (Monday). H-FIRE will be applied to the liver tumor using a minimally invasive procedure (ultrasonographic guidance, or laparoscopy, or key-hole laparotomy). During the procedure, blood samples and a tumor biopsy will be obtained. Your dog will be hospitalized in ICU under 24 hour monitoring until Friday of the same week. On Friday, a CT scan to aid in surgery and definitive surgery to remove the liver tumor will take place. Your dog will recover in the ICU and will be discharged according to standard procedure. Your dog will need to return to the Veterinary Teaching Hospital 2 weeks after the definitive surgery for recheck and suture removal. At the recheck visit, your dog will have a physical exam and additional diagnostics, if indicated.

Compensation
The study will cover the costs for the two study-related CT scans, tumor biopsy and histopathology, the H-FIRE treatment, hospital stay and associated costs, the definitive surgery (up to $3,000), and the scheduled recheck visit. This compensation will only partially cover the cost of all diagnostic procedures required for the diagnosis and treatment of the disease. You are responsible for any other clinical fees associated with medical complications of the H-FIRE/surgical therapy or other medical problems.

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