

**Purpose:** Recent in vivo experiments have showed non-thermal effects of pulsed focused ultrasound (pFUS) on tumor growth delay. This study investigates the application of a clinical 1.5T MR scanner for treatment assessment of prostate tumors after pFUS treatment, which provides a non-invasive and accurate way to measure tumor volume for treatment efficacy evaluation, and also an alternative way for small animal tumor model study that generally requires high-magnetic-field MRI facility (e.g., the Bruker NMR system).

**Methods:** A mouse tumor model was developed by implanting LNCaP tumor cells in nude mice prostates. When tumor volume reached  $\sim 130$  mm<sup>3</sup> on MRI, mice were randomly assigned into two groups (n=8): (1) pFUS treatment; (2) control. MRI-guided pFUS treatment was performed using InSightec ExAblate 2000 with a 1.5T GE MR scanner. Non-thermal pFUS was delivered for 60 sec per sonication (1MHz; 25W acoustic power; 10% duty cycle, on/off=0.1/0.9 sec). The body temperature was kept  $<42^{\circ}\text{C}$  as measured in real-time by MR thermometry. A total of 4-8 sonications were used to cover the whole tumor target for each animal. Weekly MR scans were performed using 1.5T scanner to monitor the tumor growth. A ring-shape surface coil (3 inches) was used for MR signal detection. T2-weighted MR imaging used fast-recovery fast-spin-echo (FRFSE) sequence with parameters: TR/TE=2200/85ms, NEX=3, matrix=288x288, FOV=7x7 cm<sup>2</sup> (resolution=0.137x0.137mm<sup>2</sup>), slice thickness=2/1 mm (coronal/axial).

**Results:** Tumor growth delay was quantified using the clinical 1.5T MR scanner after pFUS treatment while normal tumor growth was clearly observed in the control group. A  $>40\%$  reduction in tumor volume was shown in mice treated with pFUS compared to that for the control mice

**Conclusion:** Clinical 1.5T MRI is able to assess the tumor volume change after pFUS treatment for a small animal model (tumor size: 3-10mm). It may provide an alternative way for treatment assessment for small animal studies.

**Funding Support, Disclosures, and Conflict of Interest:**

This work is supported by Focused Ultrasound Surgery Foundation, Varian Medical Systems, DOD PC073127 and DOD BC102806.