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22

Renal ablation using magnetic resonance-guided high intensity focused ultrasound: Magnetic resonance imaging and histopathology assessment

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Abstract

AIM: To use magnetic resonance guided high intensity focused ultrasound (MRg-HIFU), MRI and histopathology for noninvasively ablating, quantifying and characterizing ablated tissue.

METHODS: Six anesthetized/mechanically-ventilated pigs underwent single/double renal sonications ($n = 24$) using a 3T-MR guided HIFU (1.1MHz frequency and 3000J-4400J energies). T2-weighted fast spin echo (T2-W), perfusion saturation recovery gradient echo and contrast enhanced (CE) T1-weighted (T1-W) sequences were used for treatment planning, temperature monitoring, lesion visualization, characterization and quantification, respectively. Histopathology was conducted in excised kidneys to quantify and characterize cellular and vascular changes. Paired Student's t-test was used and a P-value <0.05 was considered statistically significant.

RESULTS: Ablated parenchyma could not be differentiated from normal parenchyma on T2-W or non-CE T1-W sequences. Ablated lesions were visible as hypoenhanced

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