Abstract:

Purpose: Commercially available RF ablation systems are capable of driving only one single or multiprong electrode at a time. Clinical practice rarely requires the entire power output from a RF generator throughout an entire ablation. A device was created that distributes power from a RF generator across two separate electrodes using a switching device. Temperature feedback data was utilized from both probe thermosensors. This study demonstrates the feasibility of simultaneously creating multiple ablation zones using a switching device to distribute power across multiple probes.

Methods and Materials: Three domestic pigs were anesthetized and the liver exposed. A total of 13 RF lesions were created using either single (n=3), or dual probes running simultaneously in separate hepatic lobes (n=10). All lesions were created using a 150 Watt generator (RITA, Irvine, CA) for 10 minutes at a target temperature of 100°C with prongs at 3 cm. For dual ablations, probe temperatures were measured and power applied alternating between the two probes. Temperatures were transferred to a computer which controlled the period for which power was applied to each probe via an electronic switch, so that both probes stayed at roughly equivalent temperatures.

Results: No difference was detected in lesion size for individual ablation sites between single and dual probe ablations. Mean lesion diameter was 3.33±0.57 for single ablations and 3.76±0.60 for dual ablations. Mean volume was 10.67±6.00 and 17.32±8.64 respectively (p>0.05, student’s t-test). Mean time until target temperature was reached was 2.73 minutes for single probe ablations and 3.37 minutes for dual probe ablations (p>0.05, student’s t-test).

Conclusion: Multiple sites of ablation can be created simultaneously using this switching device. Individual lesions are the same size regardless of whether they are a single or dual burn. Thus, two ablations may be performed without substantial time penalty and without compromising

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**Title:** A Device That Allows for Multiple Simultaneous Radiofrequency Ablations in Separated Areas of the Liver: A Feasibility Study in the Porcine Model

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lesion size. This could be used to simultaneously ablate several different tumors, or to create a larger zone of necrosis when probes are deployed in close proximity to each other.