

Title:	Microwave Ablation of Hepatic Tissue: Simultaneous Use of Multiple Probes Results in Large Areas of Tissue Necrosis
Date:	Tuesday November 27, 2001
Start Time:	11:33 AM
End Time:	11:39 AM
Location:	Room E350

Presenter

[Andrew Wright MD](#)

as.wright@hosp.wisc.edu

Co-Author

[Fred Lee MD](#)

[Chris Johnson BS](#)

[David Mahvi MD](#)

Abstract:

Purpose: To determine the feasibility of large volume hepatic ablation using simultaneous application of multiple microwave antennas.

Methods and Materials: Eight domestic pigs (wt=35 kg) were placed under general anesthesia, and the liver exposed through a bilateral subcostal incision. A total of 18 thermal microwave lesions were created in the liver using 13 gauge microwave antennae (Vivant Medical Systems, Irvine, CA), either singly (n= 5) or in a multiple probe configuration (n= 13). Multiple probe ablations were conducted by using three microwave antennae concurrently in a triangular pattern, with separations between antennae of 0.5-3.0 cm. The microwave system is capable of running up to 8 probes simultaneously. All ablations were created at 40 Watts power and 10 minutes duration. Animals were sacrificed and livers removed and perfused with formalin via the portal vein. Tissue was sectioned at 3 mm intervals and lesions measured in three dimensions. Volume calculations were performed using the formula for a prolate ellipse ($l \times w \times h / 2$).

Results: Single antenna microwave ablation resulted in lesions with a maximum diameter and volume of 2.23 ± 0.69 cm and 8.81 ± 6.32 cm³ respectively. Multiprobe ablation created lesions with mean diameter of 4.42 ± 0.92 cm and mean volume of 37.92 ± 14.36 cm³ (single vs. multiprobe ablations unpaired t-test $p < 0.0002$ for diameter and $p < 0.0005$ for volume). Among the multiprobe ablations, there was no significant difference in lesion diameter or volume based on probe separation. Lesions created with probe separation of 0.5-1.5 cm were round and confluent, while clefts were present at 2.0-3.0 cm of separation.

Conclusion: Unlike radiofrequency ablation, microwave ablation can be performed using up to 8 probes running independently, yet simultaneously. When applied to create a single lesion, the result is a large zone of necrosis that could be used to treat large tumors with a single ablation. Multiple probes could also be used to concurrently ablate

several anatomically separate lesions. (F.T.L and A.S.W has received research support from Vivant Medical.)