TITLE Characterization of In Vivo Ablation Zones Following Percutaneous Microwave Ablation of the Liver with Two Commercially Available Devices: Are Manufacturer Published Reference Values Useful?

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KEY FINDINGS:

• With AMICA, in-vivo ablation indices* were significantly smaller than ex-vivo reference ablation indices in length (p=0.013), diameter (p=0.001), and volume (p=0.003).
• With Certus PR, in-vivo ablation indices* were significantly smaller than ex-vivo reference ablation indices in length (p=0.009), diameter (p=0.009), and volume (p=0.009).
• Neither the AMICA or Certus PR in-vivo ablations approached a spherical shape (1.0). Ablation shape, as measured with sphericity index** of the AMICA in-vivo ablations (0.375) was more elliptical than ex-vivo reference values (0.588). Similarly, the Certus PR in-vivo ablations demonstrated elliptical ablations (0.49).
• In conclusion, this study suggests that in-vivo human liver ablation volumes are significantly smaller than stated by ex-vivo bovine liver reference values when using AMICA and Certus PR antennas. In addition, reported ablation diameters were smaller than ablation lengths, which results in a more elliptical rather than spherical ablation zone.

STUDY DESIGN:

Retrospective review from Feb 2011 thru Feb 2013 of patients undergoing microwave ablation for primary or secondary liver cancers. Study compared liver ablation dimensions (length, diameter, volume) using a single 16-gauge AMICA antenna (HS Medical) (n=20 patients with 25 ablations) or a single 17-gauge Certus PR antenna (NeuWave Medical) (n=8 patients with 11 ablations). All procedures were performed with a single ablation antenna and at a single power setting with 17 of 36 ablations performed as serial ablations with the antenna in the same position. Liver ablation dimensions were measured using immediate postablation CT scans, with areas of hypoenhancement considered to represent the ablation zone. In-vivo tumor-bearing human liver ablation dimensions were compared to ex-vivo bovine normal liver ablation dimensions provided by the device manufacturers. (Level 4) Independent Study

* Definition of an Ablation Index is a ratio of the respective ablation cavity dimension (length, diameter, and volume) to the energy of ablation (in kilojoules).
** Definition of a Sphericity Index is a ratio of the calculated ellipsoid volume divided by the calculated ideal spherical volume using the axis that would give the largest radius.

**THIS CONCLUDES THE CLINICAL SYNOPSIS OF THIS PUBLICATION**