Abstracts

Theoretical Analysis and Clinical Demonstration of the Effect of Power Pattern Control Using the Annular Phased-Array Hyperthermia System

V. Sathiaseelan, M.F. Iskander, G.C.W. Howard and N.M. Bleehen. "Theoretical Analysis and Clinical Demonstration of the Effect of Power Pattern Control Using the Annular Phased-Array Hyperthermia System." 1986 Transactions on Microwave Theory and Techniques 34.5 (May 1986 [T-MTT] (Special Issue on Phased Arrays for Hyperthermia Treatment of Cancer)): 514-519.

The phase and amplitude control of power deposition patterns for the BSD Annnlar Phased Array (APA) has been theoretically analyzed at a frequency of 60 MHz. Absorbed power patterns in simple circular cross-sectional cylindrical dielectric structures were studied first to compare with published experimental results. Models based on computerized tomography (CT) scans from the pelvic region have been used for predicting the specific absorption rate (SAR) patterns in patients. Significant changes were observed with phase changes of 30° and relative amplitude changes of 20 percent. The theoretical predictions qualitatively agree with the experimental results reported for simple phantoms. It is also shown that these techniques result in a better control of the SAR patterns and thus more effective heating of tumors situated eccentrically within the pelvis, which we have confirmed in clinical treatments.

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