Abstracts

Computer simulation and experimental studies of SAR distributions of interstitial arrays of sleeved-slot microwave antennas for hyperthermia treatment of brain tumors

J.C. Lin, Shinji Hirai, Chin-Lin Chiang, Wen-Lin Hsu, Jenn-Lung Su and Yu-Jin Wang. "Computer simulation and experimental studies of SAR distributions of interstitial arrays of sleeved-slot microwave antennas for hyperthermia treatment of brain tumors." 2000 Transactions on Microwave Theory and Techniques 48.11 (Nov. 2000, Part II [T-MTT] (Special Issue on Medical Application and Biological Effects of RF/Microwaves)): 2191-2198.

The specific-absorption-rate (SAR) distributions produced by three-, six-, and seven-element arrays of sleeved-slot interstitial antennas in brain-equivalent tissues are investigated in this paper. Computer simulations of SAR distributions are compared to experimental measurement made in a brain-equivalent gel phantom at 2450 MHz. Results showed that a 15-mm antenna spacing would produce SAR patterns with the least variation in its distribution compared to smaller or larger spacings. Moreover, the region of elevated SARs is inscribed by the array and extends 35 mm in length to include the distal antenna-tip region. In addition, results indicate that a hexagonal array configuration of either six or seven sleeved-slot interstitial antennas could provide elevated SARs in brain tissues. Since the six-element configuration uses one less interstitial antenna with comparable SARs, it offers a better scheme for hyperthermia treatment of brain tumors.

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