Abstracts

Biological Effect of 27.12-MHz Short-Wave Diathermic Heating in Experimental Tumors

J. Overgaard. "Biological Effect of 27.12-MHz Short-Wave Diathermic Heating in Experimental Tumors." 1978 Transactions on Microwave Theory and Techniques 26.8 (Aug. 1978 [T-MTT] (Special Issue on Microwaves in Medicine, with Accent on the Application of Electromagnetics to Cancer Treatment)): 523-529.

Twelve isologous experimental mouse tumors of different origin, degree of differentiation, and histology have been treated with short-wave diathermy (27.12 MHz) in the temperature range 41-43°C. All heated tumors react clinically in a similar way with shrinkage and hardened consistency of the palpable tumor. Local control was normally obtained after a certain minimum threshold heat dose, but the curability varied in different tumors from 9 to 25 percent. By lower heat doses usually no control was obtained, but a slight variation in heat sensitivity exists. Higher heat doses did normally not improve the curative results but deviations under special conditions were observed. A mutual variability of temperature and heating time without alteration in biological effect was observed. Histologic examination of heated tumors showed local destruction of the tumor core in all cases. However, in some of the tumors unaffected tumor cells were observed in the periphery of the treatment field and resulted in regrowth of tumor. Therefore, the quantitative curative results were varying for the different tumors after identical hyperthermic treatments. This may be explained by a technical insufficiency of the Iocal diathermy. Such treatment will, at tumors characterized by a high peripheral blood flow and intense infiltrative growth, often be insufficient due to a heterogeneous heating of these peripheral cells. A correlation between the degree of peripheral infiltrative growth and cure rate was found. No other relationship was established between the curative effect of hyperthermia and tumor characteristic parameters.

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