Low dose re-irradiation & thermography controlled wIRA hyperthermia in extended recurrent breast cancer

Markus Notter¹, Helmut Piazena², Werner Müller³, Peter Vaupel⁴

¹HNE La Chaux-de-Fonds, La Chaux-de-Fonds, Switzerland, ²Charité Medical University, Berlin, Germany, ³Wetzlar, Wetzlar, Germany, ⁴Dep. Radiooncology and Radiotherapy University Medical Center, Mainz, Germany

Purpose:

Evaluation of efficacy and side effects of combined re-irradiation and infrared superficial hyperthermia monitored by thermography in previously irradiated recurrent breast cancer. Specifically lymphangiosis carcinomatosa may be very extended and requires large treatment fields.

Methods:

Records from 69 heavily pre-irradiated patients with locally advanced recurrent breast cancer treated from 9/2009 – 12/2013 are analyzed. Prior treatments included surgery (100%), radiation (100%), chemotherapy (82%) and hormonal therapy (85%) All patients were re-irradiated to 16 – 24 Gy (median 20 Gy) 1/week always in combination with superficial infrared hyperthermia. Temperature distribution in the treated region was monitored continuously by an infrared thermography camera mounted to the wIRA radiator and remotely controlled by a computer. Visual inspection of the temperature color-coded images was additionally used for guidance in the correct centering of the heated region and to avoid hot spots. Patients and tumor characteristics predictive for actuarial local control and toxicity were studied.

Results:

The median follow up was 12 months. 64% CR, 30% PR, 4% NC and 2% PD of 107 treated volumes was achieved. Temperature analysis: maximum skin temperature over lymphangiosis: 42.5 – 43.2°C, minimum 40.2 – 41.9°C. Time interval between first treatment and first local recurrence, initial stage and number of previous re-treatments of recurrences were most predictive for local control. Only grade 1 and 2 toxicities were noted so far.

Conclusions:

Use of thermography-controlled wIRA-hyperthermia combined with low dose re-irradiation provides good local control of heavily pretreated chest wall recurrences. The remissions achieved so far are very promising and correspond to results found in the literature. Real-time, online monitoring and control of local superficial hyperthermia all over the whole treatment field results in very low toxicity.