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Purpose: Analysis of RF-temperature and power data of primary cervical cancer patients to evaluate 15 years performance of loco-regional deep hyperthermia (DHT) with four configurations of the BSD-2000 system.

Materials and methods: Patients (n=444) were treated with the Sigma-60 applicator connected to one of four configurations of the BSD-2000 system from 1991 to 2005. The patients were grouped in three weight-groups: <61kg, 61-70kg, and >70kg. Temperature indices were calculated per patient, per treatment, per lumen and per tissue type. Ten power-related parameters were calculated for individual treatments. Then, the relationships between different temperature and power indices were computed per configuration, per weight-group, and over the time-period. Also percentages of normalized net integrated power per pelvic area and vagina T50 were calculated and the relationship between these was evaluated.

Results: No substantial variations were found for temperature and power indices over the four BSD configurations. The power indices increased from weight-group 1 to 3, however, the power data per pelvic area (or per weight) and also temperatures decreased slightly. Large variations were seen in the power-related parameters over the 1st time-period (1991-996), but they were much lower over the 2nd time-period (1997-2005). The average frequency of switched-off time was remarkably higher (2.6-fold) in the 2nd time-period. In contrast, the average duration of each switched-off was substantially lower in the 2nd time-period (75s vs. 44s). The yearly average of vagina T50 was in the range of 39.3-40.2°C (1st time-period) and 40.0-40.5°C (2nd time-period). In 40% of the patients, a positive correlation (mean: 0.7, range: 0.5 – 0.99) was found between the normalized power and temperature.

Conclusions: The small variation for the yearly average of applied-power and achieved temperatures in the last nine years shows the reproducibility of the application of loco-regional DHT to primary cervical cancer. A global view of the four BSD configurations indicates that the power outputs are almost similar; additionally, the achieved temperatures show that the four systems have provided relatively low doses of HT in the treatment area with a very small difference in the averages of temperature. An overall view of the three weight-groups shows that the applied powers increased from low-weight to the high-weight patients but the achieved temperatures decreased slightly from the low-weight to the high-weight patients. The experience of staff-members and changes in the treatment protocols certainly affected the switched-off strategy.

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