Abstracts

Evaluation of HDR brachytherapy fraction dose on local control and complications rate in patients with cervical cancer IB and IIA

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**Purpose:** The aim of this study was to evaluate of HDR-BT fraction dose on local control and complications rate in patients with cervical cancer IB and IIA treated with postoperative HDR-BT and external beam radiotherapy (EBRT).

**Material and methods:** From January 1996 to December 2002 in Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology Gliwice Branch 150 patients with cervical cancer IB and IIA were treated with postoperative radiotherapy. All patients received EBRT (total dose: 46-54 Gy in 2 Gy or 1.8 Gy per fraction). They were divided into two groups according to fraction dose received in HDR-BT: group I: 5 Gy (twice a week to total dose 25 Gy) and group II: 7.5 Gy per fraction (twice a week to total dose 37.5). The reference point was 0.5 cm from the applicator surface. Acute and late radiation toxicity was evaluated according to EORTC/RTCG.

**Results:** In group I we observed severe acute radiation toxicity only in rectum in one case (2%). Late bladder radiation toxicity was observed only in grade I, late severe rectum complications were assessed in two patients (3.8%). In group II we observed severe acute radiation toxicity only in rectum in one case (1%). In group II two patients (2%) had late severe radiation reaction in bladder, and five patients (5%) in rectum. We observed statistically significant difference in frequency of late severe radiation toxicity in bladder ($p < 0.05$) and in rectum ($p < 0.05$) between group I and group II. Total number of local recurrences in our group was 11 (7.3%): one in group I and 10 cases in group II. There was no statistically significant difference in frequency of local recurrences between group I and II ($p > 0.05$).

**Conclusions:**
1. Higher fractionation doses in HDR-BT increase the total number of late severe complications in rectum and bladder.
2. The escalation of fractionation dose in HDR-BT does not result in better local control in women with cervical cancer IB and IIA.
3. In our experience 5 Gy per fraction in postoperative HDR-BT combined with EBRT is well tolerated and provides good local control.

IPSA vs. geometry based optimization in dose distribution calculation in accelerated partial breast irradiation

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**Purpose:** Comparison of the dosimetric data of breast treatment plans calculated with IPSA and geometry based optimization method.

**Material and methods:** In our study we analyzed dosimetric data in a group of HDR breast treatment plans calculated by Nucletron Oncentra Brachy treatment planning system and realized in the Center of Oncology – Institute in Gliwice, Poland. Two different manners of dose calculations were used to compute a pair of alternative dose distributions for each patient. Treatment plans created with the IPSA (Inverse Planning Simulated Annealing) algorithm and geometry based optimization were compared in respect to dosimetric parameters, conformity index (COIN) and homogeneity index.

**Results:** In geometrically optimized plans mean PTV volume covered by 100% isodose was 88%, while in IPSA plans PTV100 was 87%. Mean DHI index was 0.56 and 0.55 for IPSA plans and geometrical plans, respectively. COIN for geometrical plans was equal to 0.58 and was higher than for IPSA plans (0.53). Maximal dwell times registered for the group of IPSA plans were significantly higher when compared to the geometrical plans. Mean relative difference between maximal dwell times for IPSA and geometrical plans was 73%.

**Conclusions:** Dose distributions calculated with the help of the IPSA algorithm and geometry based optimization method are comparable in respect to dosimetric parameters and quality indices. However, dosimetric data were collected based on the DVHs which translated spatial information into simple graph. Comparison of the maximal dwell times in both group of plans revealed that dwell time gradient is higher in IPSA plans. It may increases the risk of hot points in a treated volume. In a geometry based optimization dwell times were smoothly distributed along the active length. The risk of the single, large overdose area formation inside the treated volume is lower.