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## Prospective dosimetric and comparative study evaluating two dimensional vs. three dimensional planning in patients with cervical cancer undergoing high dose rate brachytherapy

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We did a prospective dosimetric and comparative study of 2D radiography and computed tomography (CT) based three dimensional planning (3D) in patients with carcinoma cervix undergoing high dose rate brachytherapy. A total of 16 patients underwent 48 sessions of brachytherapy after receiving external beam radiotherapy to a dose of 50.4 Gy in 28 fractions. Brachytherapy was planned to a dose of 7 Gy to point A in each session, to a total of 3 sessions for each patient. For 2D planning, doses to point A and ICRU bladder and rectal points were recorded. For 3D planning, doses received by 90%, 95% and 100% of the target volume as well as doses to 0.1 cc, 1 cc, 2 cc and 5 cc of bladder and rectum were recorded. For a prescription of 7 Gy to point A, mean dose received by 90%, 95% and 100% of the target volume was 5.9 Gy, 5.7 Gy and 5.3 Gy respectively. Mean dose to ICRU bladder point was 2.92 Gy while as doses to 0.1 cc, 1 cc, 2 cc and 5 cc of bladder were 7.2 Gy, 6.3 Gy, 5.7 Gy and 5.2 Gy respectively. Mean dose to ICRU rectal point was 3.68 Gy while as doses to 0.1 cc, 1 cc, 2 cc and 5 cc of rectum were 6.8 Gy, 5.7 Gy, 5.1 Gy and 4.5 Gy respectively. We concluded that 2D brachytherapy overestimates the target coverage and underestimates the doses to OARs. Wherever feasible, 3D brachytherapy should be encouraged as it allows precise identification and dose optimization of target volume and OARs.

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## The prognostic utility of pre-treatment 18F-FDG-PET for salvage re-irradiation in head and neck cancer patients

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**Background:** Statistical image features of tumor metabolism from pretreatment 18F-FDG-PET/CT scans were studied for their potential to predict clinical outcome of salvage re-irradiation with intensity modulated radiotherapy (IMRT) for recurrent squamous cell carcinoma of head and neck (HNSCC).

**Materials & Methods:** Pretreatment PET/CT scans and after treatment PET/CT scans of patients who underwent IMRT re-irradiation for recurrent HNSCC, were retrospectively evaluated. Metabolic response was assessed using PET response criteria for solid tumors (PERCIST). Multiple statistical image features related to the standard uptake value (SUV) were computed: Metabolic tumor volume, maximum SUV, mean SUV and total lesion glycolysis (TLG). The correlation between the image features and local control and overall survival was calculated.

**Results:** Complete tumor metabolic response (CMR) was achieved in 5 patients (45.5%). Six (6) patients failed to achieve CMR: Progressive metabolic disease was in 4 patients (36.4%); stable metabolic disease in 1 patient (9.1%); and 1 patient had partial metabolic response (9.1%). The median follow-up time was 18.2 months. Out of the calculated image features, only pre-treatment tumor TLG (individual tumor volume multiplied by its mean SUV) correlated with tumor metabolic response in the early PET/CT follow-up. Also dividing the patient population based on the median tumor TLG showed a split of the Kaplan-Meier survival curves.

**Conclusions:** The tumor TLG of pre-treatment PET/CT scans has important information on the failure risk to achieve CMR in recurrent HNSCC patients. It is necessary to obtain additional patients data to validate these results.

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