

**Conclusion.** The mean V100 in the rectum and D1 in urethra in prostate brachytherapy improve with real-time planification and Quick-Link construction seed system. This method allows getting greater limitations and achievement of constraints recommendations of ESTRO.

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#### MR-guided IGABT vs. standard BT for cervical cancer: Dosimetric comparison

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**Introduction.** MR-based Image Guided Adaptive BT (IGABT) for cervical cancer patients has been introduced at our institution since November 2012. The present work compares preliminary IGABT dosimetric results to standard point A plans.

**Material and methods.** 36 MR based IGABT applications of 7 Gy each were revised. FIGO stage distribution was: IB = 8, IIB = 24, IIIB = 4. GTV, HRCTV, IRCTV and OARs were contoured according GEC-ESTRO guidelines. Median volume for HRCTV was 15.7 cm<sup>3</sup> (IB), 28.3 cm<sup>3</sup> (IIB) and 75 cm<sup>3</sup> (IIIB). All patients received treatment based IGABT plan optimized upon the 4.6 Gy;  $\leq 4.6$  Gy; Sigmoid D2cc  $\leq 7.7$  Gy; Rectum D2cc  $\geq$  following constraints: HRCTVD90 6.4 Gy per fraction. A standard point A plan was generated for each  $\leq$  Bladder D2cc case and dosimetric data compared.

**Results.** For the 32 FIGO I-IIB cases median HRCTV D90 was 9.6 vs. 7.7 Gy with standard or IGABT plan respectively. Overall 71.4% of cases had at least 1 violation of the OARs constraints when a standard plan was applied. In details in 16.7% of cases the standard planification violated Rectum constraint, in 52.8% of cases there was a violation of Sigmoid, and in 22.2% of Bladder constraint. OAR constraints were always met with IGABT. For the 4 IIIB cases (pelvic wall invasion) median HRCTVD90 was 5.6 vs. 7.3 Gy 20%  $\approx$  with standard or IGABT plan respectively. The HRCTV dose escalation (increment with IGABT) was reached without increasing dose to OAR or even decreasing the median D2cc dose received with standard planification: Rectum 4.6 vs. 4.6 Gy (Standard vs. IGABT), Sigmoid 3.7 vs. 3.2 Gy and Bladder 5.6 vs. 5.5 Gy (Standard vs. IGABT).

**Conclusion.** Given the preliminary dosimetric data we expect that introduction of IGABT in our routine will reduce treatment morbidity for patients with small cervical tumors where a higher cure rate and overall survival is expected and potentially a significant increase of local control in IIIB/IVA tumors where a safe dose escalation is provided.

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#### MRI-brachytherapy and IMRT with PET-TAC on cervical carcinoma

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**Introduction.** The benefits of IMRT in external radiotherapy and MR imaging for brachytherapy planning are established providing accurate verification of the applicator position, identification of the residual tumor and detection of procedure-related complications. On the other hand IMRT planning with MRI and PET-TAC provides, an opportunity for conformal dose distribution to tumor volume and organs at risk, as well the possibility for dose escalation with SIB (simultaneous integrated Boost) in a short time, leading to improve local control and reduced toxicity.

**Objective.** To evaluate the dosimetry of MRI based brachytherapy combined with IMRT with PET-CT in a group of patients with locally advanced cervix cancer.

**Methods.** In the period 2007–2012, 19 patients with cervix cancer stages IIB-IVA were treated with definitive radiochemotherapy and brachytherapy. We used PET-CT and MRI for IMRT and MRI for brachytherapy to delineate the GTV, CTV, PTV and OAR. The MRI is routinely performed in our center to stage the tumor and use it for planning the IMRT, we perform other MRI preimplant and another one with the intracavitary device in place. Dose-volume histograms were calculate to evaluate IMRT, and to evaluate the Brachytherapy we have reported D1cc, D2cc and D5cc to the rectum, bladder and sigmoid, and to the CTV we evaluated V90, V100, D90, D95 and D100.

**Result.** Dosimetric study has demonstrated that IMRT achieves comparable PTV coverage compared with other approaches and provides the opportunity to spare critical normal tissue and reduce the mean doses in bladder and rectum. This is very important to offer the possibility for the better HDR brachytherapy with a very significant improvement in dose optimisation and dosimetry.

**Conclusion.** MRI plays a comprehensive role in primary tumor staging. It monitors response to treatment and helps in the planning of IMRT and Brachytherapy.

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