Conclusions: We believe that we are the first to document an association between inter-fraction variation of bladder volume and long-term bladder toxicity outcomes in image-guided ICB for cervical cancer. This is consistent with previous data showing that BV variation can avoid overlap of high dose regions within the bladder. Such data could justify changing current practice in many centers that do not routinely use variable bladder filling protocols. Nonetheless, study is ongoing to determine the exact effect of BV changes on distribution of high dose areas to further validate this recommendation.

OC-0360
Impact of random dosimetric uncertainties on dose-response curves for HDR cervix cancer brachytherapy

N. Nesvacil1, K. Tanderup2, J. Kallehauge2, J. Lindegaard2, R. Potter3, C. Kirisits2
1Medical University of Vienna, Dept. of Radiooncology - Comprehensive Cancer Center (CCC), Vienna, Austria
2Aarhus University Hospital, Department of Oncology, Aarhus, Denmark
3Medical University of Vienna, Dept. of Radiooncology - CCC - CDL for Medical Radiation Research, Vienna, Austria

Purpose/Objective: Recent analysis of dosimetric variations occurring, e.g. due to anatomical variations, within and between different BT fractions, have revealed that expected intra- and inter-fraction uncertainties are of the order of 10% for Dw0 of HR CTV and 20-30% for Dw95, for organs at risk, for the physical dose of each BT fraction (Nesvacil et al. 2012, Radiother Oncol 103, 52, 533). This leads to uncertainties in the total treatment dose by up to 4-7 Gy (EQD2) and might have an important impact on our interpretation of dose-response curves. The aim of this simulation study was to estimate this impact for target and OAR.

Materials and Methods: In this numerical experiment, a dose-dose response curve was assumed for Dw0 of HR CTV and Dw95, for OAR, by a logit function, corresponding to typical dose-response curves assessed from clinical data (e.g. Tanderup et al. (submitted) and Georg et al. (2009, Radiother Oncol 91, 173)).

Dose response uncertainties were simulated by applying typical dose uncertainties randomly for each BT fraction according to a N(Di, SD) distribution, where Di was the physical fractional dose and SD the SD of D90 of OAR, allowing for better coverage of target structures.

Results: In comparison to the expected dose-response curve, the simulations indicate a steeper slope in the low dose region and a flattening of the curve in the high-dose region. (Fig. 1) The effect is more visible in the case of OAR.

Conclusions: Our preliminary simulations indicate that the predictive power of dose-effect relationships may be significantly influenced by dosimetric uncertainties. The steepness of the real dose-effect curve may be over- or underestimated depending on the investigated dose-region. Taking into account random uncertainties, and minimizing them might lead to a relaxation of commonly used dose constraints for OAR, allowing for better coverage of target structures.

OC-0361
Vaginal dose point reporting in cervical cancer patients treated with combined EBRT and MRI-guided BT

G.H. Westerveld1, R. Poetter1, P. Dankulchai2, W. Doerr2, M.C. Sora3, S. Poetter-Lang2, D. Berger2, C. Kirisits2
1Westerveld, Academic Medical Center, Amsterdam, The Netherlands
2Medical University of Vienna (MUW) General Hospital of Vienna, Radiotherapy, Vienna, Austria
3Faculty of Medicine Siriraj Hospital, Radiation Oncology, Bangkok, Thailand
4Medical University of Vienna (MUW), Anatomy and Cell Biology, Vienna, Austria
5Medical University of Vienna (MUW), Diagnostic Radiology, Vienna, Austria

Purpose/Objective: Traditionally, vaginal dose points have been defined at the vaginal source level, thus not providing dose information for the entire vagina. Since reliable vaginal doseevolume/surface histograms are hardly available, a strategy for comprehensive vaginal dose reporting for combined external beam radiotherapy (EBRT) and brachytherapy (BT) was established.

Materials and Methods: An anatomical vaginal reference point was defined at the level of the Posterior-Inferior Border of Symphysis (PIBS), plus two points at a distance of ±2cm (mid/intrarotus vagina) (Figure 1). For BT points were selected at 12/3/6/9 o’clock for the upper vagina, at the applicator ring surface and 5 mm depth (Figure 1). A vaginal reference length (VRL) was defined from ring centre to PIBS. Fifty-nine patients treated for cervical cancer were included into this retrospective feasibility study.

Results: The method was applicable for all patients. The mean total EQD2 doses at PIBS and ±2 cm were respectively 40.4 Gy (4.4-70.7), 51.4 Gy (36.6-91.7) and 5.7 Gy (1.7-49.1). At 5 mm depth from the ring, doses were respectively 115.4 Gy (53.2-210.7)/103.2 Gy (29.9-201.9) at 3/9 o’clock, and 70.1 Gy (24.1-147.5)/63.2 Gy (11.0-82.2) at 12/6 o’clock, respectively. Median VRL on MRI was 5.6 cm (2.0-9.4).

Conclusions: With this novel system, a comprehensive reporting of vaginal doses is feasible. The present study has demonstrated large dose variations between patients observed in all parts of the vagina.

PROFFERED PAPERS: GEC-ESTRO 7: PROSTATE AND MISCELLANEOUS

OC-0362
HDR brachytherapy boost with a single fraction: is it useful to preserve the breast in young women with early cancer?

J.L. Guinot1, M. Santos1, P. Soler1, E. Jimenez1, F. Lopez-Campos1, A. Munt3, A. Arregui1, A. Moreno1, L. Arribas1
1Instituto Valenciano Oncologia (IVO), Department of Radiation Oncology, Valencia, Spain
2Instituto Valenciano Oncologia (IVO), Department of Radiation Oncology, Alcoy, Spain

Results: The method was applicable for all patients. The mean total EQD2 doses at PIBS and ±2 cm were respectively 40.4 Gy (4.4-70.7), 51.4 Gy (36.6-91.7) and 5.7 Gy (1.7-49.1). At 5 mm depth from the ring, doses were respectively 115.4 Gy (53.2-210.7)/103.2 Gy (29.9-201.9) at 3/9 o’clock, and 70.1 Gy (24.1-147.5)/63.2 Gy (11.0-82.2) at 12/6 o’clock, respectively. Median VRL on MRI was 5.6 cm (2.0-9.4).

Conclusions: With this novel system, a comprehensive reporting of vaginal doses is feasible. The present study has demonstrated large dose variations between patients observed in all parts of the vagina.
Purpose/Objective: Young women have a high rate of local failure after breast-conserving surgery (BCS) and radiation therapy (RT). We want to evaluate the efficacy and tolerability of 192-Ir high dose rate brachytherapy (HDR) with a single fraction as a boost after whole breast irradiation in women aged 45 or less.

Materials and Methods: We studied 167 consecutive patients (26-45 years old) who underwent BCS and whole breast RT (46-50 Gy), for invasive breast cancer from 1999 to 2008. One-two weeks later, an implant, with parallel metallic needles was performed under local anaesthesia and sedation in an outpatient basis. A free margin of at least 5mm was required. All cases were stages T1-2, 28.7% were pN+. Chemotherapy was used in 85% (adjuvant 67% and neoadjuvant 19%) and hormonal therapy in 77%. A single dose of 7 Gy (HDR) with optimization in volume was prescribed to the 90% isodose. Implant volume was decided by clinical assessment. No simulation or CT scan was performed, and dosimetry was calculated theoretically. The whole boost treatment was delivered in 2-3 hours, so we call it ‘Fast-boost’.

Results: The median follow-up was 86 months. Nine patients relapsed in the tumour bed or in the margin of the implant with an actuarial local control at five and ten year of 95.7% (failure rate 4.3%). Another patient relapsed in a different quadrant, therefore actuarial breast control was 95.1%. Patients aged 40 or less had a breast failure rate of 5.6% at ten year (compared with 13.5% of the EORTC 22881-10882 trial). More local failures were seen in triple negative (13.6%), G3 cases (9.9%), and patients aged 35 or less (11.5%). One patient developed an angiosarcoma. Eleven women required a mastectomy, then the preservation of breast was achieved in 94% of all patients. Twenty three patients developed distant metastasis. Disease free survival at five years (DFS) was at 5 and 10 year was 87.9% and 85.8% with overall survival of 92.1% and 87.3%. Ten-year DFS decreased in triple negative (75%) and G3 cases (76.4%). Cosmetic results were good or excellent in most cases (97%) and the acute and late toxicity was minimal.

Conclusions: Fast-boost with a single fraction of HDR is a safe, quick, simple technique. Local control in women younger than 46 years old, when surgical margins are free, has been improved related to literature data, with few failures than expected at ten year. A better biological effect of HDR is suggested, and breast preservation in young women using this approach is recommended.

OC-0363
HDR brachytherapy of the base of tongue. Ten year results of a prospective study
Z. Takacs-Nagy1, F. Obersa1, P. Koltaï, T. Major2, C. Polgar3
1Bacs-Kiskun County Hospital, Oral Maxillofacial and Head and Neck Surgery, Kecskemet, Hungary
2National Institute of Oncology, Head and Neck and Maxillofacial Surgery, Budapest, Hungary
3National Institute of Oncology, Radiotherapy, Budapest, Hungary

Purpose/Objective: To date there are only few data in the literature about the feasibility and efficacy of interstitial high-dose-rate (HDR) brachytherapy (BT) of base of tongue cancer. Therefore the aim of this prospective study was to contribute to this issue.

Materials and Methods: Between January 1992 and June 2011 sixty-six patients (mean age 57 years, range 36-78 years) with T1-4 and N0-3 carcinoma of the base of tongue were presented. Fifty-six patients (93%) had advanced (stage III-IV) disease. Male/female ratio was 5/1. HDR BT boost (mean dose 17 Gy, range 12-30 Gy) was delivered after 50 to 70 Gy (mean 62 Gy) locoregional external beam irradiation (EBI). Before 1996 the irradiation was performed by a Gammamed-IIi, since then by a Nucletron-Microselectron HDR (Ir-192) after-loading machine. In 10 cases rigid needle, in 50 cases flexible tube technique was applied.

Results: The mean follow-up time for surviving patients was 121 (range 20-229) months. The 5-year actuarial rate of local-, locoregional control and overall survival was 75%, 50% and 47%, respectively. Delayed soft tissue ulceration and osteoradionecrosis occurred in 8 (13%) patients.

Conclusions: HDR BT boost results good local tumour control with low incidence of late side-effects in patients with advanced base of tongue carcinoma. Our results are similar to LDR data published in the literature.

OC-0364
Brachytherapy in the treatment of anal canal cancers: a large monocentric retrospective series.
L. Lestrade1, B. De Bari2, P. Pommier3, X. Montbarbon1, E. Lavergne3, C. Carrie1
1Centre Léon Bérard, Radiation Oncology Department, Lyon, France
2AO Spedali Civili di Brescia - University of Brescia, Radiation Oncology Department, Brescia, Italy
3National Institute of Oncology, Radiation Oncology Department, Budapest, Hungary

Purpose/Objective: To present one of the largest retrospective, long term analyses of anal canal cancer patients (pts.) treated with radiotherapy (RT) ± chemotherapy (CT), followed by a brachytherapy (BRT) boost.

Materials and Methods: The primary and secondary endpoints of this analysis, as well all the variables analysed to study their potential impact on these endpoints are resumed in Table 1.

Results: Treatment period: 05/1992–12/2009. We treated 209 pts. (median age: 65 years; range: 26 - 89) with RT (58/209) or RT+CT (151/209). 163 pts. were stage II or IIIA (UICC 2002) and 58/209 were N1-3 at diagnosis. All pts. underwent a boost by a Low Dose Rate (LDR, 151 pts) or a Pulse Dose Rate (PDR, 58 pts) BRT. Median follow-up time was 73 months.

Primary Endpoints: Local control (LC) and toxicity rates.
Median LC time was not reached, with 5- and 10- years LC rates of 78.6% and 73.9%, respectively. G3-G4 acute and late toxicity rates were 11.2% and 6.3%, respectively. Grade 3 CT related acute toxicities were recorded in 7/151 pts. (4.6%). Globally, treatment was temporarily (> 7 days) stopped in only 2 pts. and no patient definitively stopped the RT±CT treatment. 44/209 pts. (21%) underwent colostomy, 6/44 to treat a G4 ano-rectal toxicity. Sphincter function was evaluated with the Womack scale in the remaining 165 pts. and classified as score A (total continence) in 135 pts. (82%), score B (incontinence to liquid stools) in 25 pts. (15%) and score C (incontinence to liquid stools) in 5 pts. (3%).

Secondary endpoints: OS, CSS, DFS, CF, MFS, NRSF and MFS rates were 80.9%, 85.7%, 69.4%, 79.3%, 82.1% and 90.5%, respectively.
OS rates, CSS, DFS, CF, NRSF and MFS rates were 65.7%, 81%, 49.4%, 75.5%, 78.5% and 88.8%, respectively.

Univariate and multivariate analyses.
BRT dose statistically influenced the LC, with lower doses showing better outcomes (p = 0.003). We noted a statistical relation between the total BRT dose (>18Gy vs <18Gy) and the objective response at clinical evaluation before BRT, with higher doses delivered to pts. showing worse response (p = 0.001). LC statistically influenced all the considered secondary endpoints (p < 0.001).
At the multivariate analysis, concomitant CT statistically influenced OS (p = 0.008) and MFS (p = 0.036) and the LC influenced OS and CSS (p < 0.001). A total dose < 63Gy was the only variable significantly influencing the risk of G3-4 late toxicity (2.7% vs 10%, p<0.02). None of the other variables influenced the considered primary and secondary endpoints.

Conclusions: BRT has an acceptable toxicity profile and allows high local control rates in anal canal pts. The role of this technique should be prospectively evaluated in the era of high conformal techniques and tailored oncologic treatments.