pelvis from imaging. There were no significant differences in bladder dose. The magnitude of benefit of daily imaging for a patient could not be predicted by characteristics on planning CT scan.

Conclusions: Daily online CBCT verification imaging improves CTV coverage and reduces dose to rectum during IGRT for prostate cancer.

EP-1232
Will extreme hypofractionation always improve outcome in prostate radiotherapy?
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Purpose/Objective: This study aimed to investigate the impact of increasing radiation delivery time on the outcome of hypofractionated radiation therapy for prostate cancer. Intrafraction repair is seldom discussed in relation to external beam radiation therapy as most fractional doses are delivered in the course of a few minutes and the beam-on time is not very much different from the time to deliver all individual fields. Advanced techniques aimed at delivering high fractional dose, employing multiple fields, scanning the target volume or requiring multiple imaging sessions may however take considerably longer, increasing the importance of intrafraction repair.

Materials and Methods: Mono-exponential and bi-exponential repair models have been used in prostate patients to study the loss of biologically effective dose for several clinically-relevant irradiation times between 5 and 60 minutes. These were then converted into loss of biochemical control at 5 years using clinically-relevant dose response curves derived from 10688 prostate patients treated with conventional fractionation. The theoretical predictions were subsequently compared with clinical results from 14 newly reported studies totalling 4363 patients undergoing conventionally-fractionated and hypofractionated prostate radiotherapy.

Results: For low-risk patients the equivalent doses delivered were quite high and consequently the reported results were very good and in agreement with theoretical predictions. For intermediate- and high-risk patients however, the results from hypofractionated schedules delivered with time-consuming techniques appear to be compatible with predictions accounting for intrafraction repair taking place during longer irradiations, while results from moderately hypofractionated or conventionally-fractionated schedules are in agreement with short irradiation times. Treatment sessions lasting more than about 20 minutes could lead to significant loss of biochemical control even when relatively slow repair is relevant for prostate tumours. Large effect losses could therefore be expected from extremely hypofractionated schedules with long irradiation sessions as might be the case of scanned beams and/or with multiple intrafraction imaging sessions to check the positioning of the patient. The loss of effect might also be reflected into an apparent reduced sensitivity to fractionation for the tumours.

Conclusions: Intrafraction repair plays an important role for prostate radiation therapy and may lead to loss of biological effect in the case of extremely hypofractionated techniques requiring increased irradiation times. Neglecting intrafraction could also interfere with the derivation of the fractionation sensitivity for prostate tumours.

EP-1233
Model-based prediction of rectal toxicity reduction in prostate cancer IMRT with hydrogel rectum spacer
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Purpose/Objective: To test the hypothesis that implantation of a hydrogel rectum spacer in patients with prostate cancer undergoing intensity modulated radiation therapy (IMRT) reduces predicted probabilities for grade 2-3 (Gr2-3) acute and late rectal toxicities.

Materials and Methods: In 26 patients with localized prostate cancer (low-risk:8/26 (31%); intermediate-risk: 11/26 (42%); high-risk: 7/26 (27%)), a hydrogel spacer (SpaceOAR®, Augmenix) was injected under transrectal ultrasound guidance in Denovilliers’ space between the prostate and the rectal wall. IMRT treatment plans (78 Gy in 39 fractions) were designed based on CT scans acquired before (IMRT-pre) and after (IMRT-post) hydrogel injection. Published nomograms based on clinical risk factors (use of anticoagulants, hormonal therapy, and anti-hypertensives, presence of diabetes, haemorrhoids, pre-EBRT abdominal surgery) and dose-volume histogram (DVH) parameters (V40Gy, V75Gy) were used to estimate predicted probabilities for Gr2-3 acute gastro-intestinal (GI) toxicity1, Gr2-3 late rectal bleeding (LRB)2, and Gr2-3 fecal incontinence (FI)2 for IMRT-
Purpose/Objective: The aim of this study was to evaluate the feasibility and safety of reirradiation using image-guided hypofractionated radiotherapy and real time tracking (4D Calypso® System) in patients (pts) with recurrence of prostate cancer after external beam radiotherapy (EBRT).

Materials and Methods: Between May 2013 and August 2014, 6 pts with local recurrence after EBRT were treated using VMAT (Volumetric Modulated Arc Therapy) and 4D localize and real time tracking Calypso® System. Houston-Phoenix definition (PSA nadir + 2 ng/mL) was used to define biochemical failure and all pts were assessed with endorectal MRI and choline PET/CT. Patients classification according to D’Amico Risk Group Class was the following: 2 pts high, 4 intermediate and 1 low risk class. Mean time to recurrence was 56.4 months (range 19-96 months). All the pts had been treated with 3DCRT with a mean dose of 74.4 (72-76, median 74). Total reirradiation dose was 25 Gy (5 fractions of 500 cGy on alternate days). Simulation CT with specific preparation (empty rectum, filled bladder with catheter insertion) was performed after 5-7 days from Calypso® beacons implantation. Treatment planning was performed with Varian Eclipse v.8.6 in four pts and with v.10.6 in two; two pts were treated using X6 FFF (flattening filter free) photons. Mean CTV volume was 22.77cc (range 16.56-29.6 cc); PTV coverage was 25.06 Gy, (range 24.7-25.4 Gy); maximum PTV allowed dose was 104% (urethra maximum dose allowed was 102%). OAR dose constraints were obtained converting the RTOG conventional ones using alfa/beta ratio. Mean CI (conformity index) was 0.92 (range 0.89-1.05). Radiation Therapy Oncology Group/European Organization for Research and Treatment of Cancer criteria were used to assess toxicity of both treatments.

Results: After a median follow-up of 14 months (range 2-17.6 months), all pts were alive with no evidence of urinary or rectal toxicity. In four pts a biochemical response was observed; one pt, after an initial PSA reduction, showed a rising of the marker due to metastatic disease. One patient is not yet evaluable.

Conclusions: Salvage hypofractionated radiotherapy after conventional EBRT is feasible with acceptable risk of toxicity in pts with relapsed prostate cancer. Initial data suggest effectiveness of this approach but a longer follow up and a larger number of pts are needed to confirm it.

EP-1235
Development of a web site for application of predictive models for radioinduced GI toxicity


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Purpose/Objective: A number of studies have been published, which predict the probability of acute and late toxicity after radiotherapy (RT) for prostate cancer (Pca), but no user-friendly tool is available to help radiation oncologists applying the results coming from these studies. Aim of this work was therefore to design and build a web application which can support radiation oncologists in treatment planning and evaluation, by computing the probabilities of various acute and long term toxicities, as a function of dose distribution to organs at risk and patient’s characteristics.

Materials and Methods: 4 published studies devoted to prediction of acute and late GI toxicity after RT for Pca and presenting predictive models based on logistic regression were considered. Current web and database technologies were used to develop the web tool by means of open source software (HTML, PHP, Javascript, MySQL). 11 models (5 for acute and 6 for late toxicity) have been configured into the system and new models could possibly be added in the future. Model and variable names, with their regression coefficients and their standard errors when available, are stored in a database and used to compute in real-time the probabilities of the different endpoints. We chose to insert a free registration procedure before use of the web tool is allowed, in order to have a check on people accessing it. The web application can be used by any of the most common browsers (Chrome, Mozilla Firefox, Internet Explorer).

Results: The user can chose between models including the actual dose distribution in the patient, if a RT plan is already available, or models giving probabilities for different standard dose-volume levels. Probability uncertainties are