PO-0715
The BIOPROP trial: present and future
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Purpose/Objective: Following up on the work presented at ESTRO29 on radiobiological optimization of prostate cancer dose-painting radiotherapy, we now report preliminary results on the use of this planning approach on 17 prostate cancer patients with FMRI-, PET- and/or histopathologically confirmed dominant intraprostatic lesion(s). The treatment of this small cohort of patient is a prelude to the HEXPROP 3-arm trial:
- Arm 1: 60 Gy in 20 fractions to the prostate PTV
- Arm 2: 60 Gy in 20 fractions to the prostate PTV + concurrent boost to the DIL PTV up to 68 Gy
- Arm 3: 37.5 Gy in 15 fractions to the prostate PTV + 15-20 Gy HDR brachytherapy boost

A modelling study of Arm 3 is also presented here.

Materials and Methods: The patients were treated with either 60 Gy in 20 or 74 Gy in 37 fractions regimens to the prostate PTV. Rectal inverse optimization objectives were set so as to keep toxicity as estimated by the LKB model to the same level as for our ‘standard of care’ plans. ‘Standard of care’ dose-volume objectives were used for the other organs at risk. The DIL PTV boost level was determined by a TCP maximization technique. Intensity modulated rotational delivery was employed for all patients.

The modelling of the combined EBRT + HDR brachytherapy treatments assumes a uniform dose is delivered to the prostate PTV. No correction for subclinical lesion repair during delivery is necessary due to the short duration of the HDR phase. Converting the DVHs of both modalities to BED using the LQ model allows us to simply add the doses.

Results: Patients treated in 37 (12) and 20 (5) fractions received respectively an average boost of 83.1Gy (range 79-87.4Gy) and 69.2Gy (range 66.7-70.3Gy). The median follow-up for the treated patients is 13 months (range 7-26 months). Treatment plans could be designed and the treatment completed for all patients. Observed early complications were grade II or less GU events for 4 patients and one case of grade II GI event. Regarding relatively early ‘late’ toxicity, one grade II GI and one grade I GI toxicity events have been reported so far.

The modelling suggests that arm 3 should yield the best therapeutic ratio with low toxicity and control rates similar to arm 2.

Conclusions: The BIOPROP trial has allowed us to gain experience and confidence in the dose-painting approach. Toxicity was not significantly different from our ‘standard of care’ treatments, consistent with our initial modelling studies. HEXPROP should offer patients even better outcomes.

PO-0716
Randomised study of setup errors in prostate EBRT; Varian onboard imaging
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Purpose/Objective: Compare intra-patient setup errors using 2 different stereoscopic KV imaging systems, namely Varian OBI marker match and ExacTrac for patients with fiducial markers(FMs) for prostate radiotherapy.

Material/methods: 23 patients undergoing prostate +/- seminal vesicles radiotherapy with ≥3 FMs were randomised to start treatment on one of 2 linac systems, and then to alternate weekly between them. Patients underwent daily imaging at setup, post correction and post-treatment with Varian’s marker match (v1.4 & 1.5) (linac A) on ExacTrac (v2.52) (linac B). Matching and setup correction is in 4 dof (degrees of freedom) for linac A and 6 dof for linac B, i.e. a sitting couch top correction with linac B. Post correction, patients proceeded to treatment if they were within a tolerance of 3mm in each direction, if not further imaging and correction was applied. Patient population setup accuracy after initial setup to tattoos and post correction is compared for the different imaging systems.

Post-treatment results, and differences in matching in 4/6dof will not be considered here.

Data is available from 19 patients to date. Pre-and post-correction data is available from 322 fractions on linac A(7-21 fractions/patient) and 332 fractions on linac B (8-21 fractions/patient). Per patient and population setup errors are calculated for comparison between imaging modalities, and imaging isocentre accuracy compared.

Results: Table 1 shows per-patient and population systematic errors for ExacTrac and OBI, for both pre- and post-correction match results.

Analysis of quality assurance results show the coincidence with mechanical linac isocentre for ExacTrac to have a magnitude of 0.5mm (SD 0.2mm), when broken down into each translational direction this corresponds to an average of 0.2mm (SD 0.2mm). For OBI marker match, results are 0.9mm (SD 0.4mm) and 0.4mm (SD 0.2mm) respectively.

The results of all 23 patients will be analysed for differences in individual patient post-correction systematic errors between the 2 systems using a paired t-test. Similar methods will be used for random error analysis.

Conclusion: Both imaging systems give similar population systematic errors at initial setup. ExacTrac has a more accurate isocentre per se, but the effect of correcting in 6dof compared to 4dof with OBI may induce a patient reaction that could affect the post-correction setup accuracy.

PO-0717
Five year results of high dose moderately hypofractionated tomotherapy for prostate cancer
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Purpose/Objective: To report late toxicity and 5 year biochemical relapse-free survival(brFS) of the first 99 prostate cancer(PCA) patients treated within a Phase I-II study with moderately hypofractionated (45.6Gy/25fr) image-guided helical tomotherapy(HTT).

Materials and Methods: From 01/2006- 07/2009 99 PCA pts with median age of 73 yrs (56-89 yrs) underwent moderately hypofractionated HTT. According to NCCN staging, 45 were low risk(LR), 45 intermediate risk(IR), and 9 high risk(HR) pts. Low risk pts were treated with 71.4 Gy/28 fr on the prostate gland+ seminal vesicles, while intermediate and high risk pts were treated with 51.8 Gy/ 28 fr on the pelvic lymph nodes and SIB to 74.2 Gy on the prostate gland. The median follow up was 5.2 yrs for the LR group, 4.9 yrs for the IR group and 5.6 yrs for the HR group. Neoadjuvant and/or adjuvant deprivation therapy(ADT) was prescribed in 69 pts(25 LR, 37 IR, 7 HR pts). Late toxicities were evaluated based on RTOG/EORTC scale. Biochemical relapses were defined according to the ASTRO definition.

Results: Three pts in the LR group died for other causes, 42 (100%) evaluable pts were in CR at the last follow up. Two pts in the IR group died, one with PD, the other one for other causes, and three pts were lost to follow up. Thirty-nine of 40 evaluable IR group pts (97.5%) were in CR at the last follow up, and 1 patient in biochemical relapse. One patient from the HR group died for a Hepatocellular carcinoma, 6/75 (8%) were in CR and 2/8 (25%) in PD. In five yrs of f-up, 2 LR pts developed G3 GU late toxicity, both resolved with catheterization/dilatation, and now G0, and 3 pts G3 late GI toxicity, 2 resolved with argon laser therapy(2 pt now G0), one improved without therapy. Two of 40 pts in the IR group presented G3 GU toxicity, both improved, and 2/40 pts G3 GI toxicity, both resolved with argon laser therapy. No G3 toxicity was registered in the HR