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Purpose/Objective: To evaluate the therapeutic outcomes of short course neoadjuvant and concurrent androgen-deprivation therapy (ADT) and intensity-modulated radiation therapy (IMRT) with fiducial gold markers for intermediate and high-risk prostate cancer.

Materials and Methods: This is a retrospective study of 325 patients with intermediate or high-risk prostate cancer according to the National Comprehensive Cancer Network guidelines who underwent ADT (neoadjuvant: 4-8 months, concurrent: 2 months) and IMRT (76 Gy) with gold marker implantation between 2001 and 2010.

Results: Five-year distant metastasis-free survival was significantly lower for super high-risk patients compared with intermediate and high-risk patients (82.6% vs. 99.4% and 96.5%, respectively; p < 0.01). The 5-year biochemical relapse-free survival rates significantly declined with increasing prostate cancer risk (p < 0.01) and were 95.9%, 87.2%, and 73.1% for the intermediate-risk, high-risk, and super high-risk patients, respectively. With multivariate analysis identified high pretreatment PSA level (≥ 20 ng/ml) and Gleason sum ≥ 8 as significant risk factors for recurrence and the duration of ADT was not statistically significant difference in BRFs in each risk group. Acute genitourinary and gastrointestinal toxicity grade ≥ 3 were not observed in any of the patients. Late grade 3 genitourinary toxicity occurred in 0.3% of patients.

Conclusions: Short course ADT with 76-Gy IMRT using fiducial gold markers resulted in good therapeutic outcomes with few serious complications in patients with intermediate and high-risk prostate cancer except super high risk group. More intensive therapy might be necessary for super high risk group.

EP-1226
Radiotherapy plus hyperthermia for high-risk prostate cancer: thermal parameters correlate with biochemical DFS
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Purpose/Objective: Previous clinical phase I/II trials have confirmed that radiotherapy (RT) in combination with regional hyperthermia (HT) is promising and feasible without severe toxicity in patients with prostate cancer. We hypothesized the positive relationships between the clinical outcomes and thermal parameters. The purpose of our study was to assess the efficacy of RT combined with regional HT and the potential contribution of regional HT with higher thermal parameters to the clinical outcomes in patients with high-risk prostate cancer.

Materials and Methods: According to our institution’s treatment protocol, HT was combined with RT to improve the clinical outcomes in selected patients with high-risk prostate cancer. Eighty-two patients treated with RT plus HT and 64 patients treated with RT alone were retrospectively analyzed. The primary reasons for non-indication of HT were as follows: obesity: n=20, an advanced age: n=12, patient refusal: n=8, cardiac disease: n=6, and others: n=18. All patients initially underwent neoadjuvant androgen deprivation therapy (ADT) (median, 9 months); adjuvant ADT was continued in 20 patients after the completion of RT (median, 5 months). Univariate and multivariate analyses were performed using several factors including thermal parameters to identify prognostic factors for the biochemical disease-free survival (bDFS).

Results: The median follow-up duration was 61 months. The 5-year bDFS rate in 82 patients treated with RT plus HT was 78%, while that in 64 patients treated with RT alone was 72%; the difference was not significant. Among 75 patients treated with RT plus HT with intra-rectal temperature measurements, higher thermal parameters were significant prognostic factors for the bDFS in the univariate analyses. A higher thermal parameter of CEM43*T90 (≥ 1 minute) and a T stage of T1-2 were significant prognostic factors according to the multivariate analysis. The five-year bDFS rates for the 40 patients with a higher CEM43*T90 and 64 patients treated with RT alone were significantly different, whereas those for the 35 patients with a lower CEM43*T90 and 64 patients treated with RT alone were not. A significant negative correlations was observed between the CEM43*T90 and the thickness of the maximum ventral subcutaneous fat in the pelvic region.

Conclusions: The addition of HT with higher thermal parameters to RT may improve the bDFS in patients with high-risk prostate cancer. The findings also indicate the importance of the careful selection of treatable patients with higher thermal parameters.

EP-1227
Hypo-fractionated biological optimized dose-painting radiotherapy for high-risk prostate cancer
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Purpose/Objective: We report the toxicity and clinical outcome for prostate dose-painting radiotherapy with moderate hypo-fractionation (dose to prostate 60-66 Gy in 20 fractions, integrated boost dose 66-68 Gy in 20 fractions);
dose volume constraints, TCP and NTCP parameters were used for optimization of rotational IMRT treatment plans.

Materials and Methods: We selected 28 patients with high-risk localised prostate cancer and 2 out of 3 risk factors (PSA ≥ 20ng/ml, dominant Gleason 4 or 5, T3a or T4 stage on MRI), or one risk factor and a bulky DIL (> 5mm diameter) on the staging MRI scan. Functional MRIs were used to define boost volumes with a margin of 5 mm to define the boost PTV. Neo-adjuvant hormone therapy was given for 3 months before radiotherapy with fiducial markers, bowel and bladder preparation and daily IGRT.

Results: Mean age was 66 years, mean PSA was 17.4 ng/ml (range 4.6-59.1), 20 patients had T3a and 10 had Gleason score ≥ 8. The mean dose to the prostate excluding the boost volume was 61.4 Gy (range 56.6-62.3) and the boost PTV 66.1 Gy (range 60.9-72.5). Mean NTCP for rectal bleeding was 4.7% (range 3.4-5.8), for faecal incontinence 3.5% (range 2.3-5) and mean TCP 75% (range 71-79) assuming a 71% biochemical control at 5 years for a standard plan. All patients completed radiotherapy, 16/28 patients had acute bladder toxicity grade 2 (RTOG score), but no grade 3 toxicity was observed. Worst acute bowel toxicity was grade 1 (4/28). Mean follow up was 15 months (range 8-25). For the 20 patients who had neo-adjuvant hormone therapy beyond 6 months, the mean PSA was 0.33 ng/ml (range 0.2-0.8), 2 patients had relapsed at 12 month with PSA only (PSA= 3.46) and bone metastasis (PSA=9.16 ng/ml), 6 patients are still on hormone therapy at 2-3 years. Four patients had Grade 2 urinary late toxicities (CTCv4, 1 bladder neck necrosis, 1 urethral stricture post TURP, 2 urinary frequency). Two patients developed grade 1 diarrhoea. Patient reported outcomes >6 month after completion of radiotherapy (EPIC QOL questionnaire) demonstrated similar scores to controls without prostate cancer for the bowel domains; reduction in the urinary domains was similar but no worse than other cohorts treated with external beam radiotherapy and hormone therapy.

Conclusions: In this high risk group, dose escalation with hypo-fractionated dose painting radiotherapy achieved good biochemical control and urinary and bowel toxicity similar to standard dose radiotherapy during follow up.

EP-1228
Separated arc vs. single arc VMAT therapy for the prostate in the prone position
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Purpose/Objective: Separated arc VMAT (Sep) may have advantage over single continuous arc VMAT (Sng), because we can select gantry angle ranges with collimation angles properly according to the anatomical situations. In this study we compared dosimetric, volumetric and dose delivering parameters between Sep and Sng in the prone position, and we revealed linear relationships between these parameters and rectal override volume (ROV) on the PTV. As a result, Sep need lesser time and MU than Sng in the wide range clinical situations to achieve equal dosimetric and volumetric upshot.