risk p = 0.09). The patients with low or intermediate risks had a 95% DFS and patients with high risk had a 89% DFS.
Conclusion: Three-dimensional computed tomography-guided brachytherapy of prostate cancer is a feasible method of treatment which provides the possibility of treating efficiently even difficult cases of prostate cancer.

823 POSTER

The use of intra-prostatic gold markers for verification of position of the prostate gland in dose escalated external beam radiotherapy (EBRT) in prostate cancer (PC)

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Purpose: To examine and correct for day to day movement of the prostate gland, to secure safe margins in dose escalated EBRT and to record treatment results.
Methods and Materials: During 2004, 52 patients (pts) with PC had 4 gold markers implanted transperineally in local anaesthesia under transrectal UL-guidance. Two markers were placed ventrally and two dorsally in the right re-spectively left side of the prostate. After CT-scan for dose planning, DRR-images were used at the simulator to localise the prostate. EPID and simulation images were matched at the first 3 fractions, thereafter twice a week. If alignment differed >1 mm in the vertical (ver) or 2 mm in longitudinal (long) or lateral (lat) directions, pts were moved to a new position according to the match result. All pts have completed EBRT to a mean dose of 78.7 Gy (74–80 Gy). Mean age was 67 years (50–71). T1c-, T2-, and T3-tumors were seen in 27%, 38% and 35% respec-tively, and Gleason score 5/6/7/8 in 9.5%/60%/21%/9.5% of tumors. Mean PSA was 16 (2–89). Androgen deprivation before EBRT was given to 69% of pts in mean 5 months (mo). PSA-response, time of appearance of complications and required treatment were recorded at follow up. Three and six or more mo of follow up after EBRT were reached in 29 and 11 pts respectively.
Results: Minimum 1900 images were analyzed. The frequencies of pts-movements 5 mm or more were 22%, 19% and 12% in the vertical, longitudinal and latitudinal directions (SD 3.8 mm, 3.4 mm and 3.0 mm respectively).
PSA-relapse and distant metastases were seen in one pt. Urologic grade (gr) 1 symptoms were seen in 35% and gr 2 in 19% of pts before EBRT. Similar figures after 3 months were 21% and 72%. Early rectal complications gr 1 and 2 were seen in 31% and 52% of pts, and late gr 1 urologic- and rectal complications in 4/11. No. pts developed gr 3 morbidity. Erectile dysfunction (ED) before and after EBRT occurred in 13% and 36% of pts. All except one of pts with ED at 3 months had androgen deprivation before EBRT.
Conclusion: Intra-prostatic gold markers is an accurate method to assess intra-individually differences in prostate movements during EBRT in PC. EBRT was well tolerated. If the observed low grade morbidity is persisting, the total dose of EBRT may be further escalated.

824 POSTER

Hypofractionation using a concomitant intensity modulated radiotherapy (IMRT) boost for localized high risk prostate cancer: acute toxicity results

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The potential benefits of radiation dose escalation in high risk prostate cancer patients who receive elective nodal irradiation and adjuvant hormone ablation therapy are unknown. Hypofractionation as a means of dose intensification may offer even greater radiobiologic and practical benefits than simple dose escalation. The objectives of this prospective phase 1/2 study were to assess the toxicities and efficacy of delivering a concomitant hypofractionated IMRT boost.
Patients with localized high risk prostate cancer (any one of T3a, Gleason Score $\geqslant 8$, PSA >20) were eligible. Elective nodal irradiation to a dose of 45 Gy in 25 fractions was delivered using a conventional 4-field technique. At the same time, a concomitant IMRT boost of 22.5 Gy in 25 fractions was delivered to the prostate, resulting in a total dose of 67.5 Gy in 25 fractions to the prostate gland. This is equivalent to a dose of 77 Gy to 81 Gy in 2 Gy per fraction, assuming an alpha/beta value between 1.5 and 3 for prostate cancer. Daily on-line correction of prostate position using implanted fiducial markers was performed. A 4 mm planning target volume margin was used during the IMRT boost to take into account intrafraction prostate motion (based on previous intrafraction prostate motion measurements). Following radiotherapy, 3 years of adjuvant hormone ablation will be given. Acute toxicity during and within 3 months after radiotherapy was measured using the Common Terminology Criteria for Adverse Events version 3.0.
At the time of abstract preparation, 35 patients have completed the radiotherapy portion of the treatment with complete acute toxicity assessments. Median age of the patients was 71. Median PSA prior to treatment was 20. None of the patients developed any acute grade 3 gastrointestinal toxicity. 1 patient (3%) developed grade 3 urinary incontinence, 2 patients (6%) developed grade 3 urinary frequency/urgency, and 1 patient (3%) developed grade 3 urinary retention. Acute toxicities from this ongoing concomitant hypofractionated IMRT boost trial appear to be acceptable.

825 POSTER

Intensity modulated radiotherapy for high risk prostate cancer based on sentinel node optimized target volume definition

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Introduction and Objectives: Whereas cure rates for patients (pts.) with low/intermediate risk prostate cancer (PC) are good, the situation is much more problematic in high risk PC. In parallel with risk of distant seeding, the probability of locoregional lymph node metastasis increases. The RTOG 94–13 trial provided evidence that pts. with high risk of pelvic node involvement (estimated risk >15%) benefit from an additional radiotherapy to the pelvic nodes combined with concomitant hormonal ablation. Since the physiological lymphatic drainage is highly variable, the optimal target volume definition for the adjuvant nodes is problematic. To overcome this limitation, we tried to optimize our target volume definition by including information derived from pelvic sentinel nodes (SN) identification.
Material and methods: Pts. with histologically proven high risk PC, but cN0 stage, were included. To permit a three-dimensional (3D) localisation of SN transmission- and emission data were acquired using a double-headed gamma camera with an integrated X-Ray device (Millennium VG & Hawkeye®, GE) 1.5–3 hours after injection of 250 MBq ^{99m}Tc-Nanocoll. Numbers and 3D-localisations of SN were analysed. IMRT planning was done with Hyperion® based on 3 CT's, definition of clinical/planning target volumes (CTV/PTV) and risk organs (rectum, colon, small bowel, bladder, hips) with image fusion of 3 data sets. All SN localisations were included into the pelvic CTV additionally. Dose prescriptions were 50.4 Gy (1,8 Gy daily) to the pelvis and 70.0 Gy (2 Gy daily) to the prostate/seminal vesicles.
Results: Since 08/2003 6 pts. with cT1c-3b stage were treated. No. pts. had undergone a staging lymphadenectomy. All pts. had detectable SN, the numbers of SN per patient ranged from 2 to 9. A total of 29 SN could be identified for all 6 pts. together. Most common localisations were ext. iliac (9), followed by int. iliac (6), perirectal lymph. plexus (6), comm. iliac (2), sacral (2), int. pudendal (1), seminal vesicle lymph. plexus (1), superior rectal (1) and left paraaortic (1). IMRT planning could be completed in all pts. with acceptable doses to risk organs and prescribed doses to the target volumes. 4 of 6 pts. showed SN localisations (total 10 SN) that would not have been treated adequately with only CT-based planning ('geographical miss'). The comparison between dose-volume-histograms of IMRT- and conventional CT-planning in regard to the risk organs demonstrated clear superiority of IMRT when all SN were included. No gastrointestinal or genitourinary acute toxicity Grade 3 or 4 (RTOG) occurred.
Conclusions: IMRT based on sentinel lymph node identification is feasible and reduces the probability of a geographical miss. Furthermore IMRT allows a pronounced sparing of normal tissue irradiation. Thus the chosen approach will help to increase the curative potential of radiotherapy in high risk prostate cancer patients.

826 POSTER

Impact of internal fiducial markers with daily on-line realignment on TCP and rectal toxicity for dose-escalated prostate radiotherapy: Monte Carlo simulation with Dose-Population Histogram analysis

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Background: By using internal fiducial markers with Electronic Portal Imaging (EPI) for patient repositioning prior to the delivery of each fraction, the geometrical errors in prostate radiotherapy can be reduced allowing for a tighter planning target volume (PTV) and dose escalation. We simulated effects of full (no repositioning) and reduced (repositioning) uncertainties,