Materials and Methods: 345 patients with high-risk prostate cancer (T3 or Gleason score [GS] 8−10 or PSA > 20 ng/dl) were treated with curative radiation therapy + neoadjuvant and concomitant hormonal therapy; 303 also received adjuvant androgen suppression. According to timing of hormonal therapy the patients were stratified into two group: group 1 of 285 patients received <36 months of adjuvant hormonal therapy and group 2 of 60 patients received >36 months of adjuvant hormonal therapy. Hormonal therapy was based both on LH-RH agonist (+/− antiandrogens) or high dose antiandrogen alone (bicalutamide, 150 mg/day). Total dose to the prostate ranged from 70 Gy to 74 Gy (1.8 Gy/fraction). bDFS was calculated from the time of diagnosis with Kaplan-Meier method.
Results: Median follow-up was 44 months (12–161 months). Median age of patients was 71 years (range 41−83 years). Clinical and pathological characteristics of study population were: T2 10 (2.8%), T3 330 (95.7%), T4 5 (1.5%); PSA < 10 ng/ml 152 (44.7%), PSA 10−20 ng/ml 99 (29.1%), PSA >20 ng/ml 89 (26.2%); GS 2−6 152 (44.3%), GS 7 126 (36.7%), GS 8−10 65 (19.0%). The bDFS at 5 years was 78% and 91% in patients of groups 1 and 2, respectively (p = 0.028). Considering only the patients who finished adjuvant hormonal therapy the bDFS at 5 years was statistically significant too (p = 0.032).
Conclusions: Prolonged >36 months adjuvant hormonal therapy improves biochemical desease free survival in patients with high-risk prostate carcinoma.

4040 POSTER

Salvage 3-D conformal radiation therapy for patients developing biochemical failure post prostatectomy: a single institution experience

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Background: Two recent randomized trials have shown a benefit to the use of adjuvant external beam radiation therapy (RT) post radical prostatectomy (RP) in patients presenting with high-risk features. However, residual postoperative GU toxicity, as well as fear of RT complications lead to delays in referral to radiation therapy. We retrospectively reviewed the outcome of patients presenting with biochemical relapse post RP treated with RT as salvage therapy.
Methods: Between September 1998 and July 2004, 102 patients (median age: 65 years) received salvage RT post RP biochemical failure. All patients underwent pre-RT staging using bone scan and CT scan of the abdomen and pelvis. RT typically delivered a dose of 66 Gy in 33# using 18 MV photons. A total of 25 patients received hormones given in a neoadjuvant and concomitant setting. Acute and late toxicities were graded using the CTC v3 criteria. We prospectively assessed their quality of life using the IPSS (international prostate symptom score) and SHIM (sexual health inventory for men).
Results: The median time for RT referral post RP is 24months. The median follow up time is 37 months (6–122). 44% of our patients presented with pT3 disease, 53% with positive margins and 28% with >7 Gleason score. Among them, 37% never achieved an undetectable post RP PSA level. The median pre-RT PSA is 1.00 ng/ml (range:0. 01−10.4).
Biochemical failure was defined according to SWOG criteria as any PSA > 0.5 ng/ml at least 6 months after RT. 79 patients (77%) were followed for at least one year.
28 patients (27%) developed biochemical relapse after salvage radiation, at a median time of 21 months. Of these, 22% of patients who had a pre-RT PSA < 1 ng/ml had biochemical relapse as compared to 38% with pre-RT PSA > 1 ng/ml.
Prior to RT, 41% of the patients had some degree of stress incontinence. None of our patients developed RT-induced stress incontinence. Acute and late GI/GU toxicities were minimal, 1 patient developed grade 3 urethral stenosis, one had G3 late GI and GU Toxicity.
Conclusion: Our results are comparable to others published in the literature. Post op RT was well tolerated with minimal GI and GU toxicities. As previously reported, a pre-RT PSA > 1 ng/ml was associated with higher biochemical relapse.

4041 POSTER

^{18}F-choline and/or ^{11}C-acetate positron emission tomography: detection of residual or progressive subclinical disease at very low PSA values (<1 ng/ml) after radical prostatectomy

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Background: To assess the value of PET/CT with either ^{18}F-choline and/or ^{11}C-acetate of residual or recurrent tumor after radical prostatectomy (RP) at a PSA < 1 ng/ml and referred for adjuvant or salvage radiotherapy.
Materials and Methods: 22 PET/CT studies were performed, 11 with ^{18}F-choline (group A) and 11 with ^{11}C-acetate (group B), in 20 consecutive patients (2 patients undergoing PET/CT scans with both tracers). Median PSA before PET/CT was 0.33 ng/ml (range 0.08−0.76). Endorectal MRI was performed in 18 patients. Nineteen patients were eligible for evaluation of biochemical response after salvage RT.
Results: Abnormal local tracer uptake was observed in 5/11 and 6/11 patients in group A and group B, respectively. Except for a single positive obturator lymph node, no other site of metastasis was observed. In the 2 patients evaluated with both tracers no pathologic uptake was observed. Endorectal MRI was locally positive in 15/18 patients. 12/19 patients responded with marked PSA decrease (>50% of baseline) 6 months after salvage RT.
Conclusions: Although ^{18}F-choline and ^{11}C-acetate PET/CT studies succeeded to detect local residual or recurrent disease in about half of the patients with PSA-values <1 ng/ml after RP, these studies can not yet be recommended as a standard diagnostic tool for early relapse or suspicion of subclinical minimally persistent disease after surgery. An endorectal MRI may be more helpful especially in patients with a low likelihood for distant metastases. Nevertheless, further research with ^{18}F-choline and/or ^{11}C-acetate PET with optimal spatial resolution may be needed for patients with a high risk of distant relapse after RP even at low-PSA values.

4042 POSTER

Rectal volume changes during treatment: the case for ansisotropic safety margins around the clinical tumor volume in radiotherapy for prostate cancer

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Background: To evaluate the influence of rectal volume changes (on sequential weekly CTs) on the antero-posterior (A-P) axis motion of the clinical target volume (CTV=prostate+seminal vesicles) at its apex, mid-point, and top in order to estimate for potentially anisotropic planning target volume (PTV) margins in patients undergoing 3-D conformal radiotherapy for prostate cancer.
Material and Methods: Eighty-nine patients were selected for this study. A planning CT was performed at simulation in a supine position with an empty bladder in 77 patients while 12 patients underwent, in addition, a rectal enema before simulation and before every treatment session. Weekly control CTs were implemented to all patients while on treatment (i.e., 4−7 weekly CTs per patient). The CTV and the rectum were contoured in every CT by two experienced authors (one in Geneva and one in Barcelona). Bone registrations between the simulation CT and weekly control CTs for every patient in the study was performed in order to assess for CTV A-P displacements (at the apex, mid-point, and the top) and rectal volume changes. Ideal A-P margins for the PTV were estimated at the three CTV levels.
Results: The estimated PTV A-P margins (a the CTV apex, mid-point, and top) for the 77 patients not undergoing the rectal purge, were 10, 10 and 12 mm; 12, 11, and 14 mm; and 12, 13 and 22 mm for patients with small (<60 cc), medium (60–110 cc), or large (>110 cc) rectal volumes on simulation CTs, respectively. For the 12 purged patients the estimated PTV margins were 9, 10, and 7 mm (mean rectal volume at simulation, 55 cc). A broad rectal volume distribution was observed for unpurged patients, though, a significant trend for a volume decrease was observed after the 3rd week of treatment for these patients (p = 0.017).
Conclusions: In patients with small rectal volumes at simulation, as well as in those undergoing rectal enemas as part of their preparation to simulation and treatment, PTV margins were stable and relatively small (1 cm). Contrarywise, in patients with large rectum volumes at simulation,

PTV margins were large and anisotropic (from 1 cm at the apex to >2 cm at the top). This, likely translates, a mix of translational and around the apex rotational motion of the target.

4043 POSTER

Effect of edema on postimplant dosimetry in prostate brachytherapy using CT/MRI fusion

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Purpose: To investigate the time course of prostatic edema and the impact on the dose volume histograms of the prostate for patients treated with brachytherapy.
Methods and Materials: Seventy-four patients with prostate cancer were enrolled in this prospective study. TRUS-based preplan was performed 4 weeks before the implant and CT/MRI fusion-based postimplant dosimetry was performed on the day after implantation (day 1) and 30 days after implantation (day 30). Forty-eight patients underwent neoadjuvant hormonal therapy. All patients were treated with loose 125I radioactive seeds using a Mick applicator. The updated American Association of Physicists in Medicine (AAPM) Task Group 43 (TG-43) formula was used in the planning and calculation of the final dosimetry. The prostate volume, prostate V100 and D90 were evaluated with prostate edema over time. Group comparisons for the volumes and dosimetric parameters were performed using the t test. All tests were two-sided, and a p value of $\leqslant 0.05$ was considered to be statistically significant.
Results: Prostate edema was the greatest on day 1, with the mean prostate volume 36% greater than preplan TRUS-based volume and it thereafter decreased over time. It was 9% greater than preplan volume on day 30. The V100 increased 5.7% from day 1 to day 30, and the D90 was increased 13.1% from day 1 to day 30. The edema ratio (Postplan/Preplan) on day 1 of low-quality implants V100 of <80% was significantly greater than that of intermediate to high-quality implants (80% < V100) ($p = 0.0272$). The lower V100 on day 1 showed a greater increase from day 1 to day 30. V100 on day 1 of >92% is unlikely to increase >0% during the time interval studied.
Conclusion: Low-quality implants on day 1 were highly associated with edema, however, such a low-quality implant on day 1 with significant edema tended to improve by day 30. If a high-quality implant (V100 > 92%) can be obtained on day 1, then a reexamination is no longer necessary.

4044 POSTER

Failure to achieve PSA level less than or equal to 1 ng/ml following neo-adjuvant LHRHa therapy predicts for a lower rate of biochemical control and lower overall survival in localised prostate cancer treated with radiation therapy

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Background: The benefit of using neo-adjuvant, concurrent and adjuvant Luteinizing Hormone Releasing Hormone agonists (LHRHa) along with external beam radiotherapy (EBRT) for locally advanced prostate cancer has been confirmed in several studies. We observed that not all patients acheived complete suppression of PSA prior to commencement of radiotherapy, despite receiving neo-adjuvant hormonal deprivation (NAHD) therapy with an LHRHa. We investigated if the failure to suppress PSA to less than or equal to 1 ng/ml after at least 2months of NAHD in patients due to receive EBRT was associated with reduced biochemical failure free survival.
Materials: A retrospective case note review of consecutive patients with intermeadiate or high risk prostate cancer treated between January 2001 and December 2002 with NAHD and EBRT was performed. Patients' data were divided for analysis based on whether or not the PSA in week 1 of EBRT was less than or equal to 1 ng/ml. Biochemical failure was determined using the ASTRO (Pheonix) definition.
Results: One hundred and nineteen patients were identified, 67 with post NAHD PSA levels of less than or equal to 1 ng/ml and 52 with post NAHD PSA levels of >1 ng/ml. At a median follow-up of 49 (4.2−67.8) months, the 4year actuarial biochemical failure free survival was 84% vs 60% ($p = 0.0016$) in favour of the patients with a post NAHD PSA of less than 1 ng/ml, and overall survival was 94% vs. 77.5% ($p = 0.0045$). Disease specific survival at 4 years was 98.5% vs. 82.5%. Post NAHD PSA remained an independent statistically significant predictor of biochemical failure when examined using multivariate regression analysis.
Conclusions: Patients who have a PSA > 1 ng/ml at the beginning of external beam radiotherapy following at least 2months of neo-adjuvant LHRHa therapy, have a significantly higher rate of biochemical failure, and a lower survival rate compared to those who have PSA less than or equal to 1 ng/ml. Patients who fail to acheive adequate suppression should be considered as a higher risk group and considered for either dose escalation or the use of novel therapies.

4045 POSTER

Gastrointestinal toxicity after ^{125}I permanent implantation for prostate cancer: relationship between patient-assessed quality of life score and physician-assessed toxicity score

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Purpose: The present study investigated correlations between physician-assessed toxicity and patient-assessed quality of life (QOL) for the gastrointestinal tract following permanent interstitial brachytherapy.
Materials and Methods: Gastrointestinal toxicity in 130 patients with low-risk prostate cancer was assessed by 1 urologist and/or 1 radiation oncologist at 1, 3, 6, 9, 12, 18, and 24 months after implantation using Radiation Therapy Oncology Group (RTOG) scale and National Cancer Institute Common Toxicity Criteria (NCI-CTC). Every patient received a QOL questionnaire before implantation and at the same times as physician assessment, excluding 9 months. The questionnaire included the UCLA-Prostatic cancer index, and the columns for "bowel function" and "bowel bother" were used in this study. Analysis focused on comparing QOL scores after implantation with respective baseline scores. Relationships between patient-assessed QOL score and physician-assessed toxicity score were assessed.
Results: Median follow-up period was 18 months. Most patients displayed no gastrointestinal toxicity after implantation according to physician assessment. Only 2.3% of patients displayed Grade 2 toxicity during follow up period. No gastrointestinal toxicity of Grade 3 or more was identified. A total of 282 returned QOL questionnaires were accepted from patients after implantation. On average, QOL scores remained at the same level as baseline after implantation. Physician-assessed RTOG grades correlated significantly with "bowel bother" scores, but not with "bowel function" scores. However, RTOG Grade 0 patients displayed broad variations in QOL score changes, and 7.8−30.4% of patients with Grade 0 toxicity displayed greater decreases in QOL scores than median changes for Grade 1 or 2 patients.
Conclusion: Few patients experience gastrointestinal toxicity after permanent interstitial brachytherapy for prostate cancer. However, our results indicate discrepancies between patients-assessed QOL score and physician-assessed toxicity scores, particularly in patients with mild toxicity. Reassessment of interstitial brachytherapy from the perspective of QOL appears warranted.

4046 POSTER

Health-related quality of life in patients with localized prostate cancer receiving high-dose-rate brachytherapy: a time-course analysis

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Background: High-dose-rate brachytherapy (HDR-BT) has gradually become one of the major treatment modalities for localized prostate cancer with excellent outcomes, but study of health-related quality of life (HRQoL) associated with HDR-BT is falling behined other major modalities, therefore a prompt analysis is required. The purpose of this study is to make a time-course analysis of HRQoL in patients with localized prostate cancer received HDR-BT.
Materials and Methods: Examination of HRQoL has been performed at Kawasaki Medical School Hospital since May 1, 2004. The 36-items Short-Form Health Survey version 2.0 (SF-36v2) and the University of California Los Angeles Prostate Cancer Index (UCLA-PCI) were adopted. SF-36 is consisted of 8 aspects with 36 questions about general condition. The 8 aspects are Physical functioning (PF), Role physical (RP), Bodily pain (BP), General health perceptions (GH), Vitality (VT), Social functioning (SF), Role emotional (RE), and Mental health (MH). Meanwhile, UCLA-PCI is consisted of 6 categories with 20 questions about disease-specific symptoms. The 6 categories are Urinary function (UF), Urinary bother (UB),