Conclusions: Dose escalated radiotherapy with hypofractionated proton boost seems to be feasible for local control of prostate cancer without any serious acute or late rectal toxicity. A prospective trial between boost with HDR and protons is planned at our institution.

7025 POSTER

Long Term Outcome After Combined External Beam Radiotherapy and High Dose Rate Brachytherapy for Localized Prostate Cancer

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Background: The aim of the study was to retrospectively analyze long-term results for treatment of localized prostate cancer using combined high-dose-rate brachytherapy (HDR-BT) and external beam radiotherapy (EBRT).
Material and Methods: From November 1994 to February 2000, 51 patients with locally confined prostate cancer (stage T1b-T3b) were treated with EBRT (50 Gy in 25 fractions) and HDR-BT (16 Gy in 2 fractions). Long-term outcome was analyzed as overall survival (OS), disease-specific survival (DSS) and biochemical control (BC). Biochemical relapse was computed using the 2006 Phoenix RTOG/ASTRO definition (PSA at follow-up $\geqslant$ 2 μg/l above nadir). Time estimates were obtained using the Kaplan–Meier method. Late GU/GI toxicity was graded according to the Common Terminology Criteria, version 3.0. A cross sectional self-report survey of quality of life was performed among surviving patients using the EORTC QLQ-C30, Version 3.0 questionnaire and the prostate specific module QLQ-PR25.
Results: After a median follow up of 10.1 years, 28 (55%) patients were alive. Biochemical failure was detected in 7 patients (13.7%). The 10-year cumulative probabilities of overall survival (OS), disease specific survival (DSS) and biochemical control (BC) were 58%, 93% and 77% respectively. Late rectal toxicity and urinary tract toxicity were minimal. There were 3 patients with GU toxicity $\geqslant$3. This was reflected in the self-reported quality of life scores for urinary and bowel function where the majority patients scored their urinary and bowel function as normal. Scores for the global quality of life and physical functioning showed values that were comparable to that of the general population >70 years.
Conclusions: This retrospective analysis showed excellent local control rates of combined treatment with external-beam radiation therapy and conformal high-dose-rate brachytherapy boost. Late GU and GI toxicity was low.

7026 POSTER

Hypofractionation and Conventional Fractionation Radiotherapy Schedules in the Treatment of Localized Prostate Cancer

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Background: Hypofractionated (HF) radiation for prostate cancer presents an opportunity to exploit potential biological and practical advantages based on a putatively low α/β ratio. We review a single institution experience of HF and conventional (CF) radiation schedules in localized prostate cancer.
Methods and Materials: From 2001–2004, 87 HF patients were treated with image-guided IMRT to 60 Gy in 20 fractions on a phase II study. During this time period, 263 CF patients were treated with 79.8 Gy in 42 fractions delivered via image-guided 3DCRT (87.1%) or image-guided IMRT (12.9%). Patients receiving adjuvant hormone therapy were excluded. The primary end-point was 5-year clinical progression free rate (cPFR) defined as post-radiation PSA nadir + 2 ng/mL, salvage therapy or positive prostate biopsy. HF non-inferiority was tested with a hazard ratio of 1.32 as the upper limit of equivalence for cPFR. Secondary endpoints were physician scored RTOG acute/late genitourinary (GU) and gastrointestinal (GI) toxicity.
Results: The HF and CF groups were similar for median age, median initial PSA, Gleason score and T-category. There were more low-risk patients in the HF group (HF 31.0% vs CF 22.8%; $p = 0.03$). cPFR and late toxicity rates are presented in the table. The difference in cPFR for HF and CF was not significant after univariate (UVA) and multivariate analyses (MVA). Significant predictors of cPFR on UVA were risk category, T-stage, initial PSA and Gleason score. Age was not a significant predictor on UVA analysis. After MVA, T-category (HR = 1.81, 95% CI 1.11–2.95; $p = 0.02$), initial PSA (HR 1.09, 95% CI 1.03–1.15; $p = 0.003$) and Gleason score (HR 2.79, 95% CI 1.65–4.70; $p < 0.01$) remained significant after MVA. Only a lower risk of late GI toxicity was associated with HF (HR = 0.41, 95% CI 0.00–0.98; $p = 0.02$), but this significance was lost on MVA when treatment method (3DCRT vs IMRT) was considered.
Conclusion: The cPFR and late toxicities of HF and CF are similar and are consistent with other reports of CF for localized prostate cancer. The sample size was likely too small to detect non-inferiority, but the possibility of HF inferiority to CF remains. The use of IMRT for HF radiotherapy may be important to maintain acceptable late toxicity rates. These results support further investigation of HF in ongoing randomized controlled studies.

	HF	CF
5 year cPFR	72%	77%
5-year late GI score		
$\geqslant$2	5%	12%
$\geqslant$3	1%	1%
5-year late GU score		
$\geqslant$2	11%	13%
$\geqslant$3	0%	2%

7027 POSTER

Postoperative External Beam Radiotherapy in Prostate Cancer − Results of the Spanish Registry of Prostate Cancer

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Background: To describe the results of treatment with EBRT in patients previously treated with radical prostatectomy.
Patients and Methods: For this study we have carried out the retrospective analysis of the data included in the electronic database of the different national researchers are part of the RECAP (Spanish Registry for Prostate Cancer). We selected for this patient who met the inclusion criteria of radical prostatectomy with or without lymphadenectomy and postoperative treatment with RTE.
Results: Patients who met the inclusion criteria have been 919 patients. The mean age was 65 years (range: 42−80 years). The type of surgery was exclusively prostatectomy in 41% of cases with lymphadenectomy in 59%. The pathological stage was pT2 in 80%, pT3 in 14% and pT4 in 1% and 5% unknown. 31% of patients increased the value of the Gleason score in surgical specimen of the value of the biopsy Gleason. The RT was administered adjuvant for pT3 and/or positive margins (3−6 months after surgery) in the 29.86% of the patients, biological relapse in 61.73% and histological relapse in 8.41%. The median pre-RT PSA was 0.73 ng/ml (0−29). The mean dose prescribed to the prostate bed was 70 Gy (54–80.8 Gy) compared with 66.6 Gy in the adjuvant RT group and 70 Gy in biological relapse. No G3−4 toxicity at any level were founded. The 66% of patients presented G0 toxicity in all areas (GU, GI, sexual). The median follow-up was 34 months (3–141 months). The biochemical failure-free survival (bDFS) at 2 and 5 years was 94% and 81% respectively. In the adjuvant RT group was 94% and 81% and biological failure group 92% and 76% ($p = 0.05$). The SG has been 99% and 96% at 2 and 5 years. The factors significantly associated with DFS and bDFS have been the value of PSA <1 ng/ml ($p < 0.0059$) and total RT dose >70 Gy ($p < 0.0737$).
Conclusions: This is the first national retrospective study of post-operative RT in prostate cancer. We conclude that administration of EBRT in patients treated with radical prostatectomy has an excellent toxicity profile and a high rate of biochemical control. The level of PSA <1 ng/ml and doses of RT greater than 70 Gy significantly influenced a better biochemical control.

7028 POSTER

Ano-Rectal Function in Patients With Prostate Cancer Following Radiotherapy or Radical Prostatectomy

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Background: Patients receiving radiotherapy (RT) for prostate cancer (PC) may suffer from bowel dysfunction including urgency, incontinence and increased frequency of defecation due to irradiation of the rectum. In this

study, we evaluated the ano-rectal function using a novel scoring system for evaluation of bowel dysfunction.
Materials and Methods: We conducted a cross-sectional study based on a patient administrated questionnaire. The questionnaire has been developed and validated in patients treated for colo-rectal cancer and includes the St. Marks fecal incontinence grading system, the Wexner incontinence score and questions on how bowel symptoms affected the quality of life (QL). A condensed ano-rectal dysfunction score (ARD) consisting of 5 items (fecal frequency, urgency and incontinence, clustering of stools and soiling) is extracted from the questionnaire. The study included 372 PC patients treated with RT from 1999–2007 and 249 patients treated with radical prostatectomy (RP) from 2005–2007 at Aarhus University Hospital with at least 3 years follow-up time.
Results: A total of 90% (564 patients) returned the questionnaire. 42% (135/323) of the patients treated with RT and 20% (42/214) of the patients treated with RP reported minor or moderate ARD (OR=2.95 (95% CI: 1.97–4.42; $p < 0.001$)). Rectal bleeding (OR=4.81 (95% CI: 2.957.83; $P < 0.0001$), fecal urgency (OR=3.96 (95% CI: 2.66–5.90 $P < 0.0001$) and fecal incontinence (OR=3.16 (95% CI: 2.05–4.88; $P < 0.001$)) were more frequent in the RT group compared to the RP group. A ROC-analysis revealed that the ARD score correlated significantly with QL (sensitivity 68%; specificity 79%).
Conclusion: The risk of rectal bleeding, urgency, and fecal incontinence was significantly higher in RT patients compared to RP patients and a condensed score covering 5 items on ano-rectal dysfunction correlated significantly with patients QL in RT patients.

7029 POSTER

Quality of Life in Patients With Conformal Radiation Therapy for Prostate Cancer − a 5-year Longitudinal Study

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Background: This study was designed to prospectively evaluate the time course of health related quality of life (QoL), anxiety and depression in patients receiving definitive conformal radiation therapy (CRT) for localized prostate cancer.
Materials and Methods: From 11/2001 to 4/2003 78 patients receiving definitive CRT were recruited. QoL, anxiety and depression were evaluated before CRT as well as 12, 24 and 60 months post treatment with the EORTC Quality of Life Questionnaire-C30, the prostate cancer module PR25 and the Hospital Anxiety and Depression Scale (HADS).
Results: At 5 years 18% had developed a biochemical recurrence, 7% experienced distant metastasis and 10% had died (one due to prostate cancer). One and 2 years after CRT all functional QoL scores as well as global QoL were within or slightly above pre-treatment levels. At 5 years physical functioning ($p < 0.001$) and role functioning ($p = 0.004$) dropped below pre-treatment levels, while the other scales were within the baseline. The deterioration was of clinical relevance (difference of $\geqslant$10 points) for physical functioning only. HADS anxiety dropped significantly below pre-treatment values at 1 and 2 years post CRT and reached baseline levels at five years. HADS depression changed in parallel with anxiety but not as pronounced. PR25 urologic symptoms dropped slightly below pre-treatment values at 2 years and reached baseline levels at 5 years. PR25 bowel symptoms did not change significantly over time. Except for emotional functioning patients with a biochemical recurrence had no inferior QoL as compared to men without recurrence. Anxiety, depression and fatigue explained 31% − 64% of the variance of the functional/global QoL scores, while rectal symptoms and urological symptoms explained only 5−20% and 3−24%, respectively. At 5 years 52% of the patients stated to have at least some worries about the future course of their disease. These patients had considerably lower functional and global QoL scores ($\leqslant$20 points) than those without worries ($p < 0.001$). They also displayed much higher anxiety and depression scores ($p < 0.001$).
Conclusions: As compared to pre-treatment levels QoL is minimally impaired at 5 years after CRT for prostate cancer. Anxiety, depression and fatigue explain much more variance of QoL than treatment or disease related symptoms. Worries about the future course of the disease appear to be a problem for a significant fraction of the patients.

7030 POSTER

Outcomes of Intensity-Modulated Radiation Therapy Combined With Neoadjuvant Hormonal Therapy for High-risk Prostate Cancer

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Background: To date, there have been few reports investigating outcomes of high-dose intensity-modulated radiation therapy (IMRT) for a cohort of patients with high-risk prostate cancer treated in combination with neoadjuvant hormonal therapy (NA-HT). We analyzed outcomes of NA-HT followed by IMRT to patients with T1c-T4N0M0 high-risk prostate cancer without adding adjuvant hormonal therapy (A-HT).
Materials and Methods: Between October 2002 and May 2006, 128 Japanese patients with T1c-T4N0M0 adenocarcinoma of the prostate were definitively treated by IMRT. The median age was 71 years old (range 51−83 years old). Pre-treatment prostate-specific antigen (PSA) values ranged between 4 and 179 ng/ml (mean: 35 ng/ml). Among the 128 patients, 25 and 103 cases were classified into high-risk (PSA >20, or Gleason Score >7) T1c-2N0M0 and T3−4N0M0, respectively. NA-HT (3−15 months, median: 6 months) was given to all cases. In principle, 78 Gy in 2 Gy per fraction was delivered to the planning target volume (prostate and proximal two-thirds of the seminal vesicles plus margins), although the dose was reduced to 70 or 74 Gy in 21 patients with unfavorable risks for high-dose radiation such as severe diabetes mellitus and anticoagulant therapy. A-HT was not given to any patients after the completion of IMRT. PSA values were monitored with one- to six-month intervals after the IMRT. Salvage hormonal therapy (S-HT) was essentially started when PSA value exceeded 4 ng/ml in monotonically increasing manner.
Results: Median follow-up period was 68 months (range: 21−93 months). So far, S-HT was initiated to 33 patients, and PSA values at the initiation of S-HT ranged 2.7 to 32.2 ng/ml with a median value of 6.1 ng/ml. The 5-year Caplan-Meyer estimate of the biochemical relapse-free survival rate based on the Phoenix definition was 70.3% (95% CI = 62–78.5%). The S-HT-free survival rate at 5 years was 75.4% (95% CI = 67.5–83.3%). The 5-year prostate cancer-specific and overall survival rates were 98.4% (95% CI = 96.1–100%) and 94.5% (95% CI = 90.5–98.5%), respectively. The 5-year likelihood of developing grade 2−3 late genitourinary and urinary toxicity base on the RTOG criteria were 5.5% (95% CI = 1.5−9.5%) and 6.7% (95% CI = 2.2−12%), respectively. No grade 4 toxicities were observed.
Conclusions: The finding indicated that high dose delivery with IMRT for high-risk prostate cancer is well tolerated and is associated with excellent intermediate-term tumour-control and survival outcomes despite giving no A-HT. This approach of NA-HT plus high dose IMRT with relatively early initiation policy of S-HT may be an alternative for high-risk prostate cancer because three fourths of patients maintained hormone-free status at 5 years as well as excellent survival outcomes.

7031 POSTER

The Toxicity of Dose Escalated External Beam Radiation Therapy After Elective Pelvic Nodal Irradiation − Evaluating the Utility of the QUANTEC Rectal Dose Thresholds

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Background: Elective pelvic nodal irradiation (EPNI) increases the volume of the rectum subjected to moderate doses (40−50 Gy) of EBRT. Some evidence suggests that EPNI may reduce the tolerance of small rectal volumes to high doses. Using data from rectal DVHs this study evaluates the QUANTEC thresholds and the correlation between late rectal bleeding and dose in a cohort of uniformly treated patients.
Material and Methods: ASCENDE RT is a trial for unfavorable risk patients with clinical stage $\leqslant$T3a and PSA $\leqslant$40 ng/mL that combines androgen deprivation therapy (ADT; 12 months total, 8 months neoadjuvant) and EPNI with randomization to either a high dose 3D conformal EBRT boost (Arm 1) or a ^{125}I brachytherapy boost (Arm 2). The study sample consists of all Arm 1 patients who completed treatment by Dec. 31, 2008 (N = 119). After removing identifiers, the planning CTs were copied and rectal contours were outlined by 3 trained observers. To minimize bias, observers were blinded the other contours and to the rectal bleeding status of the subjects. By including the original contours, four independent rectal DVHs were acquired for each patient providing an N of 476 for analysis.
Results: The median age was 67 years. All but one individual received ADT as per protocol; 97% (N = 116) received radiotherapy by protocol (78 Gy