Table 1

| | Favorable | Intermediate | Unfavorable |
|---|---|---|---|
| Model TCP (%) | | | |
| EBRT 69Gy | 80 | 50 | 20 |
| I-125 mono | 92 | 95 | 35 |
| Pd-103 mono | 79 | 96 | 84 |
| EBRT+I-125 | 99 | 99 | 80 |
| EBRT+Pd-103 | 99 | 99 | 97 |
| EBRT+Ir-192 | 98 | 94 | 56 |
| Clinical Series | | | |
| MSKCC 68Gy | 83 | 52 | 19 |
| MSKCC 78Gy | 94 | 77 | 51 |
| Blasko I/Pd | 94 | 84 | 54 |
| Blasko EB+I/Pd | 87 | 85 | 62 |
| Eulau EB+Ir | 96 | 72 | 49 |

**Conclusions:** 1) LDR brachytherapy as monotherapy predicts superior tumor control as compared with EBRT to conventional doses and equivalent to escalated doses, 2) both LDR and HDR in combination with EBRT predict superior tumor control when compared with either modality alone, 3) for Favorable cancers both LDR and HDR predict equivalent tumor control, however 4) for Intermediate and Unfavorable cancers, LDR predicts superior tumor control compared with HDR. These model results are supported by long-term clinical outcomes and suggest potentially improved dose-escalation with LDR brachytherapy.

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## CT/MRI image fusion based postplans significantly improve the quality control after prostate seed brachytherapy

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**Introduction:** Brachytherapy using seeds has become a standard treatment for localized prostate cancer in the U.S. and is becoming more popular in Europe. In order to provide a good service for the patients a rigid quality control scheme is imperative. Studies have shown that the D90 is the only predictive parameter when calculating a postplan. The D90 is highly dependable on the size of the prostate outlined on the postplan. In most cases a CT is being used to perform this plan. Delineating the contours of the prostate on a CT usually leads to an overestimation of the prostate size thus leading to an inaccuracy in the dosimetry.

**Material and Methods:** In a multicentre cooperation 35 consecutive patients treated were evaluated comparing CT and TRUS images taken immedeately after the implant as well as CT/MRI image fusion. The prostate contours were outlined by experienced radio-oncologists. 3-D calculations were performed using the VariSeed 6.7 software. The image-fusion protocol required the following steps: CT scan of the prostate after seed implantation, MR scan thereafter in the same position, fusion of the two image sets with a dedicated sofware, transfer of the new image set to the VariSeed, definition of target and organs at risk in the fused images set and calculation of the definitive dosimetry. The accuracy of image fusion was quantified by recording the distance between the center of the prostatic urethra on axial MR vs. CT images after fusion in each patient.

**Results:** The average distance between the center of the prostatic urethra on axial MR vs. CT scan was 1mm (range, 0mm-4mm) proving a high accuracy of the co-registration. The median prostate TRUS volume was 32cc. The median prostate CT volume was 34% greater (43cc). The median prostate on CT-MRI was 34cc (2,5% greater). The D90 (150 Gy vs. 156 Gy) and V100 (82% vs. 88%) were significantly different between CT and CT/MRI postplans (p value 0.003).

**Conclusion:** CT based postplan is widely used in prostate brachytherapy yet it proved to be inaccurate. CT-MRI images predict the prostate size with a high degree of accuracy improving significantly the quality of the dosimetry and DVH related parameters providing a more consistent way of assessing prostate seed implants. CT/MRI image fusion is very costly and time consuming, a special software is required to fuse the images. Further efforts should be made to improve TRUS based postplanning in order to accurately produce postplans at low cost.

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## Conformal radiation therapy of 180 patients with prostate cancer: Risk of biochemical failure

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**Purpose:** Analysis of factors influencing biochemical failure after 3-D conformal radiation therapy of prostate cancer to a total dose of 66 to 70 Gy.

**Materials and methods:** 180 patients with a median follow up of 30.5 months (12±67 months) were retrospectively analysed. T-Stage: T1 19%, T2 56%, T3 24%, T4 1%. Grading: G1 17%, G2 70%, G3 13%. Pretreatment PSA: Median 11.6 ng/ml (0.8-100 ng/dl). Dose to the prostate: Median 70 Gy (59.4-70.2 Gy). Neoadjuvant hormonal therapy: 72% of the patients, radiation alone: 28%. Biochemical failure was defined according to the ASTRO consensus criteria (three consecutive increases in PSA). The influence of the following factors on biochemical failure were studied in uni- and multivariate analysis: Age, body-mass-index, T-stage, grading, Gleason score, pretreatment PSA, neoadjuvant hormonal therapy, prostate dose, PSA nadir and time to nadir.

**Results:** Biochemical-failure-free-survival after 3 years (bNED-3-YS) was 75% (Kaplan/Meier). The following factors had an influence on biochemical failure (Kaplan/Meier) in univariat analysis: Age: <72 vs. > 72 years (bNED-3-YS: 69% vs. 80%, p=0.03), T-stage: T1+T2 vs. T3+T4 (bNED-3-YS: 80% vs. 60%, p=0.04), grading: (bNED-3-YS: G1 89%, G2 76%, G3 46%, p=0.02), pretreatment PSA <20 vs. >20 ng/dl (bNED-3-YS: 84% vs. 49%, p<0.001), PSA nadir <0,5 vs. >0,5 ng/ml (bNED-3-YS: 84% vs. 55%, p=0.001), time to nadir <12 vs. >12 months (bNED-3-YS: 82% vs. 70%, p=0.055). Independent prognostic factors in multivariate analysis were: pretreatment PSA, grading, height of nadir and age.

**Conclusion:** PSA before therapy, tumour grading, height of the PSA nadir and age are valuable criteria to estimate the risk of biochemical failure after conformal radiation therapy of prostate cancer, which is in concordance with other investigators.

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## The selective endothelin-a receptor antagonist improves quality of life (QOL) weighted time to progression in hormone refractory prostate cancer patients

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Atrasentan, a selective endothelin-A receptor antagonist, has recently demonstrated a significant delay in time to clinical progression of disease in a study of HRPCa patients (Placebo=129 days, 10 mg Atrasentan = 196 days, p=0.02, 52% delay). In this study atrasentan was well tolerated. Clinical progression (defined as the onset of opiate treatment for disease related pain or new disease-related events requiring intervention) resulted in a decline in all patients' QoL by 20%, as measured by EORTC Global score. Conventional analyses of time to progression do not account for treatment effects on patients' perception of their health status. Therefore, to assess the cumulative effects of atrasentan on patients' health status the area under the curve for QoL-weighted time to progression (AUC) was compared across treatment groups, with the assumption of an equal length of follow-up, over the one-year course of follow-up. EORTC QLQ-C-30 and FACT-P instruments were used to evaluate health related QoL of HRPCa patients randomized to oral atrasentan, 2.5 mg (N=95) or 10 mg (N=89), or matching placebo (N=104) once daily. For 10 mg atrasentan patients the AUCs for EORTC physical, social, and emotional functioning were significantly better than those of the placebo group (p<0.05). Their AUC responses for pain and appetite loss were also significantly better than placebo (p<0.05). The AUCs for EORTC global, role and cognitive functioning, fatigue, nausea and diarrhea and overall FACT-P domains demonstrated strong trends benefiting10 mg atrasentan patients over placebo (p<0.10). For the remaining EORTC domains (constipation, dyspnea and sleep disturbance) the AUCs were statistically indifferentiable across treatment groups. Additionally, there were no statistical differences between the 2.5 mg and 10 mg atrasentan group responses across all QoL domains. Our AUC analysis demonstrates that HRPCa patients treated with atrasentan experience a significantly longer time to disease progression after adjusting for the perceptions of their health status.