

### 835 POSTER Similar effect on rectal dose reduction despite different displacement kits during high dose rate brachytherapy for prostate cancer

M. Ryberg<sup>1</sup>, G. Cohn-Cedermark<sup>1</sup>, K. Kälkner<sup>1</sup>, E. Castellanos<sup>1</sup>, S. Levitt<sup>1,2</sup>, S. Eriksson<sup>3</sup>, J. Nilsson<sup>3</sup>, C. Holmberg<sup>1</sup>, M. Lundell<sup>3</sup>, S. Nilsson<sup>1</sup>. <sup>1</sup>Karolinska University Hospital, Department of Oncology, Stockholm, Sweden; <sup>2</sup>University of Minnesota, Department of Therapeutic Radiology, Minneapolis, USA; <sup>3</sup>Karolinska University Hospital, Department of Hospital Physics, Stockholm, Sweden

**Introduction:** It is mandatory to reduce the rectal dose during radiotherapy with high dose rate brachytherapy. Different types of displacement kits have been used in order to increase the distance between the rectum and the prostate.

**Material and methods:** Two different kind of Water stand-off kit (BK Medical, Denmark) have been used to displace the prostate in selected cases where the dorsal border of the prostate was closer than 10 mm to the ultrasound probe (= rectal inner wall). Both displacement kits use a water balloon which makes it possible to displace the prostate anteriorly, thereby increasing the distance to the rectum. In 20 patients treated with combined external therapy (50 Gy in 25F) and HDR brachytherapy (20 Gy in 2F) a second dose plan was performed based on images of the prostate with the needles in treatment position and the water balloons empty. All dose plans were performed on TRUS images taken with 5 mm interval using BrachyVision v.6.1 (Varian Medical Systems).

**Results:** The needles stabilize the prostate, but not fully, so the distance between the prostate and the probe is not equally increased to the used amount of water. The prostate was moved on average 2 mm towards the ultrasound probe when the water was removed. On average the maximum dose to the rectum decreased with 20% by withdrawal of the water from the kit during the HDR brachytherapy. Prostate volume exceeding 30 cc gave larger movements compared to smaller volumes, irrespectively of water stand-off kit type. However, the newer kit distributed the amount of water more equally in the balloon.

**Discussion:** The rectal dose correlate to late side effects from the rectum. According to our intentions the dose to the rectum should not exceed 60% of the prescribed dose to the planning target volume, which is possible if the distance between the posterior border of the prostate and the probe is >10 mm. In cases where this is not possible, a displacement kit can increase the distance during planning, assuming that the prostate is immobilized by the inserted needles and do not move when water is removed. In this trial the displacement kit increased the distance between the rectum and the prostate but the prostate was not completely immobilized by the needles when the water was removed. The overall effect was still positive in terms of increased distance between organs at risk, but to obtain the actual rectal dose an on-line assessment has to be performed.

### 836 POSTER HDR brachytherapy as boost combined with external radiotherapy for localised prostate cancer. Long term follow-up compared to nomogram

M. Ryberg<sup>1</sup>, K. Kalkner<sup>1</sup>, G. Cohn-Cedermark<sup>1</sup>, E. Castellanos<sup>1</sup>, R. Zimmerman<sup>2</sup>, S. Levitt<sup>1,3</sup>, J. Nilsson<sup>4</sup>, C. Holmberg<sup>1</sup>, M. Lundell<sup>4</sup>, S. Nilsson<sup>1</sup>. <sup>1</sup>Karolinska University Hospital, Department of Oncology, Stockholm, Sweden; <sup>2</sup>Karolinska University Hospital, Department of Oncology, Södersjukhus, Stockholm, Sweden; <sup>3</sup>University of Minnesota, Department of Therapeutic Radiology, Minneapolis, US; <sup>4</sup>Karolinska University Hospital, Department of Hospital Physics, Stockholm, Sweden

**Introduction:** Different treatments modalities are available for localised prostate cancer (PC). Our 5-year follow-up results, using a combination of high dose rate (HDR) brachytherapy and external beam (EB), have been compared to results calculated from nomograms for radical prostatectomy and conformal external dose escalated radiotherapy (3D ERT).

**Material and methods:** From May 1998 through Dec 1999, 154 patients with localized PC received neoadjuvant hormonal therapy (TAB) and external radiotherapy (2 Gy×25 F=50 Gy) combined with transperineal HDR brachytherapy with transrectal ultrasound guidance (10 Gy×2 F=20 Gy). Six patients were lost of follow-up. Risk factors were defined as PSA >10 mg/L, T-stage 3 (TNM) and poorly differentiated PC (WHO grade III). The likelihood of 5-year PSA relapse free survival after radical prostatectomy and 3D ERT was calculated from Kattan's nomogram according to patient characteristics. When no histopathology was available the results from cytology was transformed as followed; low graded cancer = Gleason score (GS) 4, intermediate graded = GS 6 and high graded cancer = GS 8. Using Kattans nomogram for 3D ERT it was stated that the dose was 88 Gy and neoadjuvant hormonal therapy was given. Results: During a median follow-up of 4.8 years PSA relapse occurred in 25 patients

and of these, 7 died from distant metastasis. No patient demonstrated clinical signs of local recurrence in the prostate. The median PSA at follow-up among the relapse-free patients was 0.06 mg/L. The relapse free survival at 5 years follow-up was 82%. Table 1 demonstrate the actual 5 years relapse free survival compared to the results using nomograms.

Table 1: Probability of 5-years relapse free survival

	Actual HDR+3D ERT	Nomogram		
		No. patients	Surgery	3D ERT
No risk factor	0.95	37	0.83	0.89
One risk factor	0.90	52	0.64	0.76
Two risk factors	0.72	53	0.40	0.60
Three risk factors	0.33	2	0.20	0.46
Total	0.82	154	0.56	0.71

**Conclusion:** HDR brachytherapy as a boost combined with EB and TAB demonstrates good clinical results in patients with localised PC even though the majority have one or several risk factors. Nomograms, which have been developed in order to provide some guidance for decision-making, may be used comparing different treatments modalities, as results from randomised clinical studies are lacking. Patients with several risk factors, including T-stage 3, would probably have less favourable results after surgery. Combining EB and HDR boost provides a biologically higher dose to the prostate than any 3D ERT technique can deliver, which probably is beneficial to high risk PC.

### 837 POSTER PSA bouncing after short-term androgen deprivation and 3-D conformal radiotherapy for localized prostate adenocarcinoma and the relationship with the kinetics of testosterone

F. Akyol<sup>1</sup>, G. Ozyigit<sup>1</sup>, U. Selek<sup>1</sup>, E. Karabulut<sup>2</sup>. <sup>1</sup>Hacettepe University, Faculty of Medicine, Department of Radiation Oncology, Ankara, Turkey; <sup>2</sup>Hacettepe University, Faculty of Medicine, Department of Biostatistics, Ankara, Turkey

**Background:** To assess the factors effecting PSA bounce and to identify any possible relationship with biochemical control after 3-D conformal radiotherapy (3D-CRT) and total androgen deprivation (TAD) for prostate cancer by evaluating four previously described PSA bounce definitions.

**Material and Methods:** Between January 1998 and January 2001, 83 consecutive patients with clinically localized prostate cancer were treated by 3D-CRT with neoadjuvant 3 months and/or 6 months adjuvant TAD. All patients had a pretreatment PSA level, at least eight post-external beam radiotherapy (EBRT) PSA and testosterone levels and minimum two years of follow-up. Total radiotherapy dose was 73.6 Gy at ICRU reference point. Four previous definitions of PSA bounce were used: Critz definition ( $\geq 0.1$  ng/mL), Cavanagh definition ( $\geq 0.2$  ng/mL), Hanlon definition ( $\geq 0.4$  ng/mL) and Rosser definition ( $\geq 0.5$  ng/mL) according to original methodology performed to report PSA bounce. Biochemical failure was defined in accordance with the ASTRO consensus guidelines.

**Results:** The median follow-up time was 40 months. PSA bounce was recorded as follows: Critz definition, 33 patients (40%); Cavanagh definition, 21 patients (25%); Hanlon definition, 11 patients (13%); and Rosser definition, 7 patients (8%). In multivariate analysis, pre-EBRT PSA level and the duration of TAD for Critz definition; age, pre-EBRT PSA and the duration of TAD for Cavanagh definition; age and duration of TAD for Hanlon definition; age and pre-biopsy PSA for Rosser definition were significant independent prognostic factors determining PSA bounce. A significant increase of mean testosterone level in bouncers was detected at the 6th-9th and 18th-21st months. PSA bounce did not predict for PSA failure in multivariate analysis.

**Conclusions:** We observed no correlation between biochemical failure and PSA bounce. The longer duration of TAD and older age were found to be inversely proportional with PSA bouncing in this cohort. Notably, recovery of testosterone might cause PSA bouncing.

### 838 POSTER Dose escalated conformal radiotherapy (DECRT) in elderly men with prostate cancer

L. Eapen, V. Gallant, S. Malone, G. Perry, C. E. R. Samant, W. Kendal, R. MacRae. The Ottawa Hospital Regional Cancer Centre, Radiation Oncology, Ottawa, Canada

**Background:** There is little literature on the safety of DECRT in the elderly. This study evaluates the toxicity and efficacy of DECRT for localized prostate adenocarcinoma in men aged 75 years and older.