be the best-fitting model with an area under the receiver operating characteristic curve of 0.74. In particular, no patient experienced GU symptoms by 2 years unless the dose to the hottest 2.9% of bladder was 77.3 Gy or higher. About 25% of the patients who received < 78 Gy to the hottest 2.9% of bladder experienced GU toxicity at 8 years compared to about 50% when the dose was ≥ 78 Gy (p = 0.002).

Conclusions: For the first time, we identified the “hottest volume” model as the best fitting model predicting GU toxicity after external beam radiotherapy for prostate cancer. Hot spots higher than 78 Gy in bladder should be minimized in radiation treatment planning.

Author Disclosure: R. Cheung, None; S. Tucker, None; R. de Crevoisier, None; A. Lee, None; S. Frank, None; R. Kudchadker, None; H. Thames, None; R. Mohan, None; D. Kuban, None.

### 65 Temporal Profile of Serum Testosterone With Goserelin Use and Cessation: Analysis of Radiation Therapy Oncology Group Protocol 92-02


1Mayo Clinic, Rochester, MN, 2Radiation Therapy Oncology Group, Philadelphia, PA, 3Fox Chase Cancer Center, Philadelphia, PA, 4Massachusetts General Hospital, Boston, MA, 5University of Michigan, Ann Arbor, MI

Purpose/Objective: Describe the response of serum testosterone (T) to neoadjuvant ± adjuvant androgen suppression (AS), T recovery with goserelin (G) cessation, and identify factors associated with time to T recovery (TTR).

Materials/Methods: Radiation Therapy Oncology Group (RTOG) 92-02 assigned 763 eligible patients (pts) to G + flutamide given 2 months before and during external radiotherapy (RT) (Arm 1) and 758 eligible pts to this + 2 additional years of G (Arm 2) (GE Hanks et al 2003). Analysis of T was restricted to pts receiving ≥75% intended G total dosage, >95% baseline T, and >1 postG T level. Endpoints were: T response to G = <normal T after G; time to T response = interval from first G administration to date of first <normal T; T recovery = >normal T after response; and, TTR = date of last G + 28 days to date of T recovery. The Cox proportionate hazards model was used to model TTR and to explore associations between age, G total dose, pelvic and prostatic RT doses with the likelihood for T recovery and with TTR within each Arm.

Results: T response and recovery according to Arm is provided in the Table. T recovery was not observed in 59 Arm 1 pts; 33 pts did not receive salvage AS (interval from G + 28 days to last T date; median 12.2 mos, range 2.8 - 112) and 26 pts received salvage AS (interval from G + 28 days to last pre-salvage T date; median 8.1 mos, range 0 - 95). In Arm 2, T recovery was not observed in 242 pts (no salvage AS: 163 pts, salvage AS: 69 pts). In those without salvage AS, the median interval from G + 28 days to last T date was 12.2 mos (range 2.8 - 112). None of the factors were associated with T recovery or TTR.

Conclusions: Most pts have an appropriate T response to G administration. The time to T response in this study was longer than that observed in pharmacologic studies, but this is likely an artifact of the protocol-specified sampling interval. Cessation of G administration does not uniformly result in T recovery. Although more rapid T recovery is noted with neoadjuvant and concurrent G than with adjuvant G, testicular recovery is prolonged. This observation is valuable when counseling patients on the duration of G adverse effects, monitoring postG T levels and interpreting postRT prostate-specific antigen values.

<table>
<thead>
<tr>
<th>T Response</th>
<th>Time to T Response</th>
<th>T Recovery</th>
<th>TTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm 1</td>
<td>366 339 93</td>
<td>4.1 2.5-140</td>
<td>265 206 78</td>
</tr>
<tr>
<td>Arm 2</td>
<td>419 415 99</td>
<td>4.6 2.9-113</td>
<td>361 119 33</td>
</tr>
</tbody>
</table>

* 21 pts with T recovery within last G date + 28 days excluded.

Author Disclosure: T.M. Pisansky, None; K. Bae, None; G.E. Hanks, None; W.U. Shipley, None; H.M. Sandler, None.

### 66 A Randomized, Double-Blind, Placebo-Controlled, Cross-Over Study to Assess the Efficacy of Tadalafil (Cialis®) in the Treatment of Erectile Dysfunction Following Three-Dimensional Conformal External-Beam Radiotherapy for Prostatic Carcinoma

L. Incrocci, C. Slagter, A. K. Slob, W. C. J. Hop

Erasmus MC/Daniel den Hoed Cancer Ctr., Rotterdam, The Netherlands

Background: Prostatic carcinoma has become the most frequent non-skin male malignancy in Western countries. Erectile dysfunction after three-dimensional conformal external-beam radiotherapy (3DCRT) for prostatic carcinoma is reported in up to 64% of the patients carcinma.

Purpose/Objective(s): The purpose of this study was to determine the efficacy of the oral drug tadalafil (Cialis®) in patients with erectile dysfunction after radiotherapy for prostatic carcinoma.

Materials/Methods: 358 patients who completed radiotherapy at least 12 months prior to the study were approached by mail. All patients had been treated by 3DCRT. Sixty patients were included and entered a double-blind, placebo-controlled, cross-over study lasting 12 weeks. They received 20 mg of tadalafil or placebo for 6 weeks. At 6 weeks patients crossed over to the alternative treatment. Drug or placebo was taken on patient’s discretion, with no restrictions regarding the consumption of alcohol or food, at least once a week and no more than once daily. Data were collected using the Sexual
Encounter Profile (SEP) and the International Index of Erectile Function (IIEF) questionnaires. Side-effects were also recorded, using a patient-completed standardized form, after each treatment period. Comparison between tadalafil scores and placebo scores was done using Wilcoxon’s matched pairs test. For within- and between-group comparison of percentages, McNemar’s test and Fisher’s exact test were used, respectively.

Results: Mean age at study entry was 69 years. All patients completed the study. For almost all questions of the IIEF questionnaire there was a significant increase in mean scores from baseline with tadalafil, but not with placebo. For all the IIEF domains there was a statistically significant difference between tadalafil and placebo. Sixty-seven percent of the patients reported an improvement of erectile function with tadalafil (placebo: 20%) and 48% reported successful intercourse with tadalafil (placebo: 9%) (p<0.0001). Side-effects were mild or moderate. Except for headache, flushing and dyspepsia, all other reported adverse events did not differ significantly between the two treatments (tadalafil or placebo). No patient decreased the dose to 10 mg.

Conclusions: Tadalafil is an effective treatment for erectile dysfunction after 3DCRT for prostatic carcinoma with successful intercourse reported in almost 50% of the patients, and is well tolerated.

Author Disclosure: L. Incrocci, None; C. Slagter, None; A.K. Slob, None; W.C.J. Hop, None.

67 External Beam Radiation With or Without Vaginal Brachytherapy in Stage IC-II Endometrial Adenocarcinoma Provides a Survival Advantage: A Surveillance, Epidemiology, and End Results (SEER) Population Analysis

Huntsman Cancer Hospital at the University of Utah, Salt Lake City, UT

Purpose/Objective(s): Adjuvant radiation in stage IC-II endometrial adenocarcinoma provides a proven local control benefit but the effects on survival remain controversial. This study was performed to evaluate how the addition of external beam radiation (EBRT) with or without vaginal brachytherapy (BR) impacts overall survival (OS) and cause-specific survival (CSS).

Materials/Methods: A retrospective analysis was conducted utilizing data from the Surveillance, Epidemiology, and End Results Program (SEER) of the U.S. National Cancer Institute from 1988-2003 (SEER 11 registries and Alaska data set). A total of 4010 patients were selected with FIGO stage IC (grade 3-4) and II (all grades) endometrial adenocarcinoma. Survival curves for OS and CSS were estimated using the Kaplan-Meier method and compared via stratified log-rank test within each T-stage/grade combination. We have chosen a semi-proportional hazards approach to assess treatment differences; this allows for the treatment effect to vary with time while pooling effects of proportional hazard covariates across strata. Conditional survival probabilities for specific time periods (0-1 year, 1-5 years, and 5-10 years) were estimated. Permutation tests were utilized to evaluate differences between treatments.

Results: The study was comprised of 2306 endometrial cancer patients who had undergone EBRT (31.3%), EBRT+BR (26.2%), and 1704 patients who had not received radiotherapy (42.5%). The average age at diagnosis was 65.3 y (range 27-98). We found no evidence of a treatment effect for stage II, grade 1 disease. The other stage/grade groups revealed significant survival differences [stage IC grade 3-4 (p=0.002), stage II grade 2 (p=0.024), stage II grade 3-4 (p=0.030)]. Time period specific differences in OS and CSS were only detectable for stage IC grade 3-4. In the short term (0-1 y), EBRT+BR results in improved OS (when compared to no adjuvant therapy) and EBRT alone is significantly worse than EBRT+BR. Among patients who survived 5 years, those who received EBRT+BR had an improved 10-year OS compared to any other treatment.

Conclusions: These data reveal an improvement in OS and CSS associated with adjuvant EBRT(+/- BR) for selected subsets of women with endometrial adenocarcinoma when compared to no adjuvant therapy. These results emphasize that specific subsets of patients with high-risk stage I-II disease may benefit from external beam irradiation with or without vaginal brachytherapy and that treatment should be customized for each patient.