

### 2381 Prostate Cancer Control and Survival in Vietnam Veterans Exposed to Agent Orange

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**Purpose/Objective(s):** Following radical prostatectomy, Agent Orange-exposed Vietnam veterans have an increased risk of prostate cancer recurrence when compared to unexposed peers. In this study, we evaluated the impact of Agent Orange exposure on survival in Vietnam Veterans undergoing prostate brachytherapy.

**Materials/Methods:** From May 1995 - January 2005, 81 Vietnam veterans (29 with Agent Orange exposure and 52 without) and 433 non-veterans of comparable age (mean age 58 years) underwent prostate brachytherapy. The mean follow up was 5.0 years. Biochemical progression-free survival (bPFS) was defined as a PSA  $\leq$  0.40ng/mL after nadir. Cause of death was determined for each deceased patient. Patients with metastatic prostate cancer or hormone refractory disease without obvious metastases who died of any cause were classified as dead of prostate cancer. All other deaths were attributed to the immediate cause of death. Multiple clinical, treatment and dosimetric parameters were evaluated for impact on survival.

**Results:** At nine years, Agent Orange-exposed men were least likely to remain biochemically controlled (89.7%, 100% and 97.2% in exposed, non-exposed and non-veteran patients,  $p = 0.012$ ). No significant differences in cause-specific (100%, 100% and 97% for exposed, non-exposed and non-veterans,  $p = 0.743$ ) or overall survival (93.3%, 100% and 88.9% in exposed, non-exposed and non-veterans,  $p = 0.63$ ) were discerned. In multivariate analysis, cause-specific survival was best predicted by risk group and D<sub>90</sub>, while bPFS was best predicted by Gleason score, percent positive biopsies and V100. Overall survival was best predicted by V100 and tobacco status. Agent Orange exposure did not predict for any of the three survival parameters. To date, 22 patients have died (metastatic prostate cancer 2, second malignancies 9, cardiovascular disease 8, trauma 2, pulmonary 1).

**Conclusions:** In this cohort of prostate brachytherapy patients, Agent Orange exposure did not have a statistically significant effect on survival in multivariate analysis. Most deaths were the result of second malignancies or cardiovascular disease. Large multi-institutional studies will be mandatory to definitively establish the impact of Agent Orange on prostate cancer incidence and survival.

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### 2382 An Analysis of Intrafraction Prostate Motion in the Prone vs. Supine Treatment Positions for Intensity-Modulated Radiation Therapy

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**Purpose/Objective(s):** To analyze prostate intrafraction motion in the prone vs. supine treatment positions for intensity-modulated radiation therapy (IMRT).

**Materials/Methods:** Between December 2007 and March 2008, 15 consecutive prostate cancer patients underwent implantation of 5 fiducial gold seeds in their prostate. Patients were subsequently treated with high dose-rate brachytherapy to 22.0 Gy in 4 fractions followed by IMRT to 50.4 Gy in 28 fractions. Patients were immobilized using a Styrofoam wedge and a Velcro strap. Patients underwent CT simulation and IMRT in the prone position. For the first 5 IMRT treatments, a gantry-mounted digital kilovoltage imaging system was used to acquire anterior-posterior (AP) and lateral localization images pre and post treatment. Immediately following treatment, each patient was positioned supine. Two sets of AP and lateral images were obtained in the supine position. The first image set was taken immediately after repositioning. The second image set was acquired 11 minutes later in order to simulate the 9-field IMRT treatment delivery time, resulting in a total of 600 images. A commercially available image analysis program was used to assess prostate displacement. Mean values for the magnitude of prostate motion in the prone vs. supine position were compared using a 2-sided paired samples  $t$  test. The Pearson correlation was used to determine if the direction of prostate motion in the prone vs. supine position was consistent across patients. Patients were asked if they were more comfortable in the prone vs. supine position.

**Results:** Mean  $\pm$  standard deviation AP intrafraction prostate motion was  $2.1 \pm 2.1$  mm and  $1.7 \pm 1.4$  mm in the prone and supine positions, respectively ( $p = 0.18$ ). In the prone position, AP motion  $>2$  mm occurred in 35% of treatments and AP motion  $>5$  mm occurred in 8% of treatments. In the supine position, AP motion  $>2$  mm occurred in 25% of cases and AP motion  $>5$  mm occurred in 4% of cases. The largest displacement in the AP direction was 8 mm and 6 mm in the prone and supine positions, respectively. In the prone position, prostate motion was typically in the anterior direction. In contrast, in the supine position, prostate motion was typically in the posterior direction ( $p = 0.008$ ). Patients usually stated that they were more comfortable in the supine position.

**Conclusions:** The prone and supine positions resulted in a similar mean magnitude of intrafraction prostate motion (2 mm). Since there was no significant difference in the magnitude of prostate motion prone vs. supine and patients were more comfortable in the supine position, patients now undergo IMRT at our center in the supine position.

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### 2383 Prostate-specific Antigen (PSA) Kinetics of the Early Response to CyberKnife Robotic Fractionated Radiosurgery of the Prostate: Correlated Regression Analysis of Combined Data from Three Institutions

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**Purpose/Objective(s):** To investigate the kinetics of the early response of serum PSA to CyberKnife fractionated robotic radiosurgery of the prostate.