prostate ultrasound images with either a Foley or gel were fused and analyzed. The catheter tends to take a path of least curvature and is thus located in the anterior urethra. At mid-prostate the difference is most pronounced with the posterior edge of the catheter located up to 7 mm anterior to the posterior aspect of the gel-filled urethra. Urethra V115% was higher when the urethra was defined with gel. Median V115% was 0 cc (0-0.03) with catheter compared to 0.03 cc (0-0.53) with gel (p = 0.02) and translated to a median V115% of 0% (0-2.14) versus 3.23% (0-20.95) (p = 0.003), respectively. Only one patient when analyzed with the gel had a V118% > 10%(16.6%) and three had a V125% > 0 cc (p = 0.31). The urethral volume was 1.4 cc (1.04-1.85) using the 6mm circle and was 1.2 cc(0.7-2.53) when using aerated gel (p = 0.522). At the prostate base and apex the smaller diameter of the urethra makes visualization with gel alone difficult.

Conclusions: Using a Foley catheter for urethral identification and dose prescription underestimates the dose that is actually received by some patients. Urethral curvature differs from the Foley catheter, especially at mid gland where the catheter rides anteriorly. A standard 6 mm circle does not represent the entire urethral volume. Although we have not observed unexpected toxicity, we will continue to monitor actual urethral dose to correlate with toxicity in future patients. In the meantime, use of a catheter is the most reliable means of visualizing the entire length of the prostatic and membranous urethra. Consideration could be given to expanding the 6 mm circle in the posterior direction in mid-gland.

39 LONG-TERM OUTCOMES OF A PHASE II TRIAL OF MODERATE HYPOFRACTIONATED IMAGE-GUIDED INTENSITY MODULATED RADIOTHERAPY (IG-IMRT) FOR LOCALIZED PROSTATE CANCER

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Purpose: To evaluate long-term biochemical control (bRFR) and radiation toxicity for men with localized prostate cancer treated with two moderately hypofractionated IG-IMRT regimens.

Methods and Materials: Eligible consenting men with T1c-T3a Nx M0 prostate cancer were enrolled in a Phase II trial and received IG-IMRT to a 54 fraction regimen. A total dose that included prostate +/- seminal vesicles at 3 Gy per fraction, 5 days per week in sequential cohorts to a total dose of either 60 Gy or 66 Gy. Late gastrointestinal (GI) and genitourinary (GU) toxicity were recorded at each follow up using the Radiation Therapy Oncology Group criteria and biochemical failure was scored using the PSA nadir+2 criteria. Outcome estimates were calculated using the Kaplan-Meier method and log rank test. Early stopping rules for toxicity were designed based on the constraints of the study. The study closed at the first interim analysis as the bRFR for the 60 Gy cohort was more than 80% at 7 years.

Results: Ninety-six men received 60 Gy and 28 received 66 Gy. Androgen deprivation therapy (3-36 months duration) was used in 10% of men in both cohorts. For each cohort, the median age was 71 years (60 Gy) and 70 years (66 Gy). Low or intermediate-risk presentation was respectively 27% and 65% (60 Gy) and 25% and 71% (66 Gy). Median follow up was 128 months (60 Gy) and 108 months (66 Gy). The five- and eight-year bRFR for 60 Gy and 66 Gy were respectively 83% and 67% versus 88.5% and 73.4% (p = 0.224). For each cohort, five (60 Gy) and one (66 Gy) subjects died from disease. Overall five- and eight-year cumulative late Grade 1-4 GI toxicity for 60 Gy versus 66 Gy were respectively 21.2% and 21.2% versus 44.6% and 48.9% (p = 0.004). Cumulative late Grade 1-4 GU toxicities were respectively 23.8% and 32.8% versus 40.4% and 51.4% (p = 0.048). Cumulative five- and eight-year late Grade 3-4 GI toxicity for 60 Gy and 66 Gy were respectively 1.1% and 1.1% versus 11.5% and 11.5% (p = 0.01). Cumulative five- and eight-year late Grade 3-4 GU toxicity for 60 Gy and 66 Gy were respectively 0 and 1.5% versus 3.7% and 3.7% (p = 0.41). At last follow up in the 60 Gy cohort there were no Grade ≥ 3 late GI toxicities and one Grade 3 late GU toxicity. In the 66 Gy cohort there was one Grade 4 late GI toxicity and one Grade 4 late GU toxicity.

Conclusions: Moderate hypofractionation to 60 Gy was associated with modest late toxicity and provided excellent five-year bRFR for our patients, although failures continued to be observed with subsequent follow up. Dose escalation to 66 Gy was associated with significantly worse late GI and GU toxicity without an apparent improvement in bRFR.

40 RADIATION PNEUMONITIS IN PATIENTS WITH INTERSTITIAL LUNG DISEASE TREATED WITH LUNG STEREOTACTIC RADIATION THERAPY

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Purpose: To determine the impact of pre-treatment interstitial lung disease (ILD) on radiation pneumonitis and overall survival (OS) in patients treated with lung SBRT.

Methods and Materials: Patients treated with lung SBRT between October 2004 and July 2015 at our institution were included. Pre-treatment CT scans were reviewed by experienced thoracic radiologists and interstitial changes including ground glass opacities (GGO), reticulations and honeycombing were scored and involvement to the nearest 5% was used to calculate Washko and Kazerooni scores. Radiation pneumonitis (RP) was prospectively documented using the CTCAE V4.0 criteria. Pre-treatment imaging characteristics, lung and heart dose parameters and clinical variables including smoking status and pulmonary function were assessed by univariate (UVA) and multivariate analysis (MVA). OS was assessed by log rank test and impact of ILD on overall survival was assessed by Cox regression.

Results: Five hundred and forty-two patients were assessed with 56 having evidence of interstitial changes on pre-treatment scans. These included 12 cases of usual interstitial pneumonia (UIP), 18 cases of possible UIP, nine cases of non-specific interstitial pneumonia and 17 cases of age-related reticulations thought to be unrelated to ILD. RP was significantly higher in the 39 patients with ILD (Grade ≥ 2 20.5% versus 5.8%, p < 0.01; Grade ≥ 3 10.3% versus 1.0%, p < 0.01). Of the three cases of Grade 5 RP observed in our series, two had imaging features of ILD. On UVA, radiographic evidence of ILD, Washko score, lung parameters (V5/V10/V15/V20/mean lung dose) and performance status were significant predictors of Grade ≥ 2 RP. Age-related reticulations were not associated with increased toxicity. On MVA, ILD (OR 5.18, p < 0.01) and mean lung dose (OR 1.003, p < 0.01) were predictors of RP. ILD did not significantly affect OS on UVA or MVA. Median survival was 26.5 months in the ILD cohort and 36.6 in the ILD negative cohort (p = 0.09).

Conclusions: Radiographic evidence of ILD is a significant risk factor for RP in patients treated with lung SBRT, but did not impact OS. CT scans should be reviewed for evidence of ILD prior to SBRT and involvement of respirology for management is essential. If ILD patients are treated with SBRT, they should be monitored closely for RP.