Note from Dr. Tisman, received September 23, 2015: <u>Patients should discuss RECTAL LENGTH AND VOLUME with XRT Doctor:</u>

Here is another finding of importance for those patients electing for XRT to the prostate. They should discuss this abstract with their therapist. Late rectal bleeding is relatively rare but apparently may be avoidable.

Dose-Volume Relations for Late Rectal Bleeding in 1001 Patients From Five Prostate Cancer Cohorts

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Presentations
TH-AB-304-1 (Thursday, July 16, 2015) 7:30 AM - 9:30 AM Room: 304

Purpose: Normal tissue complications following radiotherapy (RT) are commonly estimated from single institutions, limiting generalizability of critical dose-volume thresholds. In this study we use data from five cohorts/institutions to explore dose-volume relations for **late rectal bleeding (LRB)** after RT for prostate cancer.

Methods: The investigated cohorts included 1001 patients treated with various RT techniques for prostate cancer (922 3DCRT, 211 image-guided RT, and 79 intensity-modulated RT patients) to 70-86 Gy@2Gy/fraction in 1991-2007. The rectum extended from the recto-sigmoid flexure to the anal canal, and the median (range) follow-up for LRB was 58 (4-259) months. **Rectal cross sectional area, length, and volume** were compared between LRB and non-LRB patients (Mann-Whitney-test). The ability of dose metrics to predict moderate-to-severe LRB (prevalence: 14%) was investigated on univariate analysis, UVA, (Spearman's Rho (Rs) and p-values calculated as medians from 10 0000 Bootstrap-resamples). Dose-volume metrics significantly predicting LRB on UVA ($p \leq 0.05$) were considered for multivariate logistic regression, MVA, following removal of correlated metrics (Pearson's correlation, $Pr \geq 0.85$).

Results: Patients with LRB had significantly ($p<0.01$) smaller and shorter rectums than non-LRB patients (48 vs. 68 cm3 and 6 vs. 7 cm, respectively). On UVA, the relative volumes receiving 5-20 Gy, V5-V20 (Rs=0.05-0.07), V40-V65 (Rs=0.05-0.11), the minimum dose to the hottest 20-55% volumes, D20-D55 and D100 (Rs=0.06-0.09), and mean dose (Rs=0.05) significantly ($p<0.03$) predicted LRB. Within a range of correlated dose metrics (Pr=0.86-0.98), the metric showing the strongest relationship with LRB was considered for MVA together with the other dose metrics, length and volume. The length, V50, mean dose, and D35% remained significant ($p<0.01$) predictors for LRB on MVA, MVALRB=5.2*V50+6.1*D35+9.2*mean dose+0.2*length.

Conclusion: Our findings (>1000 patients) suggest that **shorter rectums and intermediate to high doses predict LRB**. The wide range of prescribed doses and treatment techniques applied support generalizability of our results to other prostate cancer cohorts.