361

Authors: S. Herschorn MD, FRCSC, V. Do MD, R. Choo MD, FRCPC, G. DeBoer Ph D, C. Danjoux MD, FRCPC, J. Preiner MD, FRCSC, C. Chen, I. Barak

Institution: University of Toronto, Sunnybrook and Women's College Health Sciences Centre, Toronto Sunnybrook Regional Cancer Centre

Title: EFFECT OF RADIOTHERAPY ON URODYNAMICS IN PATIENTS UNDERGOING DEFINITIVE RADIOTHERAPY FOR PROSTATE CANCER

Aims of Study:

To quantify the effect of radiotherapy (RT) on bladder function, using standardized clinical evaluation and urodynamics, in prostate cancer patients undergoing definitive RT. Potential urinary morbidity of RT such as reduced bladder capacity, hematuria, radiation cystitis, and urinary incontinence have been potential major concerns. Up to now, all studies evaluating the effect of RT on urinary function have been qualitative (1-4) and there have been few objective quantitative assessments. In this prospective study, we used urodynamics as an objective quantitative tool to examine the nature and degree of change of bladder function caused by RT.

Materials and Methods:

A total of sixteen patients with clinically localized prostate cancer completed an International Prostate Symptom Score (IPSS) with Quality of Life assessment index question (QoL) and underwent a detailed multichannel study before RT and at 3 and 18-month after RT. All patients underwent definitive RT consisting of 66-70 Gy in 33-35 fractions. The target volume of RT was limited to the prostate and did not include pelvic lymph nodes. The volume of bladder treated by RT was calculated. Median volumes of bladder receiving 100%, 80% and 50% of the total radiation dose were 4.1mL (range: 0-36.3), 81.7 mL (range: 43.4-151), 134.8 mL (range: 72-500), respectively. Results of the IPSS, QoL assessment, and urinary functional enquiry at baseline were compared with those at 18-month post-RT. Comparisons were made in bladder capacity, overactivity (compliance, instability), flow rate (Qmax), voiding pressure at Qmax (Pdet), and overall interpretation.

Results:

No patient required urologic intervention during the follow-up period. There was no significant difference in lower urinary tract function between at baseline and at 18-month post-RT, assessed by the 3 parameters (IPSS, QoL, and urinary frequency). Median day and night frequency, IPSS and QoL at baseline were 8.5 times (range: 4-14), 7 (range: 1-22), 1.5 (range: 0-5) respectively, compared with 9 times (range: 4-18), 7 (range: 0-28) and 1 (range: 0-5) at 18-month. 10/16 and 4/16 patients presented with urgency and urge incontinence at baseline. These proportions were not much different at 18-month with 11/10 and 6/16 patients respectively. There was a statistically significant reduction in median bladder capacity at 18-month post-RT. Median bladder capacity decreased from 428.5 mL (range: 104-650) to 353 mL (range: 38-604) in supine position and from 267.5 mL (range: 102-649) to 178 mL (39-578) in standing position. There was also a trend for increasing intravesical pressures measured at capacity, although it did not reach a statistical significance. The proportions of patients with decreased bladder compliance, bladder instability and bladder outlet obstruction were similar between at baseline and at 18-month (3/16, 9/16, 13/16 at baseline vs. 5/15, 8/15 and 9/15 at 18-month respectively). No statistically significant change was observed with regards to Pdet at Qmax, and post-void residual volume.

Conclusions:

The only significant change at 18-month post-RT was the reduction in bladder capacity on urodynamic testing. This reduction in bladder capacity may be explained by radiation fibrosis, which is a typical late radiation change. Despite the decrease in capacity, there was no significant adverse effect compliance, stability, and voiding. This observation corresponds well with no significant change in IPSS, QoL, and median urinary frequency over 24 hours. Furthermore, these results confirm the notion that most prostate cancer patients generally tolerate RT very well.

References:

1. Perez CA, Lee HK, Georgiou A, and Lockett MA: Technical factors affecting morbidity in definitive irradiation for localized carcinoma of the prostate. Int J Radiat Oncol Biol Phys 28: 811-819, 1994.
2. Shipley WU, Zietman AL, Hanks GE, Coen JJ, Caplan RI, Won M, Zagars GK, and Asbell SO: Treatment related sequelae following external beam radiation for prostate cancer: a review with an update in patients with Stages T1 and T2 tumor. J Urol 152: 1799-1805, 1994.
3. Jonler M, Ritter MA, Brinkmann R, Messing EM, Rhodes PR, and Bruskewitz RC: Sequelae of definitive radiation therapy for prostate cancer localized to the pelvis. Urology 44: 876-882, 1994.
4. Lee WR, Schultheiss TE, Hanlon AL, Hanks GE: Urinary incontinence following external-beam radiotherapy for clinically localized prostate cancer. Urology 48:95-99, 1996.