Title

Genitourinary Toxicity In Prostate Cancer Patients With History Of Transurethral Resection Of The Prostate Undergoing High Dose Rate Brachytherapy With A Novel Urethral-Sparing Technique

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Authors

Chew, J
Wong, AC
Shinohara, K
et al.

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Genitourinary toxicity in prostate cancer patients with prior history of transurethral resection of the prostate undergoing high dose rate brachytherapy

Jessica Chew, Anthony C. Wong, Katsuto Shinohara, Mack Roach, I-Chow Hsu

Purpose/Objectives

Prior transurethral resection of the prostate (TURP) is traditionally considered a contraindication to prostate brachytherapy due to increased risk of urinary morbidity. We previously described a novel technique using a modified triple-lumen catheter to visualize and spare the TURP defect during CT-based high dose rate prostate brachytherapy (HDR-B). We now report genitourinary (GU) toxicity in our institutional experience with this urethral-sparing technique.

Methods

Prostate cancer patients with >3 months follow-up who underwent HDR-B using a modified triple-lumen catheter to visualize the TURP defect were included. Patient demographics, disease characteristics, dosimetry, and clinical outcomes were retrospectively reviewed. Toxicity was graded using NCI CTCAE v5.0 and classified as acute (≤90 days after HDR-B) or late (>90 days).

Results

Thirty-three patients met inclusion criteria. Median age was 76 years (IQR 74-80) and median follow up was 17.0 months (range 3.3-64.8). Thirty patients had 1 previous TURP and 3 patients had 2. Median time from most recent TURP to HDR-B was 49.0 months (IQR 6.1-125.8). Twenty-nine patients had newly diagnosed prostate cancer: 9 intermediate risk, 17 high risk, and 3 regional risk disease per NCCN. Among these, 1 patient received HDR-B monotherapy (27 Gy/2 fractions) and 28 received HDR-B boost (15 Gy/1 fraction) combined with EBRT. Four patients were treated for local recurrence 3-12 years after definitive radiotherapy: 1 had received external beam radiotherapy, 1 LDR and 2 HDR brachytherapy monotherapy. Among these, 2 patients received whole gland salvage HDR-B monotherapy (15 Gy/1 fraction, 36 Gy/6 fractions), 1 patient received partial gland salvage HDR-B monotherapy (27 Gy/2 fractions), and 1 patient received whole gland HDR-B boost (18 Gy/3 fractions) combined with EBRT.

Twenty-seven (82%) patients did not experience acute G2+ GU toxicity. Five (15%) patients experienced G2 toxicity (4 with retention or hematuria requiring temporary catheter placement and 1 with urinary frequency). One patient had G3 hematuria requiring procedural intervention 2 months after HDR-B. Only 2 of 29 newly diagnosed patients experienced acute G2+ GU toxicity, compared to 4 of 4 patients receiving salvage HDR-B re-irradiation.

Twenty-seven (82%) patients did not experience late G2+ GU toxicity. Three (9%) patients experienced G2 hematuria (2 with clot retention requiring catheter placement and 1 requiring hyperbaric oxygen therapy) and 4 (12%) experienced G2 urinary incontinence. Two (6%) patients had G3 toxicity (hematuria and retention) requiring procedural intervention >3 months after HDR-B.

Conclusions

HDR-B in prostate cancer patients with a history of TURP has an acceptably low risk of G2+ GU toxicity when the urethral defect is adequately spared during CT-based brachytherapy planning. Acute G2+ GU toxicity occurred primarily in patients receiving salvage HDR-B re-irradiation and did not predict late G2+ GU toxicity.