

Hypofractionated Robotic Radiosurgery for Relapsed and Oligometastatic Prostate Cancer

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Objective(s): Patients with biochemical relapse after initial treatment is challenge for clinicians as standard-of-care. Androgen deprivation therapy (ADT) has only temporary efficacy with some side effects and even increased cardio-vascular mortality in long-term users. PSMA PET-CT allows to detect origin of relapse earlier and local ablative treatment methods such as robotic radiosurgery becomes more popular to postpone ADT or delay progression if tumor has become ADT resistant.

Methods: Since June 2016 10 patients with biochemical relapse were treated with CyberKnife M6 robotic radiosurgery system – 5 with local relapse, 5 with metastatic lesions. Patients had 1 to 5 lesions, all together 27 lesions. 2 patients were treated repeatedly (twice) due to new lesions at follow-up. All patients were scanned with PSMA PET-CT to exclude other lesions in the body and to use PET-CT images in target contouring. 3 patients were resistant to ADT. 5 patients had received adjuvant ADT after SRS, two patients refused ADT. Toxicity was assessed by RTOG toxicity criteria and follow-up was done with blood PSA every 3-6 months. Follow-up time ranged from 6 to 25 months (median 14). Biochemical control was defined as absence of continuous rise of PSA in 2 or more PSA measurements within 6 months. Local control was defined as biochemical control or improved radiological findings in PET-CT.

Results: The prescribed dose depending on surrounding structures ranged from 30Gy in 5 fractions to 18Gy in single fraction with equivalent dose in 2Gy fractions EQD2 from 65 Gy to 102 Gy. 6 patients had Grade 0 toxicity, one - Gr.1, two - Gr.2, one - Gr.3 toxicity due to urinary infection. All patients had Gr.0 late toxicity, except one, who had Gr.2 late toxicity. 7 patients had biochemical control according to defined criteria and 3 patients showed signs of biochemical relapse. Local control was achieved in 24 from 27 lesions (89%). One patient had biochemical relapse and radical operation (cysto-prostatectomy) was made due to bladder cancer. 2 patients had repeated treatment due to biochemical relapse and new oligo-metastatic lesions detected on PET-CT.

Conclusion(s): Robotic radiosurgery in relapsed and oligo-metastatic prostate cancer provides relatively high local control rates with low toxicity. Longer follow-up and larger patient cohorts in multi-institutional patient registries are needed to clarify subpopulations which will have the highest treatment efficacy.

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