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Stereotactic Body Radiation Therapy for Early Stage Breast Cancer using a Robotic Linear Accelerator-Updated Results from a Multi-Institutional Experience

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Abstract

Objectives: Standard radiation therapy for patients with breast cancer desiring breast conservation typically consists of lumpectomy followed by radiation. Radiation can either be delivered to the whole breast or to part of the breast. We examined the safety and efficacy of using an accelerated 5 day dose/fractionation schedule with a robotic linear accelerator for select patients with early stage breast cancer after lumpectomy. Herein we report our multi-institutional updated results.

Methods: 65 consecutive patients with early stage breast cancer were enrolled on an IRB approved protocol at two academic hospitals. Patients were treated and followed at Winthrop-University Hospital or at Swedish Cancer Institute from 2011 to 2016. Eligibility included Stage 0/I/II (< 3 cm), Age >45, negative margins. All patients were treated with non-isocentric robotic SBRT using real-time tracking of the implanted fiducials. The mean prescribed dose was 3000 cGy (range: 2500- 3600 cGy) delivered in 5 (range: 5-10) consecutive daily fractions. The median prescription isodose line was 71% (range: 65-76%). The mean PTV for the whole group was 114cm3 (range 39-241 cm3).

Results: With a median follow-up of 49 months, (range: 2-94), 64 of 65 patients (98.4%) remain locally controlled with no evidence of disease following treatment. One patient developed a local recurrence 18 months after radiation and was treated with mastectomy and remains without evidence of disease. Minimal erythema involving a small portion of the breast was reported by 2 patients and one patient experienced pain at the lumpectomy site 10 months post treatment. RTOG Grade 1 dry skin desquamation occurred in 1 of 65 patients. The cosmesis was good-excellent in all 64 patients using the Harvard cosmesis scale.

Conclusions: Stereotactic Body Radiation Therapy for patients with early stage breast cancer desiring breast conservation therapy can be delivered safely with a robotic linear accelerator. Treatment is well tolerated and efficacious for well selected patients in this multi-institutional cohort. More accrual and continued longer duration of follow-up will be required to see if these results remain durable.

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