

Stereotactic Body Radiation Therapy for early stage breast cancer using a robotic linear accelerator-5 Year Results from the NYU Winthrop Hospital Trial

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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. Whole breast radiation is typically given daily for 3-6 weeks depending on the dose/fractionation scheme. When partial breast irradiation is given, often an implanted catheter is used to deliver a conformal dose of radiation to the lumpectomy cavity in an accelerated manner twice daily over one week. In properly selected patients, the results for partial breast irradiation appear comparable to results for conventional whole breast radiation. We examined the safety and efficacy of using Cyberknife for selected patients with early stage breast cancer after lumpectomy and report on our technique and 5 year results.

Methods: 50 consecutive patients with Stage I/II breast cancer were enrolled on the NYU Winthrop Hospital IRB approved CyberKnife breast protocol. Eligibility included Stage I/II (< 3 cm) Age >45, margins negative. 1 patient had fiducial markers placed by the surgeon. The other 49 patients had fiducial markers placed by the treating radiation oncologist using image guidance on a CT simulator with coordinate placement determined by the physics/dosimetry staff for optimal location. Patients were immobilized either using a thermoplastic cast with a hole removed around the areola to allow for reproducibility daily or with an alpha cradle to allow the breast to remain in its natural position. All patients received a dose of 3000cGy in 5 fractions of 600 cGy each given on five consecutive days. The median number of beams was 86. The median prescription isodose line was 71%. This isodose was chosen to allow for a more rapid fall of dose beyond the target volume to more accurately emulate HDR treatment.

Results: With a median followup of 64 months, (range 14-96 months) all 50 patients (100%) remain locally controlled with no evidence of disease following treatment. RTOG Grade 1 dry skin desquamation occurred in 1 of 50 patients. Minimal erythema involving a small portion of the breast was reported by 2 patients. 1 patient reported temporary pain at the lumpectomy site 10 months post treatment. The cosmesis was excellent in 48 and good in 2 patients using the Harvard cosmesis scale.

Conclusions: With 5 year followup, Cyberknife radiosurgery for early stage breast cancer remains very well tolerated and efficacious for selected patients desiring breast conservation after lumpectomy. Further followup will be required to see if these results remain durable.

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Abstract

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