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Stereotactic radiosurgery for lung tumors: preliminary report of a phase I trial.

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BACKGROUND: Stereotactic radiosurgery is well established for the treatment of intracranial neoplasms but its use for lung tumors is novel.

METHODS: Twenty-three patients with biopsy-proven lung tumors were recruited into a two-institution, dose-escalation, phase I clinical trial using a frameless stereotactic radiosurgery system (CyberKnife). Fifteen patients had primary lung tumors and 8 had metastatic tumors. The age range was 23 to 87 years (mean, 63 years). After undergoing computed tomography-guided percutaneous placement of two to four small metal fiducials directly into the tumor, patients received 1,500 cGY of radiation in a single fraction using a linear accelerator mounted on a computer-controlled robotic arm. Safety, feasibility, and efficacy were studied.

RESULTS: Nine patients were treated with a breath-holding technique, and 14 with a respiratory-gating, automated, robotic technique. Tumor size ranged from 1 to 5 cm in maximal diameter. There were four complications related to fiducial placement: three pneumothoraces requiring chest tube insertion and one emphysema exacerbation. There were no grade 3 to 5 radiation-related complications. Follow-up ranged from 1 to 26 months (mean, 7.0 months). Radiographic response was scored as complete in 2 patients, partial in 15, stable in 4, and progressive in 2. Four patients died of non-treatment-related causes at 1, 5, 9, and 11 months after radiation.

CONCLUSIONS: Single-fraction stereotactic radiosurgery is safe and feasible for the treatment of selected lung tumors. Additional studies are planned to investigate the optimal radiation dose, best motion-suppression technique, and overall treatment efficacy.

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- Clinical Trial
- Clinical Trial, Phase I

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