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SBRT of Large Lung Lesions: Retrospective Outcome Analysis

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Categories: Radiation Oncology
Keywords: stereotactic body radiotherapy, large lung tumors, non-small-cell lung cancer, robotic radiosurgery

How to cite this abstract
Zaman M, Rashtian A, Mustafa Z (June 16, 2016) SBRT of Large Lung Lesions: Retrospective Outcome Analysis. Cureus 8(6): a75

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Objectives: To evaluate side effects, local disease control and outcome of large size/volume (>6cm and/or >80cc) non small cell lung cancer SBRT using the a Robotic Radiosurgery System.

Methods: Hypofractionated lung SBRT has shown excellent outcome, both for peripheral and central lesions. In most of the treatments, tumor sizes play a role as whether a patient is a candidate for SBRT. But tumor size or volume may not be an exclusionary parameter as long as the dose constraints to critical structures, as outlined in the literature, can be achieved. We report here the retrospective analysis of 16 patients treated between 2012 and 2015 at Riverside Community Hospital Cancer Center. PET/CT and/or CT in lung window were used to delineate the target and critical structures. The longest target dimension was between 5.5 cm and 11.5 cm. The planning target volume was between 60 cc and 200 cc. Patients received either 55 Gy or 50 Gy in 5 fractions depending on the proximity to the bronchial tree. Total lung dose constraints such as V10Gy, V20Gy as well as dose to 1500 cc and 1000cc were assessed. The target volumes were tracked in real time during treatment either by following the motion of the tumor or implanted gold seeds or by patient localization on spine, depending on the location of the tumor.

Results: All patients tolerated the treatment well. Median follow-up is 12 months. No acute respiratory side effect was reported by the patients. Patient follow-up evaluations included assessments of lung function before and after SBRT as well as pre and post imaging comparison. Two patients showed recurrence within the treatment fields after almost a year of initial treatment and were given addition SBRT to the small recurrent area. In other cases good local control of disease were achieved.

Conclusions: Retrospective study of the SBRT of large lung lesions demonstrates a good local control. No significant side effects were observed. As long as lung dose constraints can be achieved, SBRT may be an effective tool for large lung lesions. The excellent tumor tracking mechanism and sub-millimeter targeting accuracy of the treatment delivery system enables steep dose gradient and thereby allowing to deliver significant dose without compromising the dose tolerance to critical volumes.

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Published 06/16/2016