Purpose:

At East Carolina University, we have been treating primary and secondary lung cancers with Cyberknife stereotactic body radiotherapy (CK-SBRT) since February 2009. Till October 2011, we have treated a total of 79 patients (83 sites). In this study, we present our experience in CK-SBRT and clinical outcome of the treated patients.

Methods:

Of the 79 patients, 43 were female; age of the whole patient population ranged 33.2-89.7yrs (median=73.2yrs). Patients treated for primary lung cancer (n=57) had severe chronic obstructive pulmonary disease (COPD) and were not surgical candidates. Cyberknife robotic system with tracking techniques (Synchrony=52, XsiteLung=22, XsightSpine=5) were used. Majority of the patient (n=52) had multiple gold fiducials placed (1-6 placed; 1-4 tracked per patient) either percutaneously or bronchoscopically. CT images were used for dosimetric planning, by medical physicists, using Cyberknife MultiPlan software. Prescription doses were 25Gy-55Gy in 3-5 fractions (mean=48.2Gy, median=50Gy); doses were prescribed mainly to 80% isodoseline (range=75-96%, mean=81.4%). PTV margin varied from 0-7mm (mean±SD=3.2±1.4mm), based on the tumor locations; breathing patterns and cancer type. Dosimetric coverage of GTV and PTV were (mean±SD): 97.8±5% and 94.7±6.9%, respectively. The treatment response was assessed using either a CT or a PET scan or both.

Results:

The median follow up was 13.1months (range 0.3-31.9 months). Overall response rate was 98.8% (CR=73.5%). Local failure free survival at one year was 84% for primary (n=57), 76% for recurrent (n=16) lung cancer and 100% for metastatic (n=10) tumors. The toxicity rate was low with one patient reported to have chest wall pain and one patient developed grade 3-4 radiation pneumonitis.

Conclusions:

In most of the cases tight PTV margins were used. Since the prescriptions were at 80% isodeose line with more than 94% PTV coverage, the treatment outcome appeared reasonable. Further study relating PTV margin, dosimetric coverage, and treatment outcome is in progress.