AbstractID: 13444 Title: Technical aspects of a simple and effective method to perform Stereotactic Body Radiation Therapy (SBRT) in lung cancer patients without 4D-CT and Gating

Purpose: In recent years, there has been considerable debate about the necessity of using respiratory gating and 4D –CT to perform SBRT, a fast-growing practice with high risk to patients. Here, we describe the technical aspects of a method to perform SBRT in lung patients without the use of respiratory gating and 4D-CT.

Methods and Materials: After two years of slow dose escalation, we launched our SBRT program in 4/2009 and have enrolled 10 patients (11 lesions) so far. Each patient underwent a CT-guided placement of a Visicoil marker. Patients were immobilized with a homegrown method utilizing a Vac-loc and Aquaplast body cast; then underwent a fluoroscopic exam with a C-Arm to determine tumor motion. Normal tissues dose limits were set using RTOG/ M.D. Anderson guidelines on lung SBRT. About two-third of lesions (7/11) were treated with 50 Gy in 4-5 fractions, the remainder with >5 fractions due to increased risk of complications. Treatments were carried out at a BrainLab Novalis system with ExacTrac image guidance. Prior to treatment, a series of x-rays were taken with the patient in "breath-in and hold" and "breath-out and hold" positions. The mid-point of tumor motion was established and used to determine the treatment isocenter.

Results: Average target dimensions were 19cc (GTV) and 73cc (PTV). The lung DVH (V-20), based on whole lung-GTV, ranged from 3.1% to 11% with an average of 7.8%. Tumor motion observed at the treatment machine using ExacTrac x rays matched to within 3 mm of the fluoroscopic value. Patient follow-up (9/10) showed no evidence of Grade III toxicity and no progression of disease in any patient.

Conclusions: Respiratory gating and 4D-CT are not essential components of SBRT. As pointed out by recent ASTRO/ACR guidelines, the truly critical aspect is rigurous QA of each process.