AbstractID: 10733 Title: A Dosimetric Comparison of Stereotactic Body Radiation Therapy Irradiation Techniques: CyberKnife versus Conventional Linac-based systems

Purpose: The purpose of this study is to compare the different dosemetric characteristics of Linac-based SBRT and that of Cyberknife for lung tumor treatment. **Methods**: Eight patients with lung tumors received Linac-based SBRT were retrospectively included in this study. 60Gy photon dose delivered in 5 frictions was prescribed to each target. To minimize respiratory motion impact, Synchrony™ (AccurayInc., Sunnyvale, CA) and a 4D dose calculation program were used for Cyberknife and Linac-based SBRT treatment planning respectively. Identical patients' image (50% phase image of 4DCT corresponding to the end of exhalation) and contour sets were used for dose calculation. The DVHs of PTV, GTV, and lung were studied. **Results**: Both modalities can provide satisfactory dose coverage to target tumor. The lung dose (2.1±0.8Gy to 1500cc and 4.3±2.1Gy to 1000cc) is well below institutional constrains. Lung dose of Cyberknife plans is more susceptible to the tumor location than that of Linac-based SBRT plan. When tumor attaches to anterior chest wall, Cyberknife may deliver less dose to patient lung than Linac-based SBRT. When the tumor becomes more posterior, lung dose of Cyberknife plan increases much more quickly than that of Linac-based SBRT plan. Cyberknife may delivery higher dose to lung than Linac-based SBRT when the tumor is located close to the posterior chest wall. The dose distribution of Cyberknife is more heterogeneous than Linac-based SBRT in all cases. **Conclusion**: Both Linac-based SBRT and Cyberknife can provide adequate dose coverage for target tumor while sparing normal tissue. Cyberknife may delivery less dose to lung than Linac-based SBRT when the tumor is close to anterior chest wall but more dose to lung when tumor attached to posterior chest wall. This study may provide useful information to help radiation oncologist to choose SBRT modalities for lung tumor treatment.