AbstractID: 13769 Title: Daily Imaging and Dose Deformation for Assessment of Stereotactic Body Radiation Therapy (SBRT) of Lung Cancer

Purpose: The clinical application of lung SBRT requires extremely accurate targeting during treatment since its dose regimen is so potent. Although abdominal compression may be used to reduce respiratory motion, tumor motion is not eliminated entirely and it is still necessary to evaluate the delivered dose to the target during treatment. This study was designed to explore a framework for accurate tracking of delivered dose using daily CBCT data. **Method and Materials:** Ten lung SBRT patients were used for this study. The GTV-PTV margins were 5 mm. The prescription was 20 Gy per fraction for three fractions for a total of 60 Gy. For each fraction, an on-board CBCT system was used to verify patient position during treatment. The Pinnacle Treatment Planning System, research version 8.1y was used to calculate SBRT treatment plans and generate GTV volumes for each fraction based on CBCT intensity thresholds, as well as to perform deformation dose processing based on these volumes. The gEUD was used to evaluate each fraction and the three-fraction composite delivered dose to the GTV. **Results:** Results show that in eight of ten patients, the GTV gEUDs of the composite plan were higher than that of the original plan, indicating that the GTV received the intended dose. Two of the patients had a lower GTV gEUD for the three-fraction composite plan when compared to the original plan. This indicated the same partial volume of the GTV received a lower dose in multiple fractions. **Conclusions:** This study demonstrates that this technique can be used to assess the dose actually delivered in lung SBRT on a daily basis. It will be used to investigate strategies for further improvement in treatment delivery. This method may be useful for correcting an underdose in an early fraction by modifying subsequent fractions.