AbstractID: 9203 Title: 4D IMRT Quality Assurance (QA) by dynamic log file analysis

Purpose: 4D IMRT was a technique developed to account for dosimetry errors from intra-fraction motion, especially from anatomy transformation caused by respiration. To perform 4D IMRT dose validation some dynamic phantoms are used. Measurements with dynamic phantom involve the complex setting procedure. In order to simplify the QA procedure and quickly check the IMRT plan, a 4D IMRT verification tool was developed. The delivered fluence map to a moving target can be simulated from dynamic log (Dynalog) files using this tool. **Method and Materials:** A 4D CT was acquired for the patient. The breathing cycle was divided into 10 phases. An IMRT plan was generated for the exhale phase, and its leaf sequence was exported. The original leaf sequence was modified by superimposing the tumor trajectory onto the leaf trajectory in a two dimensional beam's eye view plane. The modified leaf sequence was delivered by Varian 2100 CD with Millenium 120 leaf MLC. After dose delivery Dynalog files were analyzed by an in-house software to simulate the fluence map of a moving target. The fluence map measured by the dynamic phantom was compared with the simulation of delivered fluence map. **Result:** The comparison between the measured fluence map using the dynamic phantom and the simulated fluence map by Dynalog files shows that the difference of isodose lines was within 3mm and the difference of line profiles was within 3%. **Conclusion:** A 4D IMRT QA tool was developed to simulate the delivered fluence map to a moving target. The simulated fluence map shows a good agreement with the measured fluence map based on dynamic phantom measurements. When compared to phantom measurement, this tool can assist to quickly check the 4D IMRT plan and handle irregular tumor trajectories.