AbstractID: 9005 Title: Statistical analysis of the specific patient QA for IMRT

Purpose: By analyzing measured results of patient specific DQA (dosimetry quality assurance) plans of IMRT, we identified several factors that affected the discrepancy between calculated and measured doses. **Materials and Methods**: From July 2006 to February 2008, patient specific DQA for 150 IMRT patients of H&N cancer, abdominal and prostate cancer, and brain tumor was performed by using a home-made cylindrical phantom. A verification point was selected in the region of uniform and high dose. A diode array was used to compare individual fluence maps in a γ-index method. **Results and Discussion**: The average difference between calculated and measured doses was -1.54±1.35% for H&N cancer, 0.13±1.05% for abdominal and prostate cancer, and -0.70±1.34% for brain tumor. The maximum difference was -3.4% for H&N cancer, -3.4% for brain tumor, and -2.6% for abdominal cancer. Planed and measured fluence maps were in agreement of 95.8±7.4% with the γ-index criteria of ±3 mm and ±3%. The number of PTVs, the number of split fields, and the degree of modulation showed strong correlations with the discrepancy. Most of DQA plans (94%) agreed with measured doses within the tolerance level of ±3%. However, we found systematic underdosage of highly modulated H&N plans while dose differences of all other cancer patients followed the Gaussian distribution. **Conclusions**: We recommend that highly modulated plans out of the tolerance level should be avoid even though they can be generated by RTP. We suggest that dosimetric corrections for IMRT plans over the tolerance level could be achievable only with an established IMRT QA protocol.