

AbstractID: 5312 Title: MLC IMRT vs. solid compensators based IMRT – comparison of various clinical cases.

Purpose: To compare multileaf collimator (MLC) intensity modulated radiation therapy (IMRT) with solid compensator based IMRT in order to demonstrate the feasibility and accuracy of solid compensator based IMRT.

Method and Materials: Using the CMS radiotherapy planning system a sequence of two separate IMRT plans were prepared using superposition algorithm. First plan in each sequence delivered IMRT by means of the MLC, whereas the second one delivered IMRT by means of solid compensator. Quality Assurance (QA) IMRT was performed on a 2100CD Varian linear accelerator for both plans. For the QA measurements we utilized a 120-leaf Millennium MLC with 0.5 cm resolution and brass compensators (milled by DECIMAL INC.). Cases for different sites, e.g. head and neck, chest, abdomen, pelvis were investigated using 6 or 16 MV photons. Number of delivered monitor units, intensity map shapes and the dose distributions for GTV, CTV and OAR were compared for both plans.

Results: Preliminary results indicate that solid compensator plans use significantly less monitor units and deliver smaller dose to the OAR as compared to the MLC plans. Moreover, solid compensators offer generally better resolution of intensity maps than MLC. Finally, in the process of segmentation, MLC IMRT changes DVH. In contrast, solid compensators by avoiding segmentation process of intensity maps, leave DVH unchanged between original, optimized plan and deliverable plan.

Conclusion: The presented comparison demonstrates that solid compensator based IMRT is feasible. In addition, solid compensator based IMRT can provide clinical advantage over MLC IMRT for some treatments.