

AbstractID: 13573 Title: The effect of MLC leaf width in RapidArc plan optimization

Purpose: To evaluate the effect of the leaf width during RapidArc optimization

Materials and Methods: Twenty patients were randomly selected from our department's database that were previously planned using the Eclipse treatment planning system with the RapidArc optimization capabilities. Prostate, brain, lung, liver and head and neck were the sites that were evaluated in this study. For each patient three plans were generated using linear accelerators with 120 Millennium, 120 High definition and 80 Millennium multileaf collimators. Each plan consisted of 2 arcs of the same span. The collimators of each arc were rotated by 90 degrees with respect to each other. The isocenter location and optimization parameters were kept the same for each plan within each patient. The DVH and isodose distributions were chosen for the evaluation and comparison of the plans.

Results: The comparison of the DVHs showed that the high definition MLC produced superior plans with respect to PTV coverage. Also, lower critical organ doses were calculated for the high definition MLC optimized. The millennium 80 MLC produced the most inferior plans for all cases. The plan quality was similar between the 120 and 80 millennium MLC for targets that were lateral with respect to the central axis of the beam where the MLC leaf width was the same.

Conclusions: The MLC leaf width plays an important role during the plan optimization for centrally located targets. A superior plan is achieved with smaller MLC leaf width.