AbstractID: 11227 Title: Evaluation of treatment plans without field splitting.

Purpose: For certain MLC models, restrictions in MLC carriage movement results in limited treatment field sizes for IMRT, and splitting fields are routinely used for large sized tumors. We explore the dosimetric and delivery efficiency advantages of not splitting large treatment fields when compared with splitting fields for large sized tumors.

Method and Materials: Four head and neck patients with PTV sizes larger than 14.5 cm were selected for this study. Six IMRT plans were generated for each case using a commercial TPS (Pinnacle 7.9u) with the capability of automatic field splitting. Five, seven and nine evenly-spaced gantry angles were used in each case, and for each set of gantry angles, two treatment plans were generated. In the case of allowing for field splitting, the TPS generated split fields automatically when necessary with 2 cm of field overlap. In the case of no field splitting, the jaw openings in the MLC-travel direction were manually set to 14.5 cm wide with the guidance of PTV projection in the beam's eye-view. All plans followed the treatment guidelines of RTOG Protocol H-0022. Dose constraints and optimization parameters were kept identical for all the plans. Dose volume histograms (DVH) of PTV and critical structures were compared and differences in the dose distributions between different plans were assessed.

Results: No clinically-significant differences were observed between split and non-split field plans, although dose uniformity for the high-risk PTVs was slightly increased for the plans without field splitting. For most of the cases, the total MUs were reduced when non splitting field method was used. Since the number of beams was less, the treatment planning (optimization) time was less.

Conclusion: Similar plan quality can be achieved with non-split field plans. Reducing the number of split fields can reduce the total treatment time and increase patient throughput.