AbstractID: 13335 Title: Implications of 120-MLC plans treated on an 80-MLC linear accelerator

Implications of 120-MLC IMRT plans treated on an 80-MLC linear accelerator

Methods and Materials:
This study reviews nine head-and-neck IMRT plans created on Pinnacle^3 Treatment Planning System for a Varian 120-Millenium MLC linac. Using the Varian MLC Shaper application, each field was reconfigured for an 80-Millenium MLC machine. The reconfigured fields were exported to RadCalc and were replaced with the new MLC configurations before being exported to Pinnacle. Each plan was recalculated to deliver the same dose to the same target volume using the same number of monitor units for the same number of fractions. Isodose distributions and dose volume histograms were compared. In addition, a 2D-array system was used for absolute dose verification of each plan delivered on the 120-MLC machine and on the 80-MLC machine. Isodose distributions, histogram and the gamma fluence were evaluated for each delivery.

Results:
The MLC Shaper averages two adjacent leaves to form a single leaf which may significantly affect the dose delivery. The isodose distributions and comparative DVHs of the same plan delivered show adequate sparing of normal tissues and other surrounding structures for low isodose regions. However, structures close to or adjacent to the target region may receive higher doses. Both the planning and dose validation confirm that there are larger high-isodose regions with higher hotspots for the 80-MLC plan.

Conclusion: The results indicated that delivery of a 120-MLC IMRT head-and-neck plan after undergoing MLC shaping can be delivered on an 80-MLC linac. In cases were a patient is transferred from a 120-MLC machine to an 80-MLC linac for a small number of fractions of the total dose regime, there may be insignificant changes in dose distribution. However, investigation of each individual plan must be evaluated, either through the treatment planning system or dose validation for extended treatments.