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Comparison of IMRT delivery MUs for three commercial Treatment Planning Systems for two different delivery methods - compensator and MLC imrt.

Purpose: The purpose of this investigation is to compare the number of monitor units for IMRT plans between compensator based IMRT and MLC IMRT for various treatment planning systems.

Method and Materials: Standardized benchmark IMRT treatment plans were performed at several institutions, using equivalent IMRT dose objectives in the optimization process. Plans were evaluated and shown to be similar with the use of a plan metric, which created a score for how well the plan was created compared to the desired dose constraints.

Results: Due to the broad beam method of delivery IMRT doses, compensator based IMRT monitor units averaged 351 MUs for CMS Xio (n=21), 383 MUs for Varian Eclipse (n=7), and 388 MUs for Philips Pinnacle (n=19). This is compared to 542 MUs for CMS Xio (n=4) and 458 MUs for Philips Pinnacle DMPO (n=7) MLC based IMRT. In addition, the compensator can be treated at a higher dose rate, e.g. 600 MU/ min, and is not subject to limitations such as leaf speed. The reduction in monitor units can be explained by the larger output factor for the field compared to the small segment needed for MLC IMRT.

Conclusion: Compensator based IMRT consistently illustrates lower monitor units for IMRT delivery compared to MLC based IMRT. This may be a useful advantage when extended patient treatment times are crucial to the ability to treat IMRT, especially for SBRT treatments.

Conflict of Interest (only if applicable)
Ken Cashon and Chris Warner are employees of .decimal, Inc.