

AbstractID: 8263 Title: Dosimetric Comparison of Split Fields and Fixed Jaw IMRT Techniques for Large Head and Neck Target Volumes:

Purpose: Varian Eclipse treatment planning system (TPS) used for large volumes (>14 cm) IMRT always creates split-fields that produces excessive MLC segments, match-line dose inhomogeneity and higher treatment time compared to a non-split field. A new method using fixed jaw technique (FJT) is proposed to reduce problems associated with split-fields. Dosimetric comparisons between split-field technique (SFT) and FJT used for IMRT treatment is presented.

Method and Materials: Five head and neck patients with extensive target volume are studied and compared with both techniques. Treatment planning was performed on Eclipse planning system using beam data generated for Varian 2100C linear accelerator. The proposed FJT method is studied that forces the jaw to stay at a fix position during optimization. A standard, coplanar, 9-fields equally spaced gantry angles arrangement was used in both techniques. The institutional dose-volume constraints used in head and neck cancer were kept the same for both techniques.

Results: The dosimetric coverage for the target volumes between SFT and FJT for head and neck IMRT plan is identical within $\pm 1\%$. Similarly the organ at risks (OAR) such as parotids, spinal cord and brain stems have dose-volume coverage within $\pm 1\%$ for all patients. When the total MU and segments were analyzed, SFT produces statistically significant higher segments ($13.9 \pm 9.9\%$) and higher MU ($13.7 \pm 4.4\%$) compared to the FJT. There is no match line in FJT and hence dose uniformity in the target volume is superior to the SFT.

Conclusion: Dosimetrically, SFT and FJT are similar for dose-volume coverage; however, the FJT method provides better logistics, lower MU and treatment time and better dose uniformity. The number of segments and MU have been correlated with the whole body radiation dose with long term complications and hence it is concluded that FJT should be preferred option compared to the SFT for large target volumes.