

AbstractID: 8555 Title: IMRT for Cancers of Paranasal Sinuses and Nasal Cavity: A Planning Study

Purpose: to compare intensity-modulated radiotherapy (IMRT) plans generated by segmental multileaf collimator (SMLC, 1-cm leaf width) and helical Tomotherapy (HT) techniques for patients with cancers of paranasal sinuses and nasal cavity.

Method & Materials: Five patients with locally advanced cancers of the paranasal sinuses and nasal cavity previously treated using HT technique were selected for this study. Treatment goals included a prescribed dose of 70 Gy to at least 95% of the PTV over 35 treatments while respecting dose-volume constraints to OARs. Each patient was planned using Tomotherapy HI-ART system with 2.5 cm jaw, 0.3 pitch, and 2.5 initial modulation parameters. All five patients were subsequently planned on Pinnacle TPS using the same goals for PTV and OARs for a 9-field SMLC technique on an Elekta SynergyTM LINAC equipped with 1 cm MLC. Dose volume histograms were generated and compared from both planning systems.

Results: HT planning results (average \pm one standard deviation (SD)) for PTV₇₀ are: V₇₇ (percentage of PTV₇₀ receiving 77 Gy): 8.0% \pm 17.7%; V₇₀: 94.9% \pm 0.2%; V_{65.1}: 98.3% \pm 1.2%. In comparison, SMLC planning results are: V₇₇: 37.4% \pm 43.8%; V₇₀: 95.3% \pm 0.7%; V_{65.1}: 98.5% \pm 1.3%. Maximum point doses for HT technique are: to optic chiasm (40.0 \pm 21.9 Gy), ipsi optic nerve (ON) (39.0 \pm 26.7 Gy) and contralateral ON (37.1 \pm 22.9 Gy). For SMLC technique: to optic chiasm (41.8 \pm 30.4 Gy), ipsi ON (45.2 \pm 30.2 Gy) and contralateral ON (39.9 \pm 30.1 Gy).

Summary: Results are consistent with those of others evaluating HT-IMRT for cancers of the head and neck, i.e. HT technique achieved a more homogeneous PTV dose coverage while delivering less dose to OARs compared to 9-field SMLC technique used. Investigations using Synergy-STM SMLC, 4-mm leaf width are underway and will also be presented.