

AbstractID: 7187 Title: IMRT planning comparisons between Elekta Synergy-S and Elekta Synergy

Purpose: To compare IMRT planning between Elekta Synergy (ES) and Elekta Synergy-S (ES-S), which has a new “beam modulator” MLC design.

Method and Materials: ES-S is equipped with a “Beam Modulator” MLC (4 mm leaf width at isocenter), which provides a maximum field size of 21cm×16cm. IMRT plans for two patients (prostate cancer and parotid cancer disease sites) were generated for both ES and ES-S. Planning CTs were obtained using Philips AcQSim and CT data were transferred into Pinnacle3 TPS 8.0. IMRT plans for each patient were calculated with two machine models, ES-S and ES, with minimum segment areas of 1.6×1.6 cm² and 2×2 cm² respectively. All other calculation configurations are the same. Dose volume histograms (DVH) were generated and exported into Excel for comparison.

Results: For prostate site, PTV DVH for ES-S demonstrates more conformality than that for ES, possibly because ES-S has smaller segment area. However, in the low dose region, bladder and rectum DVHs show higher doses from ES-S versus ES. This may be due to more scatter and leakage doses from MLC of ES-S. Same trend is observed for the parotid patient. While PTV DVH for ES-S is slightly more conformal than that for ES, doses for cord expansion, left parotid, and brain stem expansion for ES-S are slightly higher in low dose region compared to corresponding DVHs for ES.

Conclusions: Preliminary results indicate IMRT plans with ES-S provide slightly better conformality for target volume but slightly higher doses for critical structures in low dose region. For these two sites, there does not appear to be clinically significant differences for IMRT plans between Elekta Synergy-S and Elekta Synergy. More case example studies are planned and findings will be discussed in depth including practical considerations such as transfer of treatment plans between the two types of machines.