AbstractID: 8155 Title: Carbon fiber couch effect on skin doses as a function of photon energy

Purpose: To evaluate the dosimetric effect of a carbon fiber couch (CFC) on delivered skin dose as a function of photon energy.

Method and Materials: A carbon fiber couch (BrainLab) was incorporated into a commercial TPS (Pinnacle) through auto-contouring. A retrospective investigation on 2 lung and 2 prostate patient plans was performed. Targets and OARs, together with a skin contour of 0.3 cm thickness in contact with the CFC, were outlined in each plan. For each patient two sets of treatment plans were generated: 1) set of four plans with 4-, 5-, 7-, and 9-fields, all with 6MV beams, and 2) set of four plans, identical to the first set except that the CFC was intersected by 18MV beams. IMRT optimization was performed for each plan. Both sets of plans for each patient were normalized such that 95% of the PTV was covered by the same dose, escalated to the maximum allowed by the OAR constraints. CFC effect as function of beam energy was tallied by the highest dose to 2 cm^2 of skin. The observed skin doses range from 20% to more then 87% of the prescription doses.

Results: If 18MV rather than 6MV energies are used in the beams traversing the CFC the skin dose reduction ranges from 12% to more than 45%. An additional sparing for some OARs was also observed for the prostate cases, while the opposite was observed for the lung case.

Conclusions: The results indicate that mixed energy 6MV/18MV (18MV for the beams passing through the CFC) IMRT plans would result in a substantial skin sparing of more than 45% compared to IMRT plans with only 6MV beams. The high skin doses in some cases (87% of the prescription) suggest that in hypofractionated SRS/SRT the CFC skin effect needs to be considered.