AbstractID: 13317 Title: The utility of off-cord arc beams in RapidArc planning for head/neck cancers

Purpose To utilize off-cord arc beams in RapidArc planning for head/neck cancers.

Methods and Materials: Five patients with head/neck cancer were planned with RapidArc technique. Three RapidArc plans were generated for each patient, including a "2+1" plan, a "1+2" plan, and a "0+3" plan. The first number indicates the number of off-cord arcs with the inner x-jaw closed at 5mm away from the spinal cord. The second number indicates the number of arc beams with open jaws. The three arcs were placed with the same isocenter. Field size and collimator angle were manually set for off-cord arcs and automatically optimized in Eclipse for open-jaw arcs. Same dose constraints and priority weights were used for all three plans. No MU constraints were set. The plans were normalized to the same PTV coverage criterion. MU numbers were compared to evaluate the degree of MLC modulation. Dose volume histograms were compared for PTVs and the spinal cord plus a 5 mm margin.

Results: With the same optimization setting, the "0+3" plan has the lowest MU number. The "2+1" plan has the highest MU number, 1.9±0.2 times of the "0+3" plan. The "1+2" plan has the second highest MU number, 1.3±0.1 times of the "0+3" plan. With more MLC modulation, the "1+2" and "2+1" plans outperform the "0+3" plan in terms of cord protection and PTV coverage for all five patients. However the "2+1" plan is not guaranteed to be the best even though it has the highest MU number.

Conclusions: Utilizing off-cord arc beams causes higher MU number and more MLC modulation in head/neck planning.