AbstractID: 10322 Title: RapidArc Versus dMLC IMRT: Planning Comparison utilizing AAPM TG119 guidelines

Purpose: To compare treatment plans produced by RapidArc® and dMLC IMRT techniques for test cases proposed in AAPM TG119 report.

Materials and Methods: AAPM-TG119 proposes a set of mock clinical cases for testing the accuracy of IMRT planning and delivery system. For these mock cases, we generated two treatment plans, the first plan using 7-9 static IMRT fields and a second plan utilizing 1 or 2 arc RapidArc® technique. Dose optimization and calculations were performed using 6 MV photons and Eclipse® treatment planning system (Varian Medical Systems). Dose prescription and planning objectives were set according to the TG119 goals. Plans were scored based on TG119 planning objectives. Treatment plans were compared using- Conformity Index (CI) for reference isodose, Homogeneity Index (D_5-D_{95}), dose gradient (mean radius difference between V_{50} and V_{100} of total volume), Normal Tissue Integral-dose (NTID) and total MU.

Results: RapidArc® dose distributions were comparable to dMLC IMRT plans. Our planning results matched published TG119 planning results. For treatment plans studied, conformity indices were ranged from 1.05 - 1.10 (IMRT) and 1.04 - 1.09 (RapidArc®) respectively. Homogeneity indices ranged from 4.6 – 11.0% (IMRT) and 4.6 – 10.5% (RapidArc®) respectively. For IMRT plans, the dose gradient measure and NTID ranges were 1.5 - 2.5 cm and 8.6 - 17.7 respectively. In case of RapidArc® plans, the gradient measure and NTID ranges were 1.4-2.5cm and 8.5 -16.8 respectively. The ratio of total Monitor Units necessary for dMLC IMRT to that of RapidArc® was in the range 1.1- 2.0

Conclusion: RapidArc® treatment plans were similar to dose distributions achieved by 7- or 9- field dynamic-IMRT plans. The advantage of RapidArc® technique lies in the decreased number of total monitor units necessary which can further lead to reduction in patient “beam-on” time and out of field scatter doses.

Conflict of Interest: None