

• **Purpose/Objective(s):** To report on the capabilities of RapidArc to deliver a conformal dose to a highly irregular target and its capability of sparing nearby organs-at-risk (OARs).

• **Material/Methods:** RapidArc™ consisting of 2 and 3-arc plans were generated to treat highly irregular targets on five patients (male=1, female=4, <age>=68 yrs) diagnosed with inflammatory chestwall, angiosarcoma of the scalp, melanoma of the scalp, cancer to the left axilla and cancer to the left orbit respectively. The average target volume was 1019.86 cc (range: 50.7cc - 3039.9cc) with the smallest target attributed to the left orbit and the largest to the inflammatory chestwall. Treatment doses ranged from 30Gy to 60Gy and were delivered in fractions of 1.8, 2.0 and 3.0Gy. Full (360-deg) and partial arcs as well as 90-deg couch rotation were used to treat these irregular sites. With the exception of the axilla case, all patients were treated with bolus of 2.5mm or 5mm thick. RapidArc™ plans were generated using Varian Eclipse™ 8.6 treatment planning software which allows for multiple arcs in a plan. Daily kV/kV and weekly CBCT imaging were performed prior to treatment for verification of patient positioning.

• **Results:** Beam-on times ranged from 3-6 min and the average number of monitor units was 814 (range: 350 – 1907). Dosimetric evaluation of the plans was performed based on RTOG conformality index (CI) and homogeneity index (HI). The overall mean±SD values for CI and HI were 0.93±0.05 and 1.18±0.06 respectively. Remarkable OAR sparing was observed in all cases. Dose verification plans were generated and delivered to a solid-water phantom comprising a Mapcheck unit.

• **Conclusion:** RapidArc™'s capability of delivering multiple coplanar and non-coplanar arcs to irregularly shaped targets with short beam-on times have resulted in very conformal doses with great OAR sparing.