

AbstractID: 1957 Title: A Comparison of Multiple Carriage and Multiple Isocenter IMRT Treatments: a Phantom Study

Multiple isocenters or multiple carriage positions can be used when facing a field size limitation in IMRT. In the present work, we studied the use of dual isocenters for IMRT fields. An elliptical PTV with its center at a depth of 7.5cm was drawn. Its width was made large enough to prevent delivery with a single carriage position. A 3-field plan (one AP and 2 lateral beams) with constraints designed to give 100% dose to the PTV was developed. Additional plans were designed with the anterior field split into 2 isocenters separated by 8cm. These beams were forced to either abut at the isocenter or have 1, 2, 3 and 4cm overlaps. Jaws were manually frozen in all plans and constraints were identical. The plans were delivered on a linac and analyzed dosimetrically. The conformity index was 1.03, 1.11, 1.05, 1.04, 1.03 and 1.03 for dual carriage, no overlap, 1, 2, 3 and 4cm overlap, respectively. While the maximum in all the plans was within 0.5%, the minimum in the PTV was found to be 89.1, 78.3, 85.3, 89.5, 89.1 and 89.5%, respectively. All dual isocenter plans had slight underdosages anterior to the match point and slight overdosages posterior to it, significantly affecting the DVHs relative to the dual carriage plan. Our study has demonstrated that it is technically feasible to plan and treat with multiple isocenters, however, one should pay close attention to the magnitude of the hot and cold spots, particularly when the isocenter passes through the PTV.