

AbstractID: 10162 Title: A simple Quality Assurance Test for MU Verification in RapidArc Treatment Planning

Purpose: To manually verify the Monitor Units calculated by the Treatment Planning System for RapidArc treatment techniques by simple tests.

Method and Materials: In the Treatment Planning System (Eclipse), a homogenous cylindrical phantom of 30 cm diameter and a cylindrical PTV of 10cm diameter and height were created. A plan with a field of arc 181 to 179 degrees with optimized field size and collimator angle of 0° was done. In Arc optimization, Constraints were set (Lower limit was set as 100% volume to receive 200 cGy with no Upper limit) so that there was minimum MLC movement during gantry rotation. The dose to PTV was normalized at isocentre and Monitor units were calculated. This test was extended to heterogenous cylindrical phantoms with inhomogeneities in and around PTV. The calculated MUs were verified by manual calculation using Power law method.

Results: The MU variation was -0.15% for homogenous phantom. For cylindrical phantoms, with lung inhomogeneity in and around the PTV structure, the variations were 0.66% and 0.58 % and with bone inhomogeneity the variation was computed as -0.79% and -1.41 % respectively. For cylindrical phantoms with both lung and bone inhomogeneities the maximum variation was -2.96%.

Conclusion: The results of the tests were well within the tolerance limit for MU verification i.e., ± 0.5 % for homogenous phantoms and ± 3 % for inhomogenous phantoms as per AAPM TG 53 and IAEA TRS 430 recommendations.