

AbstractID: 9536 Title: Accuracy in the dose delivery of Sliding Window IMRT as a function of Gantry and Collimator Angles

Purpose: Because of their weight, MLC leaves may experience significant gravitational force particularly when moving against gravity. Traditionally patient specific IMRT QA is performed with the gantry directed downward not reflecting the actual beam and collimator angle used in patient. This study was done to evaluate the accuracy in dose delivery for IMRT treatments as a function of gantry and collimator angles.

Material & Methods: We have taken 3 IMRT treatment fields optimized for sliding windows IMRT dose delivery. The dose plans were generated for a Varian Trilogy unit employing a millennium MLC. All the treatment fields had 320 control points for IMRT delivery. MapCHECK along with 3 cm buildup material, in its isocentric fixture, was mounted in the linac accessory tray and secured at 100 cm SAD. Fields were individually delivered with gantry and collimator angles in increment of 30°. This resulted in 72 combinations of gantry and collimator angles at which fluences were delivered. Plans were evaluated using standard 3%/3mm criteria.

Results: The passing rates for the delivered planar distributions for field1, field2 & field3 at gantry=0° and collimator=0° were 99.6, 96.2 & 92.6%, respectively. The pass-rate was found to vary from 100 to 97.9% in field1 as function of gantry and collimator angle. The respective value in field2 & field3 were 100 & 90.2 and 93.2% & 87.9%. The standard deviation of the passing rate for the three fields as a function of gantry and collimator angles was 0.4, 2.7 & 1.3, respectively.

Conclusion: Our study has shown that the accuracy of sliding window IMRT dose delivery technique does not demonstrate significant gantry and collimator angle dependence. It is important that this type of study be carried out as a part of initial acceptance as well as periodically in a compressive QA program.