

Purpose:

Varian's new RapidArc radiotherapy technology is a fast form of precise radiotherapy that targets tumor dose while minimizing dose to surrounding healthy tissue. Treatment is given in as little as one gantry rotation.

Most QA analysis of RapidArc plans is based upon a single plane. The assumption is that if the QA passes in one plane, the results are sufficient for all planes.

Dosimetry Check (Math Resolutions, LLC) recently implemented software to verify the volumetric dose throughout the patients CT data set using EPID images. The purpose of this work is to present the results of patient's volumetric verification utilizing the EPID detector and Dosimetry Check software.

Methods and Material:

- 1) A RapidArc plan is generated for a patient
- 2) The patient's RapidArc QA plan is scheduled for QA on the LINAC. An integrated image sequence template is associated with the plan for EPID imaging.
- 3) As the treatment is delivered to EPID, the beam is turned on/off to generate 36 subarcs every 10 degrees. A 10x10 calibrate image is measured.
- 4) The EPID image along with the 10x10 calibration film is transferred to Dosimetry Check. The patients 3D CT dicom data set along with the structure set and dose matrix is transferred to dosimetry check.

Results:

RapidArc treatments were verified with Dosimetry Check software. The average gamma using criteria of 3% dose difference/3mm DTA was 98%. The measured verse predicted DVHs of PTVs as well as critical structure showed excellent results. The isodose overlays, dose profiles, point doses, dose differentials and GammaValue histogram were within acceptable tolerances.

Conclusion

Due to the complexity of the delivery of 3D dose using RapidArc technology, a tool to evaluate the 3D dose distribution is needed. The results using Dosimetry Check validated our RapidArc treatments in our Clinac.