

Purpose:

The new RapidArc™ treatment technique, also described as Volumetric Modulated Arc Therapy technique, has the potential to treat patient with improved result in target coverage and normal tissue sparing in much less time than IMRT. One important aspect of this is to ensure the quality in an efficient way, find the cause of any discrepancy and learn how to best use the various TPS parameters. Delta⁴, originally developed to improve IMRT QA was also designed for RapidArc /VMAT 4DRT and helical tomotherapy. Presented data is from the first test using Delta⁴ on RapidArc made in collaboration between ScandiDos and Varian.

Method and Materials:

Measurements on a Varian ClinacX with RapidArc capability, installed in Varian Medical Systems laboratory in Baden, Switzerland, were performed with a Delta⁴ QA-device of absolute dose distribution in 4-dimensions resolved in time and each dose pulse was tagged with independently measured gantry angle. The measured dose was grouped into the control points (every 2.2 degree) of the delivery sequence planned with Eclipse. Verification against planned data in 3D using Eclipse TPS were done as well as reproducibility studies.

Results:

Generally there was a very good agreement between planned data and measurement using Delta⁴. Gamma index (3%, 3mm) was generally better than 98%.

For the reproducibility gamma index (0.5%, 0.5mm) nearly all measurement were within 100%.

Reproducibility could be verified also individually for each control point.

Conclusion:

It was shown that Delta⁴ can be used very efficiently to verify RapidArc delivery; the measurement time is only as long as the delivery time and set-up is very fast, thanks to the 3D measurement array no data is missed. Analysis can be done in a few minutes directly after measurement.

QA must not become the bottle neck in RapidArc clinical implementation!

Conflict of interest:

Sponsored by Varian and ScandiDos