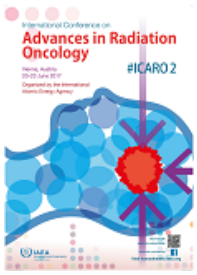

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An evaluation of the portal dosimetry and arccheck systems for VMAT pre-treatment patient QA plan verification

Thursday, 22 June 2017 10:40 (5 minutes)

In external beam radiation therapy the precise patient positioning is essential with the current use of complicated treatment plans. Patient-specific pretreatment verification of volumetric-modulated arc therapy (VMAT) is strongly recommended for all patients in order to detect any potential errors in treatment planning process and machine deliverability, and is thus performed routinely in many clinics. Portal dosimetry is an effective method for this purpose because of its prompt setup, easy data acquisition, and high spatial resolution.
Portal imaging is often used for pre and during treatment anatomical setup verification. Currently the most advanced and widely used amorphous silicon Electronic Portal Imaging Device (EPID) and the Varian TrueBeam linear accelerator were used here for the measurements. A Varian Portal Dosimetry system was compared to a SunNuclear ArcCheck diode array for VMAT pre-treatment patient plan Quality Assurances (QA). For further validation of the method, direct comparisons of the delivered QA beam to the treatment beam were performed using EPDI and the ArcCheck systems and show that gamma passing rates under 2%/2 mm criteria are 90,0%–100% for the all VMAT plans.
The EPDI and the ArcCheck systems showed comparable dosimetric results. In this study, the results revealed both systems to be suitable for patient-specific QA measurements for VMAT. We conclude that, depending on the status of clinic, both systems can be used interchangeably for routine pretreatment QA.

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