

AbstractID: 11381 Title: Comparison of IMRT verifications with a two-dimensional array of diodes and a commercial portal dosimetry system

Purpose: The purpose of this work is to replace our IMRT verification protocol with a commercial portal dosimetry system. Currently, our department performs IMRT verifications for prostate patient's plans using a commercial two-dimensional array of diodes (MapCheck from Sun Nuclear). Our goal is to develop an equivalent QA program using a commercial electronic portal imager (EPID) to simplify and expedite the plans verifications as well as to increase the resolution of our measurements.

Method and Materials: Using Varian aS500 portal imager with the Portal Dosimetry Calculation (PDC) from Eclipse (commissioned according to manufacturer's recommendations), we perform verifications for 15 prostate patients treated at our department. We use a beam-by-beam Γ analysis with a 3%3mm criteria for acceptance and compare the results with our standard verification method using a discrete two-dimensional array of diodes. We compare the Γ scores for absolute dose and calculate beam-by beam space correlations between the portal imager and MapCheck.

Results: The clinical IMRT verifications performed with the EPID are consistent with the ones performed with our commercial two-dimensional diode array. The Gamma scores show a correlation coefficient of 0.77 and almost all the beams within the acceptance limits in MapCheck are within acceptance limits for the EPID. The 3 beams outside the acceptance limit in MapCheck are also outside the acceptance limit in the EPID system. The spatial correlation, although not perfect, is acceptable.

Conclusion: The EPID system with the Varian aS500 and the PDC calculation from Eclipse show essentially equivalent results for prostate IMRT verifications as the two-dimensional diode array. The EPID system has the advantage of set-up simplicity, shorter time and higher resolution and can be implemented as the primary IMRT verification method.