

Introduction: 3D dose verification of IMRT delivery is very time consuming. With the expectation of the increase uses of adaptive IMRT plans in the near future, more efficient way of IMRT QA is needed. We use a 3D diode array for routine IMRT machine QA, and hope it can lead to less plan specific IMRT QA.

Method and Materials: Varian Eclipse, Trilogy with 6MV and 10 MV photon beams using sliding window technique IMRT are used. The 3D diode array is the Delta4 system from Scandidos. Delta4 has 1069 P type Si diodes on three wings, which are inserted to two planes in a cylindrical PMMA phantom. Four single beam plans (one open field, one wedge field for each energy) and two IMRT plans (one typical head and neck with 6MV, and one typical prostate with 10 MV) are used to irradiate the Delta4 weekly. The data of first measurement is set as reference data, subsequent measurement is compared with it by using 2D isodose display, profile comparisons, percentage dose deviation, and DTA and Gamma index. The open field measurement checks the combination of output, PDD, and flatness and symmetry. The IMRT measurement checks the combination of the above parameters plus IMRT delivery at various gantry angles.

Results: Of about 10 weeks of measurements, the average percentage of diode with Gamma index (3% dose and 3 mm) 1 or less is more than 97% with standard deviation less than 2% for the prostate IMRT plan and the single beam plans. For the head and neck IMRT plan, we see more variations (the lowest one is only 78%).

Conclusion: For simple IMRT plans such as prostate, this method works very well. More work has to be done for complicated IMRT plans such as Head and neck.