AbstractID: 4370 Title: A simple Method of Calculating Isocenter Dose from Measured d-max Dose of IMRT Field

Purpose: To provide a simple method of calculating isocenter dose from the measured d-max dose of IMRT fields, then compare the result dose with the calculated isocenter dose from the treatment planning computer system in the patient geometry.

Method and Materials: IMRT plans are developed with Varian Eclipse, and delivered on two Varian 21EX treatment units by using sliding window technique. We use a device with a film holder and a diode holder about 2 cm below the film at central axis of the field. This device is mounted at the block tray level. A Kodar X-OMAT V film gives fluence map and effective field size. A diode (SunNuclear RF-IVD) reading gives the d-max dose. Using the effective field size and the depth from the plan, one can find the effective TMR. The following formula gives the relation between dose at d-max with 100 SSD and dose at isocenter. $Dose\_iso = Dose\_dmax \times TMR \times [(SAD + dmax)/SAD]^2$

Results: We have used this method to calculate isocenter dose from diode readings for about 150 IMRT plans. The average differences between QA isocenter dose and plan isocenter dose are: -0.5 % with a standard deviation of 2.3% for 80 prostate plans using 6 MV photon beams; 2.4 % with a standard deviation of 1.5% for 36 prostate plans using 10 MV photon beams; 2.2 % with a standard deviation of 2.3% for 40 IMRT plans treating sites other than prostate using 6 MV photon beams.

Conclusion: We have good agreement between the QA isocenter dose and isocenter dose from treatment planning system. Unlike IMRT QA methods using phantom, our method also checks a point dose with patient geometry; Unlike MU calculation programs, our method also checks the delivery of the treatment machine.