AbstractID: 10272 Title: Factors Study for MapCheck IMRT QA Evaluation

Purpose: To examine the factors that function in MapCheck IMRT QA result. **Method and Materials:** IMRT plan was calculated with Eclipse planning system and projected into a phantom at gantry angle zero position to create a verification plan. MapCheck QA result variation was evaluated with (1) a linac output fluctuation by calibrated MapCheck at previous 1.007 and current 0.995 linac outputs, (2) an effect of projected phantom slice interval at 0.5cm and 0.3cm, and (3) the number of point passing the criteria with MapCheck comparision models (AD/DTA, RD/DTA, AD/γ and RD/γ). A normalization point was selected as the value difference $\leq$2% and fixed the point was used for all comparison models. All comparisons were done at 3% and 3mm criteria with a threshold 10. **Results:** MapCheck result varied with linac output showed an average improvement of 1.94% from 4 plans and 2.00% from 20 individual fields at CAX reading, and no signification improvement with the comparison models through MapCheck re-calibration. Phantom slice interval difference related with a QA result showed no signification change in CAX reading, and the mean improvement from five field measurements was 0.76%, 1.30%, 5.80% and 4.10% in four comparison models from 0.5cm to 0.3cm interval. There was 100% point passing observed with a normalization point off 3.44%, and 91.8% point passing observed from same testing when the normalization point difference reduced to 0.32%. An average point passing the criteria from four comparison models was 91.81%, 95.71%, 85.77% and 95.30% from 50 fields, and 95.59%, 98.49%, 90.76% and 98.03% from 16 plans. **Conclusions:** A phantom slice interval 0.3cm is suggested for IMRT verification plan projection. MapCheck re-calibration should be considered when a linac output changes. All comparison model results vary with normalization point selection. RD model is more sensitivity to the normalization point selection than AD model.