

AbstractID: 4394 Title: Inter-institution Comparison of Patient Quality Assurance Analysis for Tomotherapy

Purpose: HiArt Tomotherapy unit has been used in the clinics for a couple of years. However, the patient-specific intensity modulated radiotherapy (IMRT) quality assurance (QA) methods vary from center to center. The purpose of this investigation is to analyze and compare the patient specific QA results for the HiArt TomoTherapy between two different institutions.

Method and Materials: A patient-specific IMRT QA procedure was developed and implemented in two different institutions. Once a QA plan is calculated, the dose to a phantom is measured using ion chamber and film. The ion chamber is placed 5 mm below the film which in turn is placed in the equator of a cylindrical solid water phantom. After the plan is delivered to the phantom, the point dose is recorded and the film is processed. Dosimetric analysis is performed after the film and planar dose are co-registered in the TomoTherapy planning station. In total, sixty-three patient QA from one center and fifty-four patients QA from the other were analyzed.

Results: For 52.99% of QA measurements done, the difference between measured and calculated doses was less than 1%. In both centers, the patient specific QA tolerance is set to 3%. In total, 92.31% of patient specific QA can pass the QA. Failure to pass the QA can be attributed to: (1) setup uncertainty (2) resolution differences in scanned QA phantom (3) the machine output fluctuation.

Conclusions: A comprehensive patient QA program has been developed and the results of 117 patients from two different centers are analyzed in this paper. Given the novel approach of TomoTherapy towards IMRT, it is important to see that for the majority of the patients the deviation between planned and delivered doses is less than 3%.