

Purpose: To validate and test the integrity and consistency of the overall Tomotherapy system in delivering of an IMRT plan, producing of a Plan Adaptive from its MVCT scan, dose delivered to MVCT scan, and matching and shifting of a patient positioning using its MVCT scan.

Methods: The phantom was constructed with a solid water slab on the bottom, an IMRT MatriXX in between, and another solid water slab on the top. A Tomotherapy plan was created that contained a target volume in the middle of the phantom and 2 volumes of interest on the lateral and posterior of the target area and was optimized to deliver a prescription dose to the target while minimize the dose to the volumes of interest. A DQA plan was then created and delivered to the phantom to compare the planned and the delivered doses. The phantom was positioned on the treatment couch and scanned to verify the MVCT system in matching and shifting the phantom accordingly to the positioning offset position. The scan dose was also measured from the MVCT scan of the phantom. The MVCT image dataset was then used to create a Plan Adaptive to compare the verification dose and the planning dose.

Results: Measuring and analyzing of the delivered dose to an ionization array of the same phantom and IMRT plan on a routine basic can validate and detect the discrepancy of consistency of the Tomotherapy system.

Conclusions: This QA routine indicates the acceptable application of an ionization array in testing the overall performance of the Tomotherapy system. Further recommendation includes incorporating an inhomogeneity phantom system such as mix the slabs with lighter and/or heavier density material. This QA routine can also be used on other Linacs.