

AbstractID: 2840 Title: Intra- and inter-planner dosimetric variations in inverse planning of IMRT

Purpose:

To investigate intra- and inter-planner variations in dose-volume output in IMRT with identical input parameters (volumes, beams and constraints) for estimation of quality assurance in the treatment planning process.

Method and Materials:

Five collaborators with Helios/Eclipse TPS and Varian accelerator were chosen. The PTV and OAR of prostate, lung and head and neck cases were copied and distributed with instructions having identical beam orientations, beam energy and dose volume constraints. Each planner repeated the treatment planning process three times with inhomogeneity correction to see intra-planner variation. Data were electronically collected for analysis. The study was blind such that planners had no access to the data other than their own. For quality assurance, PDD, dose profiles, leaf leakage etc. were also evaluated.

Results:

There were large variations in the IMRT plans reflected by the DVH among planners even with identical dose and constraints. The PTV coverage as well as OAR was unusually broader. Based on the style and weight in optimization, it provided very different coverage for PTV and other structures. The inter-planner variations in PTV as large as 20% and in OAR up to 60% were found in this study. Similar variations were also noted for the intra-planner study. Every time optimization is performed even with same constraints, the DVH output was significantly different. Differences up to 26% were noted in intra-planner study for all cases. There was no correlation among planner and the cases indicating a random pattern.

Conclusion:

Significant intra- and inter planner variation exists for all cases indicating that for same constraints the outcome cannot be guaranteed to be identical. This study raises significant concerns on the quality of optimization as they cannot converge at the same point. Hence the patient treatments are subject to random variations reflected with treatment planning which could vary significantly.