

AbstractID: 13871 Title: Evaluation of RapidArc techniques in treatment of liver cancer: Comparison with 3D-CRT, IMRT and RapidArc plans

Purpose: A planning study was performed comparing 3D-CRT, IMRT, RapidArc plans with liver cancer case. And we evaluated the performance of the three different advanced treatment techniques through the dose distribution, DVH, and dosimetric parameters.

Materials and Methods: The patient with localized liver cancer of small volume and somewhat constant motion were selected. We performed 3D-CRT, IMRT and RapidArc(RA) plannings such as Double Arcs(2RA), limited Triple Arcs with total gantry angle less than 1000° (3RA) and Multiple Arcs(3MRA) with Eclipse versions 8.6.15. The same dose constraints were defined directly for only CTVs, PTVs except normal organs. The Normal Tissue objective function with the same parameter was used for normal organs such as heart, liver and partial body.

Results: When compared with the ratio of dose enclosing 98% of PTV (I_{98}) and maximum dose (I_{max}) within PTV and body volume between the calculated DVH actually and the defined dose constraints for optimization in 3D-CRT, IMRT, 2RA, 3RA and 3MRA planning, the ratio of I_{98} in PTV ranged from 0.958 to 0.98 and the ratio of I_{max} of both PTV and body ranged from 0.971 to 1.018. The satisfaction of the calculated I_{98} against dose constraint of PTV is the lowest in IMRT and is almost the same among RAs and the best in 3MRA. When evaluated various planning with this indices, 3MRA had a good indices. 3MRA had the lowest MUs of plannings and 3D planning had the highest MUs.

Conclusion: In Conclusion, RA planning is a fast and accurate technique than 3D-CRT or IMRT techniques. Besides, 3MRA planning provided similar sparing of OAR and better PTV dose homogeneity than 2RA or 3RA plannings. Our result suggest that 3MRA planning is able to reduce the MUs further, keeping a similar or better target dose homogeneity, conformity and sparing normal tissue.