

AbstractID: 13896 Title: An Initial Study of Dose distribution in the Junction of SmartArc and 3D Superclavical Fields for Head and Neck Tumors

Purpose: It has been common practice in head and neck radiotherapy to combine IMRT and 3d fields for larynx protection. Half beam block technique ensures a smooth dose distribution in the junction volume. The newly emerged VMAT technique, such as SmartArc, has proved in a variety of cases to achieve similar, or even better, dosimetric tumor coverage and critical organ protection compared with IMRT with the advantage of less needed MU and shorter delivery time. However, dose distribution of junction of VMAT fields with other fields is still an underexplored area. This abstract will present the result of our study on this topic and discuss issues existing if VAMT is to replace IMRT for head and neck cases in combination with 3D fields.

Method and Materials: Treatment planning was performed using Pinnacle version 9.0 planning system on Varian's 21EX Linac treatment machine with constant jaw. Coplanar double arc of 360° was selected in combination with 2 superclavical 3D fields. Control point spacing of the arc beams was set at the default 4°.

Results: Dose distribution in the conjunction volume is very sensitive to the collimator angle. With the commonly preferred collimator angle of 45°, dose in the junction volume can be as high as double the prescription dose. Decreasing the collimator angle improved dose uniformity in the junction, but the tumor coverage in proximity to the junction could be compromised. 0° degree angle proved to produce the best tumor coverage and junction dose uniformity. Best jaw match requires a collimator angle of 90°, but it proved to produce the coldest tumor coverage from the VMAT fields.

Conclusion: More study and efforts are needed to resolve the issue of dose uniformity in the junction volume if VMAT fields are to be combined with 3D fields for head and neck tumors.