

AbstractID: 10357 Title: Planning comparison to determine techniques and role for Volumetric IMRT (RapidArc) in routine treatment planning

Purpose: Compare volumetric (RapidArc 8.6) to static beam IMRT plans for a wide range of anatomic sites to determine: 1) where volumetric can be anticipated to outperform static beam IMRT 2) normal and target tissue morphologic characteristics favoring one approach over the other 3) develop template beam arrangements.

Method and Materials: Large volume pelvis/nodes, head and neck, brain, abdomen, breast and lung were examined. Six recent static IMRT plans were selected for each site and re-planned using volumetric IMRT to achieve the same $D_{05\%}$ PTV coverage. Mean, max, and appropriate V_{Dose} were determined from DVH analysis. Overall volume of healthy tissues treated to prescribed dose (VPTV – VRx) was examined.

Results: Templates were developed for all sites. For pelvis, head and neck and abdomen: two coplanar arcs, collimators $\pm 30^\circ$. For brain two non-coplanar arcs one arc in the transverse and a second in the saggital plane. In breast and lung Hybrid RapidArc was used. Volumetric arc demonstrated improvement in the pelvis: VPTV – VRx 55%; lower (48%-63%), mean bowel dose; 8% lower (2-15%), Bladder V90%; 29% lower (1-47%), Rectum V90%; 8% lower (5-26%). Improvement was seen in the head and neck: Spinal cord/brain stem max dose; 6% lower (1-12%). In contrast mean ipsilateral parotid doses were higher 32 vs 30 Gy. Similar behavior was seen for other sites.

Conclusion: Volumetric IMRT plans reduced dose to healthy tissues except when abutting large (~10cm) concave PTV volumes e.g. parotid. In that case mean dose was similar. When the target was small (≤ 3 cm) abutting normal tissues were easily spared with sharp dose gradients. Volumetric IMRT is a promising technique yielding similar to improved results over static field IMRT for many anatomic sites.

Conflict of Interest : Work was supported in part by a grant from Varian Medical Systems