

Purpose: This investigation focuses on possible dosimetric and efficiency advantages of HybridArc—a novel treatment planning approach combining optimized dynamic arcs with IMRT beams. Application of this technique to two disparate sites, complex cranial tumors and prostate, was examined.

Methods: HybridArc plans were compared to either dynamic conformal arc (DCA) or IMRT plans, in order to determine whether HybridArc offers a synergy through combination of these two techniques. Plans were compared with regard to target volume dose conformity, target volume dose homogeneity, sparing of proximal organs at risk, normal tissue sparing and Monitor Unit (MU) efficiency.

Results: HybridArc produced improved and comparable dose conformity for cranial and prostate cases, respectively, compared to IMRT. Using the DCA technique produced inferior results on average in this regard, for both sites. For prostate cases, HybridArc also offered the advantage of improved dose homogeneity in the target volume compared to IMRT. Both arc-based techniques distribute peripheral dose over larger volumes of normal tissue compared to IMRT, while HybridArc involved slightly greater volumes of normal tissues compared to DCA. Compared to IMRT, cranial cases required 38% more MUs, while for prostate cases, MUs were reduced by 7%.

Conclusions: HybridArc is capable of improving dose conformity and dose homogeneity for cranial and prostate cases, respectively. MU efficiency may depend on the complexity of the case.

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