

PURPOSE: To compare mMLC and GK with respect to physical dose characteristics.

METHODS: Ten patients with irregularly shaped AVMs, previously treated with a manual 1.5 mm leaf mMLC, were selected for study. All cases were replanned for GK (Model B) with a goal of achieving the best conformality possible by using as many isocenters as needed. Comparison parameters included: target coverage (TC), conformity index (CI) at 100, 80, 50 and 20% of prescribed dose, homogeneity index (HI), target minimum dose, tissue maximum dose, treatment time.

RESULTS: All plans achieved a minimum target coverage of 95%. Mean/median CI at the prescription isodose line (PI) for mMLC and GK was 1.4 and 1.6, respectively; mean CI for lower IDL's (80, 50, 20% of PI) were 2.5, 5.2, 19.0 (mMLC) and 2.4, 4.6, 15.0 (GK). For mMLC and GK, mean HI was 1.25 and 2.0, target minimum dose 84% and 73%, and tissue maximum dose 97% and 161%, respectively. The actual mean treatment time after initial patient setup was 48 minutes for mMLC cases; it was estimated at 2.3 hours for GK using a mean of 17 isocenters.

CONCLUSION: Radiosurgery (RS) delivered with GK or mMLC results in comparable dose distributions with respect to target conformity and coverage for irregular targets. Dose inhomogeneity and tissue maximum dose are much higher with the GK; dose falloff is minimally more rapid with GK. Since conformality at PI is considered a major determinant of target control and rate of complications, mMLC with very fine leaves may be an effective alternative to the GK.