



Radiosurgery of functioning pituitary adenomas: Comparison of different treatment techniques including dynamic and conformal arcs, shaped beams, and IMRT

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ABSTRACT

Evaluation of different techniques including intensity-modulated radiotherapy (IMRT) for stereotactic radiosurgery (SRS) of pituitary adenoma (PA).

Between January 2003 and February 2005, 152 SRS procedures were performed. Ten patients with PA were compared: conformal vs. dynamic arc treatment with micromultileaf collimator (mMLC) vs. circular collimators vs. 8–10 conformal static mMLC beams with and without IMRT. Prescribed total dose: 18 Gy (90%). Constraints: Dmax optic chiasm <8 Gy, Vol10Gy temporal lobe <10 mL. End points: coverage, conformity index, homogeneity index (HI), Vol10Gy temporal lobe.

SUMMARY

For the end point “improvement in coverage,” an advantage with IMRT was noted for 5 of 10 patients as compared with the dynamic arc approach. Volume treated >18 Gy outside the planning target volume was lowest in 9 of 10 patients after IMRT; 1 patient achieved

better conformity with circular collimators. As for Vol10Gy temporal lobe, an advantage was depicted for 1 of 10 patients with IMRT, the other techniques appearing equally effective in shielding the temporal lobe. With all techniques Vol10 Gy temporal lobe was <10 mL and Dmax optic chiasm <8 Gy. However, using circular collimators yielded the highest maximum dose with 39.8 Gy (HI, 2.2) as compared with 20.46–21.74 Gy (HI, 1.13–1.2) for other approaches.

CONCLUSION

Novalis-based radiosurgery using dynamic arc treatment with mMLC is considered a safe and appropriate approach for SRS of PA.