

Radiosurgery with Linac and Micro Multi-Leaf Collimator (mMLC)

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Objective: To determine the efficacy, advantages and disadvantages of radiosurgery using on one hand circular collimators and on the other hand a Micro Multi-leaf collimator.

Material and Method: Between 1993 and 1999, 95 patients were treated at the CHUV with Linac radiosurgery (Varian 6 MV). Since November 1999, another Linac (Siemens Primus 6 MV) has been equipped with a Micro Multi-leaf Collimator (M3-BrainLab) allowing conformal treatments, and 33 patients have been treated with this equipment. Lesions treated were AVM, acoustic schwannomas, meningiomas, metastases, pituitary tumors, hemangioblastomas, small gliomas.

Results: The efficacy of treatment cannot be commented strictly, considering the short follow-up using the new technology. However, compared to previous technology available at the CHUV, M3 with its hardware and software, provides a more homogeneous dose distribution in oddly shaped lesions, a reduction in the time invested in planning, the possibility of fractionated treatment using mask immobilization. Software allows CT, MRI, angio images fusion, projection of isodose curves, 3D visualization of lesion and isodose distribution, quantitative evaluation of target volume and critical structures (Dose Volume Histograms, DVH), and simulation of treatment. **Conclusion:** Compared with the previous technology using circular collimators, the new Micro Multi-leaf Collimator has allowed to treat more complex lesions, to use fusion techniques of images, a more precise definition of the volume, and less time invested in planning the treatment. The possibility of fractionated treatments offers clear radiobiological advantages in some lesions compared to radiosurgery. Conformal treatments and homogeneous dose distribution, characteristic of the technology using the Micro Multi-leaf Collimator should reduce the complication rate of radiosurgery.