

A variety of techniques are used in the radiation therapy of brain tumors. The dose to critical normal tissues outside the treatment volume such as thyroid, lens and gonads is a concern and is dependent on the field arrangement. We have used in-vivo dosimetry to estimate doses to these and other organs for three treatment techniques, parallel opposed lateral whole brain, three field vertex (laterals and vertex) and stereotactic radiosurgery (four non-coplanar arcs). Different patients were treated. All treatments were delivered with a 6 MV photon beam (Varian 2100 C/D). LiF-100 TLD chips surrounded by full buildup were placed on the patient's skin over eye, thyroid, chest, gonads and ankle. The highest dose, 6.7% of the dose to isocenter, was delivered to the thyroid with the three field vertex technique. The simulation and port films showed the vertex field exited through the thyroid and the TLD measurements agreed with the treatment plan isodose distribution. For the other organs and field arrangements, the in-vivo dosimetry was typical of out-of-field doses. For example gonadal doses were < 0.5% of isocenter for all techniques. With the radiosurgery technique, all measured organs received less than 1% of the dose to isocenter. These findings should be considered in designing treatment fields, especially for patient with long expected survival.