AbstractID: 8139 Title: I-125 Liquid in an Intracranial Balloon -- TG-43 Formalism for an Extended Source

A commercially available intracranial balloon with a catheter leading to a transdermal infusion port is implanted in the excision cavity of a glioblastoma multiforme (GBM). The balloon is filled with a saline solution containing I-125 in a molecular form that inhibits uptake by the thyroid in case of leakage. This homogeneous spherically symmetric radioactive source is used to irradiate the tumor bed. The implant remains in place for several days with a dose rate on the order of 50 cGy/h at a distance of 1 cm from the balloon. Because of the diffuse character of the activity distribution, the dose falloff is found to be less extreme and more predictable than other brachytherapy techniques. It provides better sparing of surrounding tissue than treatment with external beams. Treatment planning dose volume histograms are used to compare the distribution to equivalent external beam treatments. The TG-43 geometry factor $G(r,\theta)$ and the radial dose function $g(r)$ for this diffuse extended spherical source are computed, and an air kerma strength conversion factor is presented.