AbstractID: 9164 Title: A Simple Independent Dose Calculation Method for Verification of Treatment Time in Gamma Knife Radio-Surgery Using Integral Dose

**Purpose:** to develop a simple independent dose calculation method to verify the treatment times prior to Gamma Knife radiosurgery, using models B or C.

**Materials and Methods:** Our approach uses the total integral dose of the whole skull as an end point for comparison. The total integral dose is computed using a spreadsheet and is compared to that obtained from Leksell GammaPlan. It is calculated as the sum of the integral doses of 201 beams, each passing through a cylindrical volume for each shot. The average length of the cylinders is estimated from the skull-scaler measurement data taken before treatment. Correction factors are applied to the length of the cylinder depending on the location of a shot in the skull. The radius of the cylinder corresponds to the collimator aperture of the helmet, with a correction factor for the beam penumbra and scattering. Correction parameters were derived empirically from multiple treatment plans based on one patient’s geometry.

**Results:** We have tested our simple spreadsheet program using 40 patients treated in our center. These patients differ in geometry, size, lesion locations, collimator helmet and treatment complexities. The results showed that the observed differences between the treatment planning and our calculation are typically within 3%, with a maximum difference of 3.7% to date.

**Conclusion:** We demonstrated that our simple spreadsheet program is a convenient and effective independent method to verify treatment times prior to Gamma Knife radiosurgery.