

## Abstract ID: 9682 Title: Peripheral dose investigation of factor pusco llosotomy by Gamma Knife, Model C.

**Purpose:** Corpus callosotomy by Gamma Knife Radiotherapy is a treatment for medically refractory epilepsy. Due to the long treatment duration (3-6 hours), the peripheral dose received by patients becomes a concern. In this study, peripheral doses for a posterior corpus callosotomy by Gamma Knife, Model C were investigated.

**Method and Materials:** RANDO-Phantom was used to measure the peripheral doses. Three types of dosimeters systems were used, which included ionization chambers, TLDs (TLD-1003 x3x1mm chips), and OneDose™ MOSFET dosimeters. The dosimeters were placed on the surface of the RANDO-Phantom under 0.5 cm of build-up at distances of 5.0, 17.5, 30.0, 42.5, 54.0, 70.0 and 84 cm from the center of the treatment volume. Seven cylindrical ionization chambers with build-up caps were placed at the same distances, one chamber at each position. The leakage of the ionization chambers was measured before irradiation and recorded during treatment sessions. The phantom was irradiated using a clinical treatment plan for a posterior corpus callosotomy. The prescription dose was 130 Gy (max dose), and the delivered dose was reduced to one-third of the prescription dose for measurement purposes. The treatment time was 99.38 minutes.

**Results:** The measured doses by TLD were 17.9, 9.9, 5.8, 2.9, 2.4, 1.5, and 1.1 cGy for these seven positions respectively. The measured doses by ionization chambers were 16.9, 12.0, 5.2, 2.9, 2.8, 2.2, and 2.0 cGy. The results obtained with the OneDose™ were not consistent due to the decay of the signal over the period of measurement. The doses measured by TLD and ionization chamber for the same position were averaged. The total doses to the measurement positions were 52.2, 33.0, 16.5, 8.7, 7.8, 5.7, and 4.8 cGy, respectively, for the full prescription dose of 130 Gy.

**Conclusion:** The peripheral doses were significant, especially in the head and neck region.