

AbstractID: 11659 Title: Measuring Extracranial Dose with the Leksell Gamma Knife Model 4C using Gafchromic EBT Film

Purpose: Measure scatter and leakage dose in critical, extracranial organs for patients undergoing Leksell Gamma Knife Radiosurgery. **Method and Materials:** A stereotactic frame was attached to the head of an anthropomorphic Rando phantom. Using a fiducial box to determine the coordinates of the target (center of the Rando head), a CT scan was taken and registered in the GammaPlan treatment planning system where a dose prescription of 25Gy to the 50% isodose line was applied to the target site. The plan was generated for the 18 mm collimator size helmet with a single shot run using the automatic positioning system (APS). Multiple (2 to 5) 2"x2" Gafchromic EBT films were placed between each slice of the Rando body phantom, from the neck to pelvic region (phantom slice 8 to 31), and analysis was done using a Vidar VXR-16 scanner with the RIT113 Version5.1 analysis software. An H&D curve was created using Gafchromic EBT film, a calibrated 0.05cm³ ion chamber, the Keithley 35617EBS Programmable Dosimeter, and a framed 16cm diameter sphere phantom (with film and ion chamber inserts). **Results:** The extracranial dose measured in regions of interest were 11.3±1.1cGy for the thyroid, 8.7±1.3cGy for the thymus, 5.1±0.4cGy average for the adrenal glands, 1.0±0.2cGy average for the ovaries, and 0.8±0.3cGy for the testes. **Conclusion:** The extracranial dose during Gamma Knife Radiosurgery will depend on the total target dose and distance of the organ from the isocenter during treatment. The greater the prescription dose, the larger the dose to the extracranial organs; dose will also decrease with increasing distance from the focal point. The doses are low but may be considered for younger patients with longer life expectancy.