AbstractID: 9626 Title: Gamma Knife Quality Assurance Technique for Treatment of Functional Disorders

Purpose: Present the technique used for commissioning and validation of Leksell Gamma Knife Radiosurgery machine for treatment of functional disorders. **Method and Materials:** Leksell Gamma Knife C Radiosurgery machine was commissioned and validated for use for treatment of functional disorders such as Essential Tremor and Parkinson Disease. These patients are treated with 4 mm collimator to a much higher radiation dose of 120 Gy to the nerve. Due to the proximity of the target with vital structure, internal capsule it is very critical that the target localization and delivery accuracy is maintained to less than 1 mm. The isocenter verification of the machine was done using the Elekta target localizer using Gafchromic film, which was calibrated for dose range from 5 Gy to 120 Gy. The isocenter was verified along X,Y and Z orientations. The beam profile for the 4 mm collimator was determined using films exposed along X-Y and X-Z plane . The FWHM along both planes were determined from the scans converted to dose, and compared with the data in the Leksell Gamma Plan software. The absolute output for 18 mm collimator was determined using a micro chambers in a spherical phantom . The film from the same batch of calibration was irradiated with 18mm and 4 mm collimator . The ratio of the doses was used for output factor of 4mm relative to 18 mm collimator for dosimetry. The computer generated plan was verified in a phantom with ion chamber, and TLD measurements. .**Results:**The root mean square deviation of target isocenter was 0.6mm . The beam profiles agreed within planning system to 0.8 mm . The absolute dose agreed with computer value to 1.2%**Conclusion:** Using these tests we have established confidence in the dosimetry and localization for use on patient.

Conflict of Interest (only if applicable):