

## AbstractID: 4393 Title: Application of the Post-Processing Dose tool (PPD) to dosimetrically compare Gamma knife and Hi Art tomotherapy

**Purpose:** To develop a tool that enables us to process the dose matrix generated by the same or different radiation treatment planning system.

**Method and Materials:** A Matlab tool was developed in order to post-process the dose matrix generated from different treatment planning systems. Currently, the tool can import the dose matrix from Pinnacle<sup>3</sup>, Tomotherapy, Nomos Corvus and gamma knife planning computers. Tumor contours can also be imported. Using the tool one can calculate region-of-interest dose statistics, dose volume histograms (DVH), 2D dose maps, 3D dose maps, effective uniform dose (EUD), biological uniform dose (BUD), and dose profiles. The software tool can produce a comprehensive report that includes all the calculation. The software has been used to facilitate a comparison study between Tomotherapy and Gamma Knife for radiosurgical cases. The conformality index, defined as the ratio of the prescribed dose divided by target volume, was used to evaluate the treatment plans. Maximum dose, minimum dose, means dose, DVH and treatment time were also parameters used in the comparison.

**Results:**

Five gamma knife patients have been selected as candidates for the dose comparison between tomotherapy and gamma knife. All five patients had single brain lesions. Results show that tomotherapy can achieve the same DVH with higher dose conformality as compared to GK. However, the treatment volume of the lower dose lines (<10 Gy) is higher than gamma knife.

**Conclusion:** A Matlab tool has been developed for post-processing dose matrices generated by different treatment planning systems. The tool has been applied on comparison of the radio surgery cases between tomotherapy and gamma knife. The comparison results show that tomotherapy can deliver radio surgical precision and achieve the same results as gamma knife considering conformality index, maximum dose, minimum dose and mean dose in the tumor.