

AbstractID: 5149 Title: TomoDose: A daily quality assurance device for helical TomoTherapy

**Purpose:** We have characterized TomoDose (Sun Nuclear Corp.), a daily QA device for TomoTherapy, which monitors in-plane and cross-plane beam profiles as well as machine output. These parameters were tracked over a one-year period to determine the stability of the device.

**Method and Materials:** Daily measurements were carried out over a one-year period. The data included in-plane, and cross-plane measurements with TomoDose and ion chambers. Periodic measurements with a water scanner and film profiles were also carried out for comparison. For consistency, these measurements were carried out at equivalent depths. An Exradin A1SL chamber was used for the point dose measurements, and a TomoScanner (Standard Imaging) water scanning systems used for profile verification. Kodak EDR2 film was also used for profile verification. Machine profile analysis using TomoDose, as well as film/water scanning comparisons, were carried out using DTA criteria (distance to agreement criteria of VanDyk et al).

**Results:** TomoTherapy Output varied by +/- 1.75% based on TomoDose output analysis and by +/- 1.56% based on ion chamber measurements. In-plane profile analysis indicates that 100% of the DTA are less than 4 mm and 95% less than 3 mm. Cross-plane profile analysis indicates that 100% of the DTA are less than 3 mm. TomoDose retained its calibration for approximately 8 months after which recalibration was required. There is a significant linear relationship ( $P < 0.01$ ) between TomoDose unit and ion chamber outputs based on SPSS correlation analysis.

**Conclusion:** TomoDose accurately predicted increases and decreases in machine daily variation. The results demonstrate that TomoDose is an acceptable QA device capable of carrying out daily, as well as periodic, verification of TomoTherapy output and profile parameters.

**Conflict of Interest (only if applicable):**