

## AbstractID: 6606 Title: Evaluation and performance characteristics of an implantable dosimeter with the TomoTherapy Hi-Art System

**Purpose:** To evaluate the performance of an implantable dosimeter for IMRT treatment delivery and daily dose verification with the TomoTherapy Hi-Art System.

**Method and Materials:** The DVS® dosimeter from Sixel Technologies was used to measure the dose delivered with TomoTherapy and was compared against the treatment planning calculation and ion chamber measurements. Two DVS® devices were used. One of the devices tracked the dose for a static tomotherapy beam. The other device tracked the dose for an IMRT prostate treatment plan. Comparable measurements were obtained with a NIST-traceable calibrated ion chamber. All three detectors were placed at isocenter within a uniform cylindrical phantom. Before delivery, MVCT scans were made for treatment position verification followed by measurements.

**Results:** Day-to-day position verification using MVCT scans for both types of dosimeters was reproducible. When comparing the results for the static beam delivery, the cumulative dose error was 0.4% between the ion chamber and the DVS® dosimeter. The results for the first 10 fractions resulted in an average percent difference of 0.70% from the planned dose with a standard deviation of 0.92%. When comparing the results for the prostate plan, the cumulative dose error was 3.2% between the ion chamber and the DVS® dosimeter. The results for the first 10 fractions resulted in an average percent difference of 0.68% from the planned dose with a standard deviation of 1.0%.

**Conclusions:** The measurements made by the DVS® dosimeter falls within the device's specified accuracy of the dosimeter. The DVS® device is easily identifiable with the Hi-Art TomoTherapy System and is an effective fiducial marker. MVCT verification scans did not contribute any significant dose nor did they affect the accuracy of the DVS® device.

**Conflict of Interest:** Sixel Technologies, Inc provided the equipment and materials used in the study.