

## AbstractID: 3023 Title: Evaluation of Film Calibration Procedures for Quality Assurance of Helical Tomotherapy Treatments

**Purpose:** To evaluate and compare film calibration procedures using a conventional 6 MV static beam and an optimized helical tomotherapy plan for the patient-specific QA of tomotherapy treatments.

**Method and Materials:** The conventional 6 MV static beam was delivered by a Varian 2300CD Clinac to blocks of solid water. Three different doses were delivered to each of two Kodak EDR2 films, giving a total of six dose values. Cerrobend blocks were used to cover portions of the film outside each field in order to prevent contamination from one field to the others. The optimized helical tomotherapy plan was delivered by a TomoTherapy Hi-Art™ System to a cylindrical solid water phantom. Nine cylindrical ROIs were contoured within the phantom along the horizontal and vertical axes. This procedure produces two films with a total of nine different dose values. All films were analyzed using in house software coded in LabVIEW™. Each calibration procedure was evaluated on the basis of accuracy, efficiency and ease of implementation.

**Results:** Both the conventional 6 MV static beam and optimized helical tomotherapy plan were able to deliver the dose accurately, with the static beam producing a steeper gradient in the vertical direction but better uniformity in the coronal plane. It took approximately the same amount of time to complete each procedure.

**Conclusion:** The conventional 6 MV static beam is able to deliver a slightly more uniform dose to the film plane. However, the optimized helical tomotherapy plan provides sufficient accuracy, is able to add more points to the calibration curve in the same amount of time and is delivered with the same beam and phantom used to deliver the patient treatments. For this reason, the optimized helical tomotherapy plan has been implemented as the film calibration procedure for patient-specific QA of tomotherapy treatments.