

## AbstractID: 4869 Title: Utility of Film Dosimetry for Assessing TomoTherapy Treatments of Superficial PTVs

**Purpose:** To assess the utility of film dosimetry in a cylindrical polystyrene phantom for evaluating the accuracy of dose calculated by the TomoTherapy HI-ART treatment planning system for superficial planning target volumes (PTVs).

**Method and Materials:** A TomoTherapy treatment plan was developed for a superficial PTV (1-cm deep radially by 90° azimuthally by 4.2-cm longitudinally) contoured on a 27-cm diameter by 37.4-cm long cylindrical white opaque polystyrene phantom. The phantom included two removable planar film cassettes, one perpendicular to and one including the cylinder's axis. Kodak EDR2 film was cut using templates, resulting in film edges coinciding with the phantom surface ( $\pm 0.25$ -mm). The axial film was irradiated according to the TomoTherapy plan then the phantom was translated longitudinally and the sagittal film irradiated. The films were scanned with a Vidar film digitizer, converted to dose, and the common depth-dose curves compared. Measured axial and sagittal dose distributions were compared with those calculated.

**Results:** The common depth-dose of the axial and sagittal films agreed well, although the axial film had a lower relative dose by 2.5%. Comparisons of measured and calculated dose on the axial film showed agreements to within 5% at depths greater than 3-mm. At shallower depths, doses showed larger differences but distance-to-agreement values were small ( $< 2$ mm). These differences could be due to planned to delivered dose alignment techniques and/or the film cutting process, which is under investigation.

**Conclusion:** Orthogonal films irradiated in a cylindrical polystyrene phantom produced common depth-dose curves that agreed well. Future comparisons with thermoluminescent dosimetry should confirm the utility of EDR2 film for a comprehensive study of the accuracy of the TomoTherapy treatment planning system for planning treatments of superficial PTVs normally treated with electrons.

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