Abstract ID: 18832  Title: Comparative Evaluation of EBT2 Film, Matrixx and PTW729 for Patient Specific, Small-Field, High Dose IMRT Plans

Purpose: To compare the use of Gafchromic EBT2 film and 2D array ionchamber detectors (IBA Matrixx and PTW729) as a QA tool for patient specific QA of small-field, high dose IMRT plans.

Method and Materials: EBT2 film is designed to detect high dose gradients with excellent spatial resolution powerâ€”100um. The film has wide dose coverage of 1cGy â€“ 1000 cGy in red color channel and therefore can serve for high dose applications. In the study, the film was calibrated by a 6MV photon beam in a water-equivalent phantom. Measuring the performance of the EBT2 film and 2D array ionchamber detectors was proceeded simultaneously by inserting a film between the top build up and top of the ionchamber array. In all, eight previous patient cases, planned on BrainLab iPlan Version 4.1.1 and delivered by Varian TX Novalis, were re-delivered. Differences were evaluated using dose profile and Gamma Index comparisons.

Results: For EBT2 vs. planar dose, X and Y profiles of the film were similar to the planar dose. Dose profiles from the film showed better agreement than Matrixx and PTW729 due to improved spatial resolution in high dose region. The high gradient dose region is also very well matched. For Matrixx and PTW729 vs. calculated dose, the Matrixx and PTW729 dose profile were unable to resolve the smaller peaks within the target region. The overall Gamma evaluation results showed that the stricter the analysis criteria were, the lower the percentage pass rate occurs on Matrixx and PTW729.

Conclusions: Results show that EBT2 film is able to better characterize the calculated dose distribution for small fields due to its better spatial resolution as compared to Matrixx and PTW729. Additionally, Matrixx and PTW729 appear to show lower Gamma Index values as the evaluation criteria is restricted.