

AbstractID: 13119 Title: Implementing Patient Specific Plan QA for CyberKnife: Comparison between Two Independent Systems

Purpose: Patient specific plan QA (PSPQA) is not in current practice for CyberKnife (CK) application mainly due to lack of facilitated procedures. We present the importance of implementing PSPQA for CK, compare, discuss procedures involved and analyze results obtained from two independent systems. **Method and Materials:** Since CyberKnife was designed to deliver SRS/SRT treatments plans to critical structures no PSPQA has been introduced for the system yet. In this work, we evaluate two independent systems in performing PSPQA; First PTW 2D array with Octavius; a planar chamber array with 1cm center-to-center distance and 5mm spacing (Seven29) and the other is film-chamber-based analysis with FilmQA. Eight plans were evaluated with target volume ranging from 37cc to 225cc. **Results:** The PTW system exhibited standard gamma criteria characteristic (3% dose difference, 3mm DTA) for most CK plans larger than 3 cm. Eight plans exhibited an absolute % dose difference of 0.0(1.8) and an overall average %dose difference, %DTA and %gamma equivalent to 75.4(7.0), 89.6(4.1) and 95.2(2.3). The % dose differences improved following the correction from an average of %75 to over %85. With 3% and 2 mm criteria, Gafchromic FilmQA presented excellent fusion and dose overlay with DD, DTA and gamma index agreements of 90.5(6.6), 95.8(7.0) and 98.6(2.0) respectively (n=74). The percent chamber absolute dose difference equivalent to %1.1(2.2). Evaluations showed surprising variation based on the filtering option selected. **Conclusion:** PSPQA is absolutely essential for CK plans. Tools such as film-stereotactic chamber or 2D ion chamber array can be used to achieve it. Further investigation needed to evaluate PTW 2D array for target lesions that are either < 3 cm or with high dose. The optimal choice of performing the QA analyses may depends on the policy and passing criteria set by the user.