

AbstractID: 13487 Title: Respiratory Organ Motional Effect on the Dose Distribution in Tomotherapy

**Purpose:** The respiratory organ motional effect on the dosimetric accuracy in Tomotherapy was analyzed according to the range and cycle of organ motion combined with the effect of field width in Tomotherapy plan. **Method and Materials:** The three Tomotherapy plans according to the different field widths (1.0cm, 2.5cm, 3.0cm) were developed for the treatment of lung tumor. The DQA (Delivery Quality Assurance) plans were prepared with the CT data of MapCHECK inserted in the MapPHAN (SunNuclear, USA) phantom. The phantom system which can simulate one dimensional respiratory organ motion was used and two motional ranges (1.3cm, 3.0cm) and two motional cycles (3.0sec, 6.0sec) were applied to the measurement of dose variation in the delivery of each Tomotherapy plan. The coronal dose distributions were evaluated in total fifteen Tomotherapy deliveries and the criteria for the determination of pass in MapCHECK were 3% of dose and 3mm of distance. **Results:** A considerable dosimetric error was occurred as increase of organ motional ranges. The effect of field width on the dosimetric accuracy in the condition of organ motion could not be analogized with a definite trend although the large field width (5.0cm) showed the a little higher average pass rate compared with other field widths. The analysis results of the effect of organ motional cycle showed some consistent trend which indicates a degraded dose accuracy as an increase of the cycle. **Conclusion:** Based on these results, we could verify that the proper factors should be applied in Tomotherapy planning process in order to reduce the organ motional effect and the effective data should be accumulated from the experiments which can simulate various patients' organ motional features to find the optimized planning factors.