

## AbstractID: 7190 Title: Clinical study to evaluate the dose calculation accuracy for IMRT lung patients

**Purpose:** There is a deficiency in clinical data and evaluations of dosimetric performance in a commercial TPS in clinical setting for IMRT lung patients. The purpose of this study is to compare a full Monte Carlo dose calculation with a commercial PB TPS for 25 IMRT lung patients.

**Method and materials:** In this study, we have compared Monte Carlo simulation with pencil beam algorithm (CORVUS) TPS for 25 IMRT lung patients. The treatment plans which were used in the study are for patients who were previously treated with 6MV IMRT beam in our clinic. Full Monte Carlo simulation for each patient was performed using the CT data. Dose comparison between MC and TPS was performed within the lungs, heart, spinal cord, GTV, GTVP, and esophagus. The comparison involved evaluation of the mean dose difference,  $D_{max}$ ,  $D_{50}$ ,  $D_{min}$ , lung's  $V_{20}$ , lung's  $V_{30}$ , DVHs, and EUDs. The study also includes dose comparison between ion chamber measurements, TPS, and MC in solid water phantom.

**Results:** Comparison in solid water shows that MC agrees within  $\pm 2\%$  with the TPS. On the other hand, MC and TPS dose comparison for the realistic situations shows up to 8% difference, for some patients. The largest variation was seen at the GTV-P regions. Dose comparison for the organs at risk shows small difference between MC and TPS for all the patients. The EUD differences between MC and TPS for the organs at risk show small variations up to 1.2 Gy. These variations become more significant in the high dose region and reach up to 6Gy.

**Conclusion:** Significant variations in lung dose between MC and PB TPS were reported in this study. The variations between MC and TPS disappear after performing the measurements in water phantom. Reported EUD shows significant variation for IMRT lung patient.