AbstractID: 2090 Title: Verification of dose accuracy in a commercial planning system for IMRT lung cancer treatments

IMRT for lung cancer treatments has been delayed due to two technical issues -- the accuracy of IMRT dose calculation in heterogeneous structures and the motion of tumor volume and lungs. In this study, we verified the dose calculation accuracy in a NOMOS CORVUS IMRT planning system on five patients with lung tumors at different parts of the lungs. Tumor volumes ranged from 15 to 123 cc with 4 to 8 cm in one dimension. A plan was generated for each patient using a CORVUS V5.0 system with tissue inhomogeneity correction and 1x1 cm^2 beamlet size. All plans were normalized to ensure 95% tumor volume coverage by the prescription doses. The dose distribution of each plan was then recalculated in a benchmark Monte Carlo method using the beam intensities extracted from CORVUS-generated MLC files for the plan. Calculation uncertainties were less than 1%. Dose volume histograms of tumors and surrounding structures were reconstructed and compared with those calculated by CORVUS. Comparisons showed that CORVUS over-estimated doses to tumors in all 5 patients with discrepancies in mean doses ranging from 3 to 6% of prescription doses. The worse case was 18%. Discrepancies in doses to the 95% tumor volume ranged from 2 to 7% of prescription doses, with a worse case of 27%. Discrepancies in mean doses to normal lung tissues and spinal cord in all cases were within 2% of prescription doses. The doses physically delivered to the tumor volumes were found inferior to planned dose coverage.