AbstractID: 13047 Title: Dosimetric comparison of low dose region (V5) for Tomotherapy versus conventional IMRT plans of lung cancer

Purpose:
To compare clinical Tomotherapy plans for lung cancer with conventional IMRT plans in terms of mean lung/ventricle dose, heterogeneity index, V5, V10, V15, and V20 for total lung.

Method:
The conventional IMRT plans for 16 patients treated with clinical Tomotherapy plans were made retrospectively with Pinnacle 8.0 for Varian 6EX. We designed the conventional plans to achieve comparable target coverage as well as maximum spinal cord dose of the clinical Tomotherapy plans. To minimize any planning-related subjective issue, nine-beam angles aligned through anterior-posterior directions were chosen for all cases. Multiple iterative processes were performed until the objective functions were minimized and the treatment planning goals were met. Dosimetric parameters of the two types of plans were compared in terms of avoidance of normal tissues (i.e., total lung and ventricle).

Results
Median differences in lung between the Tomotherapy plans and conventional IMRT plans for 16 patients were 7.4%, 4.4%, 3.0%, and 1.9% for V5, V10, V15, and V20, respectively. Median ratios of mean lung dose and mean ventricle dose between the Tomotherapy plans and conventional IMRT plans were 1.2 (range, 0.97~1.41) and 1.6 (range, 0.86~2.55), demonstrating that dose to normal tissues for conventional IMRT plans, especially in low dose region (V5~V10), was considerably lower than Tomotherapy plans for lung cancer. However, median ratio of heterogeneity index defined as D5%/D95% was 0.96 (range, 0.86~2.55) indicating better dose-uniformity of Tomotherapy plans, which resulted from the difference in number of beam angles for the two different plans.

Conclusions
Median V5 of conventional IMRT plans was lower than that of Tomotherapy plans, showing that conventional IMRT plan appears to be effective in low dose region (V5) for lung cancer. However, Tomotherapy plans showed better dose-uniformity in terms of target coverage.