AbstractID: 14343 Title: Poorly and Well Functional Lung Regions Change Differently after Radiation in Lung Cancer

Purpose/Objective(s): This study aimed to investigate local regional function changes at 3 months after radiotherapy (RT) and their relationship with baseline (pre-RT) and during-RT functional level in patients with non-small cell lung cancer (NSCLC).

Materials/Methods: 60 patients with stages I-III NSCLC were eligible for this prospective study. The patients were treated with a definitive course of RT to >= 60Gy, ±chemotherapy. Ventilation and perfusion (V/Q) SPECT-CT were performed pre-, during-, and 3 months Post- RT. The pre-RT SPECT was used to map the lung into three functional regions: FL=functional activity > 60% of normal lung; PF= functional activity 30-60% of normal control; and DF=functional activity < 30% of normal control. SPECT-CT scans of various time points were registered with simulation CT for dosimetric computation. Paired t-test was applied for statistic assessment, $p<0.05$ was considered to be significant.

Results: Preliminary results of 15 patients with a minimum follow-up of 24 months are summarized here. On average, regional function reduced by 10-24% 3 months after completion of radiation therapy. Such reduction was significantly correlated (positively) with the functional levels at baseline and changes at 45 Gy during-RT. For example, perfusion function reduced significantly in FL region in 80% (12/15) patients, while the DF lung regions improved after high dose radiation in 85% of patients (13/15). Dose response differed among lung regions of FL, PF and DF (Figure-1 for all patients, Figure-2 for example).. A great individual difference on dose response relationship was seen cross all patients of DF regions. Overall functional changes at 3 months was significantly associated with long-term grade 1 radiation-induced-lung-toxicity by 24 months (P=0.02).

Conclusions: Lung regions with vaious function at baseline change differently after radiation in patients with NSCLC. This is interesting, deserves further study.

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