

AbstractID: 14342 Title: Metabolic Tumor Activity and Metabolic Tumor Volume at 3 Months after Radiotherapy in Patients with Lung Cancer

Purpose: To investigate post-radiotherapy (post-RT) changes in both metabolic activity and tumor volume in patients with non-small cell lung cancer (NSCLC) and compare to those observed during radiotherapy (during-RT).

Patients and methods: Eligible patients included those with NSCLC who were enrolled into prospective PET-CT imaging trials. All patients were administered definitive radiotherapy with or without chemotherapy. PET-CT scans were obtained at a minimum of three time points: pre-RT, during RT and post RT. For tumor delineation based on PET, tumor metabolic activity was normalized to that of the mediastinal blood pool (aorta), and tumor/aorta ratio (TAR) of 1.5 was used for autosegmentation. Anatomy knowledge based manual editing was applied as indicated. PET metabolic tumor volumes (PET-MTV) and CT gross tumor volumes (CT-GTV) were delineated using a same methodology throughout the scans. Metabolic tumor activity (MTA) was measured within the MTV using FIAT. Regression analysis was used for statistic test.

Results: 14 patients satisfied the criteria were analyzed. The median duration from the end of RT to post-RT scan was 3.0 months (range 2.0-13.0 months). The normalized MTA demonstrated a remarkable reduction ($P<0.01$). PET-MTV and CT-GTV also significantly reduced from the pretreatment levels. The median percentages of PET-MTV and CT-GTV at 3 months post-RT were 4.0% (95% CI: 0-44.1%) and 57.5% (95% CI: 31.2-95.7%) of pre-RT volumes, respectively. The PET-MTV reduced more than CT-GTV ($P<0.01$). Similarly, the post-RT volume were significantly smaller than that of the during-RT. There was a linear correlation between the changes of PET-MTVs of during-RT and post-RT ($P=0.002$), as well as for the CT-GTV ($P=0.003$).

Conclusion: Metabolic tumor activity and tumor volume reduced significantly at Post-RT. This reduction was correlated with during-RT changes and pre-RT levels. Post-RT PET-MTV reduced more remarkably than post-RT CT-GTV.

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