response (PR) or stable disease (SD)) and local tumor control. Indices of SUVmax in tumors/SUVmean in muscle were calculated for individual patients. Normalized SUV FDG (SUVmax tumor/SUV mean muscle) was plotted against normalized baseline SUV F-MISO1 (SUVmax tumor/SUV mean muscle) and the correlation was calculated. Follow-up included MRI every 3 months.

Results: Patients undergoing definitive RCTx for SCCHN (n=16) were included. Tumor hypoxia was present in >90% of patients at baseline whereas at subsequent examinations hypoxia was sharply diminished in incidence (36% and 27%) and extent. On quantitative analysis the mean SUVmax indices decreased from 1.9 (week 0) to 1.6 (week 2) and 1.3 (week 5). No correlation was found for normalized SUV FDG and the corresponding normalized baseline SUV F-MISO1 (Pearson correlation coefficient 0.32). MRI scans obtained at treatment week 5 showed CR in 8 %, PR in 77 % and SD in 15 % of patients. Kaplan-Meier analysis of local recurrence against time after treatment for a mean follow up of 39 months showed significantly worse local tumor control for tumors hypoxic on F-MISO PET 1 and 2 ($p<0.05$) compared to non-hypoxic-tumors.

Conclusions: Stable reduction of tumor hypoxia was found in the majority of patients. A significant correlation between tumor hypoxia obtained by F-MISO PET (F-MISO 1, 2) and local control was found.

Poster: Clinical track: Lung

PO-0651

Long-term change in pulmonary function after definitive radiotherapy for non-small cell lung cancer

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Purpose/Objective: Radiotherapy (RT) for non-small cell lung cancer (NSCLC) may cause late toxicities, such as heart toxicity, changes in pulmonary function (PF) and lung fibrosis, but late toxicity data are scarce in the literature for this category of patients. The objective of this study was to analyze long term PF changes after definitive RT for patients with NSCLC. PF was measured by FEV_1 and FVC as assessed by spirometry.

Materials and Methods: This is a single institution study of patients receiving definitive RT for NSCLC between 1996 and 2010. A total of 556 consecutive treated patients with 3063 pairs of pulmonary function test (PFTs) were screened for eligibility for inclusion in the analysis of late changes in PF. To be eligible, patients had at least 3 PFTs after baseline. In this study, baseline was defined as 12 months after RT commencement to overcome a possible effect of tumor shrinkage and the acute side effect, radiation induced pneumonitis. PFT within 6 months prior to thoracic progression were excluded. The final study group comprised 106 patients with 1286 pairs of PFTs. For each patient complete dosimetric data, including GTV, PTV, mean lung dose, V_x for total lung volume were available as well as patient specific pretreatment factors such as age, gender, smoking status, performance status, and pretreatment PF. Multivariable regression analyses were performed with patient, treatment, and dose-volume metrics as covariates to investigate their possible impact on long term PF. FEV_1 and FVC were analyzed separately.

Results: The long-term change in PF relative to the 1-year baseline was estimated by linear regression. Relative to the 1-year-FEV_1 most patients experienced a decrease in FEV_1 over time. The change in FEV_1 per year, varied considerably among patients (Fig 1). Treatment year and V_{60} were the only covariates having a significant impact on FEV_1 deterioration. Patients treated early in the period experienced a larger functional decline. Also for FVC a linear relationship with the follow-up time was found, again with large inter-patient variation. An unsuspected finding was that high V_{60} was associated with less decline in FVC, but FVC may be a less reliable parameter for pulmonary damage.

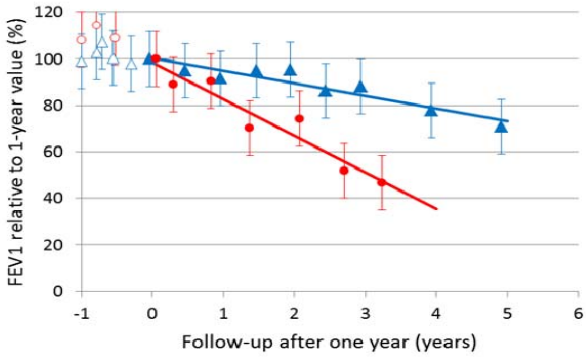

Figure 1. Data on pulmonary function expressed in FEV_1 from 2 patients.The straight lines are the estimated loss, λ in the model. Zero denotes baseline, i.e. 12 months after start of radiotherapy.

Conclusions: Patients experience a decline in FEV_1 after the 12-month value following definitive RT for NSCLC. In a multivariable analysis, deterioration of FEV_1 was significantly associated with V_{60} of the lung (risk factor) and treatment year (risk factor). Early calendar year of treatment was associated with higher risk of deterioration. The yearly decline in FVC was less than in FEV_1. A large V_{60} was, somewhat puzzling, associated with a lower FVC decline in a multivariable analysis.

PO-0652

Stereotactic body radiotherapy for metastatic lung tumors with emphasis on the difference in oligometastatic state

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Purpose/Objective: The state of oligometastases was divided into sync-oligometastases and oligo-recurrence, the